Taxing Human Capital

Michael Simkovic[*]

Table of Contents

Introduction

Economists believe that taxes can alter behavior and that such shifts in behavior, or "distortions," generally reduce economic efficiency and social welfare. For example, taxes on investment income are often believed to reduce the level of savings and investment and cause a shift toward greater present consumption.[1]

  [1] Taxes on investment, like taxes on labor, may also cause a shift away from labor and toward leisure because prospective workers may consider the after-tax rate of return on the portion of their earnings that they intend to invest.

  These are theoretical predictions. Empirical studies of the effect of taxation on savings and investment behavior have produced mixed results. Michael J. Boskin, *Taxation, Saving, and the Rate of Interest*, 86 J. POL. ECON. S3 (1978); Laurence S. Seidman & Kenneth A. Lewis, *The Consumption Tax and the*

Such distortions are of great concern because of a belief that by reducing investment, taxes on investment may reduce the rate of per-capita economic growth, reduce future resources per person, and slow the pace at which the welfare of the typical individual can be improved.[2]

To reduce disincentives to investment, the U.S. Internal Revenue Code provides for: recovery of costs of investment; opportunities for tax deferral; opportunities to smooth taxable income to reduce the effects of progressive taxation on volatile income streams; favorable capital gains and dividends tax rates; opportunities to convert certain kinds of labor income into capital income; and deductions from taxable income for the costs of borrowing.[3] There are also special provisions to encourage certain forms of investment, in particular, retirement savings and owner-occupied housing.

However, there is one form of investment for which the tax code offers relatively little support: investments in formal higher education,[4] a form of human capital which empirical studies suggest increases labor earnings and contributes to economic growth.

Federal tax rates on labor are much higher than tax rates on capital. In addition, higher education expenses generally cannot be capitalized and amortized, and student loan interest deductibility is sharply curtailed. Although limited education tax credits and deductions are available, the rules are complex and the benefits per-student are relatively small.

Economic theory suggests that inconsistent tax treatment of investments that are substitutes for one another distorts

---

Saving Elasticity, 52 NAT'L. TAX J. 67 (1999); *cf.* Robert Hall, *Intertemporal Substitution in Consumption*, 96 J. POL. ECON. 339 (1988); A. Lans Bovenberg, *Tax Policy and National Saving in the United States: A Survey*, 42 NAT'L TAX J. 123, 128 (1989).

[2] N. Gregory Mankiw et al., *Optimal Tax in Theory and Practice*, 23 J. ECON. PERSP., Fall 2009, at 147, 164-65.

[3] These provisions are not universally praised. Critics argue that they contribute to misallocation of capital and erode the tax base. Calvin H. Johnson, *Measure Tax Expenditures by Internal Rate of Return*, 139 TAX NOTES 273 (April 15, 2013). The focus of this discussion is not on the ideal tax system, but on inconstancies within the extant tax system.

[4] For a discussion of higher education tax benefits and their limitations, see *infra* Part IV.F.

investment decisions and drives down investments in the disfavored investment relative to the favored investment, even if the disfavored investment offers a higher pre-tax rate of return.[5] Assuming declining marginal rates of return across investments and elasticity of demand for higher education, differences in the tax treatment of higher education relative to other forms of investment could create an undersupply of educated labor relative to physical or financial capital.

Disadvantageous tax treatment of investments in human capital relative to physical capital may help explain two mysteries of labor economics: persistently high pre-tax rates of return on investment in higher education in the U.S. and slower than expected growth in educational attainment. Labor taxes constitute an increasing share of federal revenue even as labor income constitutes a declining share of national income.

If the extant tax system is indeed steering investment decisions away from human capital, this raises the question of what approach should be taken to effectively counter such distortions and increase investment in higher education to its optimally efficient level.

Options include harmonizing tax treatment of investments in different forms of capital, reducing the differences between the tax rates on labor relative and the tax rates on capital, directly subsidizing education, and offering increased downside protection for investment in education.

The ideal approach or mix of approaches likely depends on factors such as salience, information costs, liquidity constraints and discount rates, and risk aversion. Ultimately, optimal policy depends on prospective students behavioral responses, which can only be verified empirically.

Part I of this article reviews the empirical evidence linking higher education to increased individual earnings and economic growth and considers the rationales provided for treating higher education expenditures differently from other forms of investments; Part II reviews the empirical evidence on whether

---

[5] *See* Louis Kaplow, *Human Capital Under an Ideal Income Tax*, 80 VA. L. REV. 1477, 1513 (1994); Louis Kaplow, *Taxation*, *in* 1 HANDBOOK OF LAW AND ECONOMICS 647, 682-83 (A. Mitchell Polinsky & Steven Shavell eds., 2007); N. Gregory Mankiw et al., *Optimal Tax in Theory and Practice*, 23 J. ECON. PERSP., Fall 2009, at 147, 164-65.

the level of investment in higher education is at, below, or above the optimal level and finds unusually high rates of return consistent with underinvestment; Part III reviews optimal tax theory with a particular emphasis on the problem of distortions; Part IV contrasts the tax treatment of favored forms of investment with the tax treatment of investments in higher education; Part V concludes by considering which policy options may be most effective to offset distortions created by the extant tax system. Although tax harmonization would increase horizontal equity, the most cost-effective policy to increase investment in higher education to its optimal level depends on empirical questions of elasticities and rates of return on investment. Promising non-tax policy options include expanding low-cost education loans and insurance against adverse outcomes.

I. Higher Education as an Investment

In an economy in which capital is allocated efficiently, the risk-adjusted marginal rates of return on all potential investments should be equal. If the risk-adjusted marginal rate of return on one form of investment is above average, the investment should attract more capital, and this influx of capital will then drive down returns. If risk adjusted marginal returns are lower than average, investors should seek higher returns elsewhere, and capital flight should eventually increase returns to the capital that remains. An efficient allocation of capital will maximize economic growth for a given level of investment, promoting social welfare.

In the absence of taxation, efficient capital markets will equalize *pre-tax* risk-adjusted marginal rates of return, which reflects an efficient allocation of capital in the absence of externalities. In the presence of taxation, capital markets will equalize *after-tax* risk-adjusted marginal rates of return.[6] This allocation of capital will be less efficient if tax rates on different forms of investment are different and there are no offsetting externalities or inefficiencies.

---

[6] N. Gregory Mankiw et al., *Optimal Tax in Theory and Practice*, 23 J. ECON. PERSP., Fall 2009, at 147, 167; Kaplow, *Taxation, supra* note 5 at 682-83.

This article proceeds under the assumption that higher education is an investment that typically increases earnings and employment and therefore economically resembles business expenditures such as advertising, research, development of intellectual property, or purchases of equipment. Like these other business expenditures, higher education can reasonably be expected to provide an economic return that exceeds the cost of the investment (i.e., to generate a profit). However, unlike these other forms of investment, higher education expenditures are taxed largely as if they were a form of personal consumption rather than investment.

The association between higher education and higher earnings and employment is long established,[7] but association is not enough for higher education to be considered an investment. For purposes of tax policy, the important question is whether higher education *causes* increases in earnings.

Over the last twenty years, new techniques for inferring causation from observational data, even when it is impossible to run a randomized controlled experiment, have revolutionized empirical social science.[8] Many of these techniques were pioneered by labor economists specifically to estimate causal effects on earnings and employment.[9]

Based on numerous independent peer reviewed studies of identical twins,[10] instrumental variable analyses,[11] fixed and

---

[7] JACOB A. MINCER, SCHOOLING, EXPERIENCE, AND EARNINGS (1974); GARY S. BECKER, HUMAN CAPITAL: A THEORETICAL AND EMPIRICAL ANALYSIS, WITH SPECIAL REFERENCE TO EDUCATION (3d ed. 1993).

[8] Lee Epstein & Gary King, *The Rules of Inference*, 69 U. CHI. L. REV. 1 (2002); STEPHEN L. MORGAN & CHRISTOPHER WINSHIP, COUNTERFACTUALS AND CAUSAL INFERENCE: METHODS AND PRINCIPLES FOR SOCIAL RESEARCH (2007); JOSHUA D. ANGRIST & JÖRN-STEFFEN PISCHKE, MOSTLY HARMLESS ECONOMETRICS: AN EMPIRICIST'S COMPANION (2009); RICHARD J. MURNANE & JOHN B. WILLETT, METHODS MATTER: IMPROVING CAUSAL INFERENCE IN EDUCATIONAL AND SOCIAL SCIENCE RESEARCH (2010); GUIDO W. IMBENS & DONALD B. RUBIN, CAUSAL INFERENCE IN STATISTICS, SOCIAL, AND BIOMEDICAL SCIENCES: AN INTRODUCTION (forthcoming Dec. 2014).

[9] ANGRIST AND PISCHKE, *supra* note 8; 4 HANDBOOK OF LABOR ECONOMICS A 1-772 (ORLEY ASHENFELTER & DAVID CARD EDS., 2010); MURNANE, *supra* note 8.

[10] *See, e.g.*, Orley Ashenfelter & Alan Krueger, *Estimates of the Economic Return to Schooling from a New Sample of Twins*, 84 AM. ECON. REV. 1157, 1157 (1994) (estimating from a sample of identical twins that an additional year of schooling increases wages by 12% to 16%, and reporting that this is probably

random effects analysis,[12] regression discontinuity designs,[13] propensity scores or covariate balancing and matching with OLS regression,[14] and a wide range of other sophisticated statistical techniques, labor economists can now say with a high degree of confidence that education—including college and advanced degrees—*causes* a large increase in earnings[15] across time, across

not due to differences in innate ability); Dorothe Bonjour et al., *Returns to Education: Evidence from U.K. Twins*, 93 AM. ECON. REV. 1799, 1799–1812 (2003); Colm Harmon & Ian Walker, *Estimates of the Economic Return to Schooling for the United Kingdom,* 85 AM. ECON. REV. 1278, 1278–86 (1995); Paul Miller, Charles Mulvey & Nick Martin, *What Do Twins Studies Reveal About the Economic Returns to Education? A Comparison of Australian and U.S. Findings*, 85 AM. ECON. REV. 586, 586–99 (1995); Oddbjorn Raaum & Tom Erik Aabo, *The Effect of Schooling on Earnings: Evidence on the Role of Family Background From a Large Sample of Norwegian Twins*, 26 NORDIC J. POL. ECON. 96 (2000); Cecelia Elena Rouse, *Further Estimates of the Economic Returns to Schooling from a New Sample of Twins,* 18 ECON. EDUC. REV. 149, 149–157 (1999); *cf.* David Neumark, *Biases in Twin Estimates of Returns to Schooling*, 18 ECON. EDUC. REV. 143 (1999) (discussing how within-twin estimates may result in an upward bias).

[11] For a brief review, *see* Simkovic and McIntyre, *supra* note 193. *See also* J. D. Angrist & A. B. Keueger, *Does Compulsory School Attendance Affect Schooling and Earnings?*, 106 Q. J. ECON. 979 (1991) (exploiting minimum drop out age and instrumenting by birth quarter); Douglas Staiger & James H. Stock, *Instrumental Variables Regression with Weak Instruments*, 65 ECONOMETRICA 557 (1997) (same); Thomas J. Kane & Cecilia Elena Rouse, *Labor-Market Returns to Two- and Four-Year College*, 85 AM. ECON. REV. 600, 606 (1995) (instrumenting by state-specific tuition rates and proximity to higher education institutions when growing up); Colm Harmon & Ian Walker, *Estimates of the Economic Return to Schooling for the United Kingdom*, 85 AM. ECON. REV. 1278 (1995) (instrumenting by birth cohorts and variation in minimum school leaving ages); Joshua D. Angrist & Alan B. Krueger, *Split-Sample Instrumental Variables Estimates of the Return to Schooling*, 13 J. BUS. & ECON. STAT. 225 (1995).

[12] Peter Arcidiacono, Jane Cooley & Andrew Hussey, *The Economic Returns to an MBA*, 49 INT'L ECON. REV. 873 (2008).

[13] Lars Kirkebøen, Edwin Leuven & Magne Mogstad, *Field of Study, Earnings, and Self-Selection* (2014); Justine S. Hastings, Christopher A. Neilson & Seth D. Zimmerman, *Are Some Degrees Worth More than Others? Evidence from college admission cutoffs in Chile* (Nat'l Bureau of Econ. Research, Working Paper No. 19241, 2013).

[14] Simkovic and McIntyre, *supra* note 193.

[15] *See* David Card, *The Causal Effect of Education on Earnings*, *in* 3 HANDBOOK OF LABOR ECONOMICS 1801 (Orley C. Ashenfelter & David Card eds., 3d ed. 1999) (reviewing the empirical literature).

countries,[16] across ability levels, and across race and ethnic groups.[17]

A. *Value creation versus value redistribution*

Moreover, investment in education does not simply shift incomes from the less educated to the more educated members of the work force, redistributing wealth without improving social welfare. Rather, investments in education increase the rate of economic growth,[18] likely by improving productivity[19] and accelerating the pace of innovation.[20] Education may also help

---

[16] ORG. FOR ECON. CO-OPERATION AND DEV. (OECD), EDUCATION AT A GLANCE 2013: OECD Indicators (2013), *available at* http://dx.doi.org/10.1787/eag-2013-en (2013); Eric A. Hanushek & Ludger Woessmann, *Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation*, 17 J. ECON. GROWTH 267 (2012).

[17] Lisa Barrow & Cecilia Rouse, *The Economic Value of Education by Race and Ethnicity*, 2006 ECON. PERSP. 14, 23 (analyzing data and concluding that returns on education do not differ by race); James J. Heckman, *Lessons from the Bell Curve*, 103 J. POL. ECON. 1091, 1091–1120 (1995); Orley Ashenfelter & Cecilia Rouse, *Schooling, Intelligence, and Income in America: Cracks in the Bell Curve* (Nat'l Bureau of Econ. Research, Working Paper No. 6902, 1999), *available at* http://www.nber.org/papers/w6902 (reviewing the econometric literature and concluding that the economic returns on schooling do not differ significantly by family background or by measures of ability of the student).

[18] N. Gregory Mankiw, David Romer & David N. Weil, *A Contribution to the Empirics of Economic Growth*, 107 Q. J. ECON. 407 (1992); Paul Romer, *Endogenous Technological Change*, 98 J. POL. ECON. S71, S71 (1990) ("[T]he stock of human capital determines the rate of growth [and] too little human capital is devoted to research in equilibrium."); Philippe Aghion & Peter Howitt, *A Model of Growth through Creative Destruction*, 60 ECONOMETRICA 323, 324 (1992); Richard Blundell et al., *Human Capital Investment: The Returns from Education and Training to the Individual, the Firm and the Economy*, 20 FISC. STUD. 1, 16–19 (1999); Alan B. Krueger & Mikael Lindahl, *Education for Growth: Why and For Whom?*, 39 J. ECON. LIT. 1101, 1102, 1108, 1130 (2001)

[19] David A. Wise, *Academic Achievement and Job Performance*, 65 AM. ECON. REV. 350, 364 (1975); Becker, *supra* note 7; Hanushek and Woessmann, *supra* note 16 (linking investments in education to cognitive skill development and cognitive skill development to economic growth).

[20] Paul Romer, *Endogenous Technological Change*, 98 J. POL. ECON. S71, S71 (1990); Philippe Aghion & Peter Howitt, *A Model of Growth through Creative Destruction*, 60 ECONOMETRICA 323, 324 (1992); Philippe Aghion et al., *The Causal Impact of Education on Economic Growth: Evidence from US*, (2009) (instrumenting state-level investment in higher education by appointments to

signal ability levels or motivation, thereby matching employees with employers, much as sales and marketing expenditures create value by matching customers with products and services.[21]

Although some studies have failed to find a strong link between educational attainment and economic growth, subsequent research has suggested that this may be due to problems with data quality and difficulties measuring the quantity and quality of higher education and human capital.[22]

More recent studies with higher quality data generally find a causal link between education and growth.[23] The level of education that is most relevant to growth seems to depend on the current level of development and technology. Primary and secondary education appear to be more important for developing economies that are further from the technological frontier, while investment in post-secondary education appears to be a more important driver of growth for high income advanced economies such as the United States and Western Europe.[24]

Returns to higher education are typically high and positive. However, like any investment, there is range of possible individual outcomes, and some uncertainty and risk.

---

federal appropriations committees and finding evidence that increased investment in 4-year educational institutions increases the rate of economic growth, likely by increasing the pace of innovation).

[21] Joseph Stiglitz, *The Theory of "Screening," Education, and the Distribution of Income,* 65 AM. ECON. REV. 283 (1975); Paul J. Taubman & Terence J. Wales, *Higher Education, Mental Ability, and Screening*, 81 J. POL. ECON. 28, 43 (1973).

[22] Alan B. Krueger & Mikael Lindahl, *Education for Growth: Why and For Whom?*, 39 J. ECON. LIT. 1101, 1102, 1108, 1130 (2001); Angel de la Fuente & Rafael Domenech, *Human Capital in Growth Regressions: How Much Difference does Data Quality Make?*, 4 J. EUR. ECON. ASS'N. 1, 1 (2006); Hanushek and Woessmann, *supra* note 16.

[23] *cf.* Mark Bils & Peter J. Klenow, *Does Schooling Cause Growth?*, 90 AM. ECON. REV. 1160 (2000) (finding that education may cause only about one third of the economic growth with which it is correlated).

[24] Aghion et al., *supra* note 18; James B. Ang, Jakob B. Madsen & Md. Rabiul Islam, *The effects of human capital composition on technological convergence*, 33 J. MACROECON. 465 (2011).

B. *Consumption versus investment*

One important objection to viewing higher education as an investment is that higher expenditures are at least in part a form of consumption rather than a form of investment.[25] According to one version of this objection, students chase expensive degrees of little economic value to enjoy the consumption benefits of social prestige. According to another version, students select into low earning potential fields rather than higher earnings fields because they enjoy studying the lower earning fields and find the work associated with such degrees more rewarding.[26] Still another version focuses on amenities such as aesthetically pleasing campuses and sporting and social events for students.

If attending a higher-cost institution were a form of consumption rather than investment, one would expect high cost institutions to boost earnings by no more than low cost institutions. However, more expensive institutions with more resources and higher spending on instructions generally boost earnings by more than lower cost institutions and may also have higher completion rates.[27] Degrees are not simply commodities and institutions do not simply sort students by parental socioeconomic status or innate intellectual ability levels. There are differences in quality and value-added across institutions, and higher quality correlates with higher costs.[28]

Some economists have tried to measure the consumption value of education by comparing the earnings of high academic achieving students in low earnings-potential majors to the earnings those students could potentially have achieved with a

---

[25] Dodge, *supra* note 149 at 939, 953–961.

[26] *Id.*

[27] Stacy Berg Dale & Alan B. Krueger, *Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables*, 117 Q. J. ECON. 1491, 1524 (2002) (("We do find that students who attend colleges with higher average tuition costs tend to earn higher income years later, after adjusting for student characteristics. . . . [T]uition matters because higher cost schools devote more resources to student instruction.").

[28] *See* Michael Simkovic & Frank McIntyre, *Populist Outrage, Reckless Empirics: A Review of Failing Law Schools,* 108 NW. U. L. REV. ONLINE 176, 193-97 (2014) (reviewing the empirical literature on links between costs and quality).

higher earnings major.[29]   Earnings and employment outcomes vary across fields of study.[30] These differences appear to be partly caused by differences in the students who select into certain fields, and partly caused by differences in the causal effects of the fields of study themselves.[31]

What these analyses often overlook, however, is that students tend to underestimate earnings differences across majors when choosing a major.[32] Measuring the actual differences in earnings may overestimate the consumption value of lower-earnings degrees.

Another problem with estimating consumption value based on earnings differences across majors among those who have completed college is that completion rates tend to be lower for more challenging majors associated with higher earnings.[33] Many students initially intend to major in higher earnings fields, but switch after receiving low grades.[34]

---

[29] *See* Annette Alstadsæter, *Measuring the Consumption Value of Higher Education*, 57 CESIFO ECON. STUD. 458, 468 (2010).

[30] Peter Arcidiacono, *Ability Sorting and the Returns to College Major*, 121 J. ECONOMETRICS 343 (2004); Simkovic, *supra* note 189.

[31] Lars Kirkebøen, Edwin Leuven & Magne Mogstad, *Field of Study, Earnings, and Self-Selection* (2014) (exploiting qausi-random assignment of college students in Norway to institutions and majors based on ranked preferences and arbitrary and shifting cut-offs); Justine S. Hastings, Christopher A. Neilson & Seth D. Zimmerman, *Are Some Degrees Worth More than Others? Evidence from college admission cutoffs in Chile* (Nat'l Bureau of Econ. Research, Working Paper No. 19241, 2013).

[32] Julian R. Betts, *What Do Students Know About Wages? Evidence from a Survey of Undergraduates*, 31 J. HUM. RESOURCES 27, 49 (1996); Peter Arcidiacono, V. Joseph Hotz & Songman Kang, *Modeling College Major Choices Using Elicited Measures of Expectations and Counterfactuals*, 166 J. ECONOMETRICS 3 (2012).

[33] *See* Sylvia Hurtado et al., *Degrees of Success Bachelor's Degree Completion Rates Among Initial STEM Majors*, HIGHER ED. RES. INST.: RES. BRIEF, at 3 fig.3 (2010), http://www.heri.ucla.edu/nih/ downloads/2010%20-%20Hurtado,%20Eagan,%20Chang%20-%20Degrees%20of%20Success.pdf ("[S]tudents who initially enter undergraduate STEM programs have substantially lower degree completion rates than their same-race peers who enter other academic disciplines.").

[34] Ben Ost, *The Role of Peers and Grades in Determining Major Persistence in the Sciences,* 29 ECON. EDUC. REV. 923, 923–34 (2010); Kevin Rask, *Attrition in STEM Fields at a Liberal Arts College: The Importance of Grades and Pre-collegiate Preferences*, 29 ECON. EDUC. REV. 892, 894 (2010).

In other words, the lower earnings potential of certain majors may be offset in part by lower risks of non-completion, or a higher likelihood of completion in a shorter period of time. Faster completion means lower opportunity costs of foregone earnings. Taking non-completion risk into account increases expected returns to many low-earnings majors and reduces expected returns to many high-earnings majors. Non-completion risk is substantial at the undergraduate level. For the cohort who started college in 2005, only 38.6 percent of students completed college within 4 years.[35] Within six years, the percentage of completers increased to 58.8 percent.[36] Some fields of higher education probably more closely resemble consumption than others, but most will at least generate returns sufficient to reasonably be considered an investment relative to a lower level of education.

High marginal rates of return to higher education[37] may suggest that education has *negative* consumption value (disutility) for many actual and potential students.[38] Several econometric studies suggest that "psychic costs" of schooling may explain why many individuals who would benefit financially from additional education do not pursue it.[39] Taste for education is likely heterogeneous throughout the population, with those who enjoy education more likely to pursue it.

Indeed, it is difficult to explain how such high rates of return to education and relatively low enrollment, completion, and

---

[35] DIGEST OF EDUCATION STATISTICS tbl.376 (2012), *available at* http://nces.ed.gov/programs/digest/d12/tables/dt12_376.asp.

[36] If data more than six years out were available, completion rates would likely be higher still, but non-completion rates could remain substantial.

[37] Many of the instrumental variable studies cited above emphasize the marginal student and find higher rates of return than suggested by OLS. This may be because OLS targets the average rather than the marginal student.

[38] Mantz Yorke, *The Quality of the Student Experience: What Can Institutions Learn from Data Relating to Non-Completion?*, 6 QUAL. HIGH. EDUC. 61 (2000).

[39] James J. Heckman, Jora Stixrud & Sergio Urzua, *The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior*, 24 J. LAB. ECON. 411, 413 (2006); James J. Heckman, Lance J. Lochner & Petra E. Todd, *Chapter 7 Earnings Functions, Rates of Return and Treatment Effects: The Mincer Equation and Beyond*, *in* 1 HANDBOOK OF THE ECONOMICS OF EDUCATION 307, 434–37 (2006).

educational attainment rates could persist in equilibrium without some non-financial "psychic" costs of education, liquidity constraints, high levels of risk aversion, or inaccurate expectations about the value of education.[40]

A mixture of consumption and investment motives should not disqualify an activity from being viewed primarily through the framework of business and investment activity as long as the rate of return is high. Many other activities that are enjoyable (at least for some)—for example, selecting securities or real property in which to invest, or running a business[41]—are nevertheless treated as investment activity for purposes of the income tax.[42] Indeed, as discussed below, many of these activities appear less investment-like than pursuing higher education, because the rates of return to these activities are lower than the rates of return to higher education.

If an activity is primarily a form of consumption, it should attract a large number of individuals with non-pecuniary motivations, driving down the rate of return. A high rate of return suggests that an activity has at least a substantial investment component.

II. *Evidence of Underinvestment in Higher Education*

The question of whether there is underinvestment or overinvestment in higher education turns on the total marginal private and public rate of return to higher education compared to the return to other investments.[43] If the risk adjusted marginal return on education is higher than the return to alternatives, this

---

[40] Heckman, Lochner, and Todd, *supra* note 39 at 436–37.

[41] Entrepreneurship has an extremely high failure rate, and many small business owners could likely earn more working for a larger company than running their own. [insert citation]

[42] Several tax scholars have theorized that simply holding financial wealth without spending it may confer consumption benefits—security, power, and prestige—but these consumption benefits are nevertheless not taxed. Lawrence Zelenak, *The Reification of Metaphor: Income Taxes, Consumption Taxes and Human Capital*, 51 TAX LAW REV. 1, 26 (1995); Jeff Strnad, *Periodicity and Accretion Taxation: Norms and Implementation*, 99 YALE L.J. 1817,1833-46 (1990).

[43] BECKER, *supra* note 7 at 205–14.

suggests underinvestment in education. If the return on education is lower than other investments, this suggests overinvestment in education. The analysis that follows suggest that there is both underinvestment in higher education and that the tax system contributes to this underinvestment by taxing investments in higher education more heavily than other forms of investment.

Measuring returns can be challenging. Most studies focus on the pre-tax education earnings premium (the increase in earnings attributable to higher levels of education) as if it were the full rate of return because estimating externalities caused by education (and alternative investments) is difficult. If positive externalities or non-pecuniary benefits of education exceeded those of alternative investments, this would suggest underinvestment in education even if returns to education (measured based on earnings premiums) were no higher than returns to other activities.[44]

Estimates by Becker in the mid 1990s suggested underinvestment in education.[45] More recent estimates also suggest very high rates of return on higher education relative to other investments, and that the rate of return has increased since the 1970s even as educational attainment and tuition have increased.[46] Tables 1 and 2 illustrate growth in the annual higher education earnings premium for men and women since the 1980s.[47] Estimates by the OECD suggest public and private internal rates of return to a college degree in the low double digits in the United States.[48] The OECD found a higher public

---

[44] Several studies suggest that there may be positive externalities of education, such as reduced crime or improved martial stability or health, but the evidence for these claims is less robust than the evidence that education increases earnings and employment

[45] BECKER, *supra* note 7 at 214.

[46] Heckman, Lochner, and Todd, *supra* note 39 at 330–46, 433–34, 442–46.

[47] Raw differences in the tables likely exceed the causal effect of education on earnings, but help illustrate the growth of the education earnings premium. Although tuition costs have also grown, rates of return have likely increased.

[48] OECD, EDUCATION AT A GLANCE 2013 144–47 (2013), http://www.oecd-ilibrary.org/education/education-at-a-glance-2013_eag-2013-en (last visited Jul 23, 2014).

rate of return than private rate of return, which suggests that taxes on higher education exceed subsidies.[49]

The real rate of return to a law degree was recently estimated to be around 10 to 20 percent before taxes.[50] This is even higher than the return to a college degree, suggesting that the rate of return may *increase* at higher levels of education, at least for some programs.

To put these rates of return into context, it may be helpful to consider the equity risk premium. The equity risk premium is the return to global equity above a risk free-rate. This risk free rate baseline currently close to zero in real terms, and is generally modestly higher than inflation. Recent studies suggest that the real global and U.S. equity risk premia are only around 3 to 4 percent.[51] In other words, the real pre-tax return to a bachelor's degree appears to be around two to three times as high as the return to equity, and the return to professional degrees such as law degrees is likely higher still.

Pre-tax returns on bonds and real estate are generally lower than returns to equity.[52] Real returns to housing over the long-term average only about one percent per year.[53] Alternative investments, such as hedge funds and private equity, typically underperform the stock market net of fees by a wide margin.[54]

---

[49] Id. at 134, 144-47.

[50] Simkovic and McIntyre, *infra* note 193.

[51] Eugene F. Fama & Kenneth R. French, *The Equity Premium,* 57 J. FIN. 637 (2002) (arguing that equity premia should be estimated based on dividends and earnings rather than observed returns); Ravi Jagannathan, Ellen R. McGrattan & Anna Scherbina, *The Declining U.S. Equity Premium,* 24 FED. RES. BANK OF MINNEAPOLIS Q. REV. 3 (2000) (estimating that equity premiums declined from 7 percent in 1926 to 1970 to 0 from 1982 to 1999); Elroy Dimson, Paul Marsh & Mike Staunton, *The Worldwide Equity Premium: A Smaller Puzzle, in* HANDBOOK OF THE EQUITY RISK PREMIUM 467 (Rajnish Mehra ed., 2008) (presenting long term worldwide historical data suggesting that equity premiums are 3 to 3.5 percent); John R. Graham & Campbell R. Harvey, *The Equity Risk Premium in 2014* (2014) (estimating the 10 year equity risk premium as 3.5 to 4 percent based on surveys of U.S. Chief Financial Officers).

[52] JEREMY J. SIEGEL, STOCKS FOR THE LONG RUN: THE DEFINITIVE GUIDE TO FINANCIAL MARKET RETURNS & LONG TERM INVESTMENT STRATEGIES (4th ed. 2007).

[53] *See infra* notes 141 to 143 and accompanying text.

[54] Ludovic Phalippou & Oliver Gottschalg, *The Performance of Private Equity Funds*, 22 REV. FIN. STUD. 1747 (2009) (finding that private equity funds

These are all average returns rather than marginal returns, and they are gross rather than risk-adjusted, but at least with respect to higher education, the marginal returns appear to be not too much lower than the average rate of return.[55]

Limited liquidity of investments in higher education[56] likely contributes to higher rates of return, but it seems unlikely that illiquidity alone can fully explain the unusually and persistently high returns to education.[57] Nor do idiosyncratic risks of investment in higher education appear to be sufficiently large to explain the high returns to education, unless one assumes extremely high levels of risk aversion and overlooks evidence that higher levels of education *reduce* many cyclical risks to income.[58] (Assuming liquidity and risk contribute to the higher education

---

underperform the S&P 500 by 3 percent net of fees and by 6 percent after adjusting for risk); Carl Ackermann, Richard McEnally & David Ravenscraft, *The Performance of Hedge Funds: Risk, Return, and Incentives*, 54 J. FIN. 833 (1999) (finding that hedge funds underperform stock indexes and have more volatile performance).

[55] *See* Card, *supra* note 15 (suggesting that IV estimates of returns higher than OLS estimates may suggest higher returns for the marginal student than for the average student).

[56] Educated workers can rent their labor or borrowed against a portion of their future incomes, but cannot sell their degrees or convert a lifetime of future earnings into a lump sum.

[57] Illiquidity can contribute to higher returns because investors typically prefer greater liquidity. Therefore, illiquid asset prices are depressed. Researchers have attempted to estimate illiquidity premia by comparing investments that are close to identical except with respect to liquidity, but measures of liquidity may correlate with otherwise unobservable differences in risk. Pure illiquidity premia appear to be lower than the excess returns to higher education. To the extent illiquidity explains returns to higher education, one would expect returns to education to fall when liquidity is ample. Yakov Amihud, *Illiquidity and stock returns: cross-section and time-series effects*, 5 J. FIN. MARK. 31–56 (2002); Howard W. Chan & Robert W. Faff, *Asset Pricing and the Illiquidity Premium*, 40 FIN. REV. 429–458 (2005); Viral V. Acharya & Lasse Heje Pedersen, *Asset pricing with liquidity risk*, 77 J. FIN. ECON. 375–410 (2005); Elroy Dimson & Bernd Hanke, *The Expected Illiquidity Premium: Evidence from Equity Index-Linked Bonds*, 8 REV. FIN. 19–47 (2004); George O. Aragon, *Share restrictions and asset pricing: Evidence from the hedge fund industry*, 83 J. FIN. ECON. 33–58 (2007); Gerald R. Jensen & Theodore Moorman, *Inter-temporal variation in the illiquidity premium*, 98 J. FIN. ECON. 338–358 (2010).

[58] Bas Jacobs, *Real options and human capital investment*, 14 LABOUR ECON. 913–925 (2007).

earnings premium, disadvantageous tax treatment would still likely also explain a portion of the premium).[59] In other words, the relatively high *pre-tax* returns to higher education suggest underinvestment in higher education. [60]

Some may wonder how it is possible to simultaneously have underinvestment in education and also have highly educated individuals who are unemployed.

Some unemployment is necessary in a market economy to facilitate matching of employers and employees.[61] Keynesian economists speak of a "natural rate of unemployment" and more mainstream macroeconomists discuss tradeoffs between unemployment and inflation, accepting that neither unemployment nor inflation can be reduced to zero. Just as equipment or machinery generally cannot be utilized at full capacity 100 percent of the time, it would be rare to find an individual who will go through his or her entire career without a period of unemployment.

Estimates of higher education earnings premiums can—and often do—incorporate periods of unemployment.[62] The likelihood of unemployment, and the length of unemployment are typically lower for those with higher levels of education than for those with lower levels of education, especially after controlling for age, experience, and other demographic characteristics.[63] Younger

---

[59] *Id.*

[60] CLAUDIA GOLDIN & LAWRENCE F. KATZ, THE RACE BETWEEN EDUCATION AND TECHNOLOGY (2010).

[61] Edmund S. Phelps, *Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time*, 34 ECONOMICA 254 (1967); Thomas J. Sargent, David Fand & Stephen Goldfeld, *Rational Expectations, the Real Rate of Interest, and the Natural Rate of Unemployment*, 1973 BROOK. PAP. ECON. ACT. 429 (1973); Chinhui Juhn et al., *Why has the Natural Rate of Unemployment Increased over Time?*, 1991 BROOK. PAP. ECON. ACT. 75 (1991); Edmund Phelps*, The Origins and Further Development of the Natural Rate of Unemployment*, *in* THE NATURAL RATE OF UNEMPLOYMENT: REFLECTIONS ON 25 YEARS OF THE HYPOTHESIS 15 (ROD CROSS, ed., 1995); Mary C. Daly et al., *A Search and Matching Approach to Labor Markets: Did the Natural Rate of Unemployment Rise?*, 26 J. ECON. PERSP., Summer 2012, at 3.

[62] Simkovic and McIntyre, *supra* note 193.

[63] *Id*; W. Craig Ridell & Xueda Song, *The Impact of Education on Unemployment Incidence and Re-Employment Success: Evidence from the U.S. Labor Market*, 18 LABOUR ECON. 453, 462 (2011); OECD, *supra* note 48 at 76–98.11/14/14 3:17 PM

workers typically have higher unemployment rates than mid-career workers, but among the younger workers, those with higher levels of education are less likely to be employed. This also holds true for experienced workers, and continues to hold for young graduates during the recent recession.[64]

A related question is how there can be underinvestment in education when some highly educated individuals are "underemployed"—that is, working in jobs that are typically occupied by individuals with a lower level of education than themselves and do not officially require their level of education.

Workers who appear to be "underemployed" or "overeducated" often need higher levels of education to obtain the same outcomes as some less educated workers, because the "overeducated" workers generally may have lower innate ability levels or less helpful social connections, and additional education helps them compensate for these deficiencies.[65]

After properly controlling for differences in earning potential prior to higher education, those with higher levels of education are more likely to be employed full time, and they earn more per hour of work, even including the underemployed.

---

[64] Simkovic, *supra* note 189; Abel and Deitz, *supra* note 188.

[65] Thomas K. Bauer, *Educational Mismatch and Wages: A Panel Analysis*, 21 ECON. EDUC. REV. 221 (2002) ("Controlling for unobserved heterogeneity might be important if the probability of educational mismatch is correlated with innate ability. . . The estimated effects change dramatically when one controls for unobserved heterogeneity using panel estimation techniques. The earnings differences between inadequately educated workers and equally educated workers who work in occupations for which they are adequately educated becomes at least smaller, and in most cases disappears totally."); Peter Arcidiacono, Jane Cooley & Andrew Hussey, *The Economic Returns to an MBA,* 49 INT'L ECON. REV. 873 (2008) ("additional schooling could compensate for low workplace skills [or fewer] job contacts—something those who do not choose to obtain an MBA may already have. … Those who do not obtain an MBA are actually stronger in areas not generally measured by standard survey data. Controlling for these factors explains much of the difference between the fixed effects and OLS estimates, thus providing evidence of negative selection into business school"); Yuping Tsai, *Returns to Overeducation: A Longitudinal Analysis of the U.S. Labor Market,* 29 ECON. EDUC. REV. 606 (2010) (finding evidence from long term data that "overeducated status does not cause lower earnings. Instead, the significant wage differential found in previous studies is simply a result of ignoring the non-random assignment of workers to jobs.").

Labor economists have long rejected efforts to determine whether there is a "shortage" or "surplus" of education by reference to job openings or projections for specific types of jobs, instead favoring earnings premiums as the better measure.[66] Jobs opening projections are notoriously inaccurate, and the benefits of education extend across multiple occupations and industries.[67] Within every occupational category, those with higher levels of education typically earn more than those with less, including those who are underemployed.[68]

Another question is why, if distortions within the United States lead to underinvestment in higher education and unusually high rates of return to education, an influx of educated immigrant labor from other countries without such distortions does not correct this imbalance. There are two likely explanations. First, similar distortions likely exist in other countries, which are also taxing labor at higher rates than capital and which are also experiencing increased demand for highly

---

[66] *See* Michael W. Horrigan, BUREAU OF LABOR STATISTICS, U.S. DEPARTMENT OF LABOR, *Employment Projections to 2012- Concepts and Context*, MONTHLY LAB. REV. 3, 15-16 (Feb. 2004)("The general problem with [projections for] specific occupations over the next 10 years is the difficulty of projecting . . . dynamic labor market responses . . . [Education earnings premiums] speak to a general preference on the part of employers to hire those with skills associated with higher levels of education"); Richard B. Freeman, *Is A Great Labor Shortage Coming? Replacement Demand in the Global Economy* 1, 3 (Nat'l Bureau of Econ. Research, Working Paper No. 12541, 2006)("[BLS] Projections of future demands for skills lack the reliability to guide policies on skill development. . . .").

[67] David Neumark, Hans Johnson & Marisol Cuellar Mejia, *Future Skill Shortages in the U.S. Economy?* 32 ECON. EDUC. REV. 151 (2013)(finding "substantial economic returns to higher educational degrees in occupations where, according to the BLS skill requirements, those degrees were not required."); *see also* Simkovic and McIntyre, *supra* note 193 (finding a substantial law degree earnings premium including 40 percent of law degree holders who were not practicing law).

[68] David Neumark, Hans Johnson & Marisol Cuellar Mejia, *Future Skill Shortages in the U.S. Economy?* 32 ECON. EDUC. REV. 151, 156 (2013) ("For nearly every occupational grouping, wage returns are higher for more highly-educated workers even if the BLS says such high levels of education are not necessary. For example . . . for management occupations, the estimated coefficients for [professional degrees are] above the estimated coefficient for a Bachelor's degree, which is the BLS required level.").

educated skilled labor. Second immigration laws and other frictions limit the free flow of educated labor.

The appropriate method to measure the value of education is through the earnings premium, and the appropriate method to determine whether there is over investment or underinvestment in education is to compare the returns to education to other investments. These methods suggests that there is underinvestment in education, and that it has likely become more severe over the last 30 years as demand for educated labor (relative to uneducated labor) has increased.

Although educational attainment has increased in the United States and in the rest of the developed world, the demand for educated labor has increased by more than the supply. In 2013, 31.7 percent of the civilian non-institutional U.S. population[69] age 25 and over had a bachelor's degree or above.[70] This was by far the highest level recorded since the start of the Current Population Survey in 1940.[71] Among those aged 25 to 34, the proportion with a bachelor's or above is only slightly higher—34.7 percent.[72] In 2013, just 8.4 percent of Americans above the age of 25 had a master's degree, only 1.5 percent had a professional degree, and only 1.7 percent had a PhD.

Although there has been growth in the proportion of bachelor's, master's, and PhD holders, the professional degree holders as a share of the population have been essentially flat for decades, in spite of high returns.

III. *Optimal Tax Theory Seeks to Minimize Distortions*

---

[69] The *civilian noninstitutional population* consists of persons 16 years of age and older residing in the 50 States and the District of Columbia who are not inmates of institutions (for example, penal and mental facilities and homes for the aged) and who are not on active duty in the Armed Forces. Most Census surveys are designed to represent this group.

[70] U.S. CENSUS BUREAU, U.S. DEPT. OF COMMERCE, EDUCATIONAL ATTAINMENT: CPS HISTORICAL TIME SERIES TABLES tbl.A–1, *available at* http://www.census.gov/hhes/socdemo/education/data/cps/historical/ (last visited Jul 16, 2014).

[71] *Id.*

[72] Miriam King, et al., Integrated Public Use Microdata Series, Current Population Survey: Version 3.0. [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

Optimal tax theory has influenced the U.S. Income Tax Code and contributed to a system that is generally investment-friendly. However, recent optimal tax studies suggest that the current tax system may be discouraging investment in higher education.

Optimal tax theory focuses on the challenges of designing a tax system that can raise a particular amount of revenue to fund government services while producing a minimum amount of economic distortions and deadweight loss.[73] (This approach is not without its critics).[74]

Optimal taxation models assume that taxpayers prefer not to be taxed. Paying taxes subtracts from the utility a taxpayer could have enjoyed from consuming untaxed resources and paying taxes is not itself a source of utility. Although some individuals or firms may prefer a larger public sector, those individuals or firms will still seek to reduce their own tax burden.

Because of their preference not to be taxed, at least some taxpayers respond to taxation by substituting away from activities that are more heavily taxed and toward activities that are lightly taxed or untaxed.[75] These behavioral responses are called distortions.

Distortions are considered undesirable because individuals and firms are assumed to make optimally efficient decisions in the absence of taxes. Individuals seek to maximize their own utility by trading off labor and leisure, present consumption versus future consumption, particular forms of consumption versus alternate forms of consumption, and a range of potential investments with different liquidity, risk levels, and expected rates of return. This process will maximize social welfare,

---

[73] *See* Kaplow, *Taxation, supra* note 5, at 651-52; LOUIS KAPLOW, THE THEORY OF TAXATION AND PUBLIC ECONOMICS 317 (2008); David Gamage, *A Framework for Analyzing the Optimal Choice of Tax Instruments,* 68 Tax L. Rev. (forthcoming 2014).

[74] *See, e.g.*, Noel B. Cunningham & Deborah H. Schenk, *The Case for a Capital Gains Preference*, 48 TAX L. REV. 319 (1993); Brian Galle, *Tax Fairness*, 65 WASH. & LEE L. REV. 1323 (2008); Chris William Sanchirico, *A Critical Look at the Economic Argument for Taxing Only Labor Income*, 63 TAX L. REV. 867 (2010).

[75] Kaplow, *Taxation, supra* note 5 at 654-66, 671.

conceived of as the aggregation of individual utilities,[76] assuming perfect markets and no externalities.[77]

Distortions will reduce taxed activities from their optimal level, which will simultaneously reduce the welfare of the individual being taxed, and erode the tax base, thereby reducing tax revenue.[78]

The degree to which taxpayers respond to taxation is referred to as elasticity. Some taxpayers may have higher elasticity than others for a given activity; some activities may have higher elasticity than others for a given taxpayer or for the economy in aggregate.[79]

The implication of optimal taxation models is generally that activities or taxpayers with lower marginal elasticity—i.e., less ability or tendency to change behavior in response to tax increases at the current tax rate—should be taxed more heavily while those with higher marginal elasticity should be taxed less,

---

[76] Kaplow, *Taxation, supra* note 5 at 656-58; James A. Mirrlees, *An Exploration in the Theory of Optimum Income Taxation*, 38 REV. ECON. STUD. 175 (1971).

[77] If there are externalities—that is, cost and benefits not reflected in market transactions—efficiency can be increased by taxing activities that generate negative externalities so as to reduce the level of the activity to its optimal level, and by subsidizing activities that produce positive externalities to increase their level to the optimal level. The classic example of a negative externality is pollution. Commonly used examples of activities generating -positive externalities include sanitation, basic scientific research, infrastructure and education. *See* ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE (4th ed. 1932); William J. Baumol, *On Taxation and the Control of Externalities,* 62 AM. ECON. REV. 307 (1972); Louis Kaplow & Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation,* 4 AM. L. & ECON. REV. 1 (2002); Kaplow, *Taxation, supra* note 5 at 651-54.

[78] For example, suppose that several individuals prefer wool pants to cotton pants. If the government taxes wool at a higher rate than cotton, and this price increase is passed on to the consumer, then some of the individuals who prefer wool pants at the pre-tax price will switch to cotton pants, which they enjoy less than wool pants. This will also reduce the demand for wool and the quantity of wool produced, thereby reducing the government's revenue from the new wool tax. Assuming no negative or positive externalities from wool or cotton, the post-tax allocation of consumption between wool and cotton is inefficient and welfare-reducing compared to the pre-tax allocation.

[79] Emmanuel Saez, Joel Slemrod & Seth H. Giertz, *The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review,* 50 J. ECON. LIT. 3 (2012).

because this will minimize the total amount of distortion or behavioral response to taxation for a given level of desired revenue.[80]

The optimization problem is also often subject to additional constraints, such as a desire for progressivity (also known as vertical equity or the idea that taxes should be proportional to ability to pay), limits on information about each taxpayer available to the government, and sometimes a desire for horizontal equity (similar treatment of taxpayers with the same ability to pay).[81] Without such constraints, the problem of optimal taxation becomes trivial[82] and less useful to policymakers.[83] Constraints also make the analysis more useful to policymakers who have certain preferences or political mandates other than minimizing distortions, such as progressivity.[84]

The conclusions of optimal tax models vary depending on the assumptions used and the structural limits imposed.[85] The usefulness of recommendations derived from such models

---

[80] Gamage, *supra* note 73.

[81] Kaplow, *Taxation, supra* note 5.

[82] A lump-sum head-tax that does not depend on individual behavior will almost always produce less distortion than any other option. Anthony B. Atkinson & Joseph E. Stiglitz, *The Design of Tax Structure: Direct Versus Indirect Taxation,* 6. J. PUB. ECON. 55 (1976); Kaplow, *Taxation, supra* note 5 at 652.

[83] Additional limits on real-world tax policies may be imposed by administrative considerations and related costs.

[84] *See* Mankiw, *supra* note 6, at 172; Alvin C. Warren, Jr., Comment, *Fairness and a Consumption-Type of Cash Flow Personal Income Tax,* 88 HARV. L. REV. 931 (1975).

In addition to political considerations, progressive taxation and transfer payments are often thought to be efficient because of assumptions of declining marginal utility of consumption. *See* Joseph Bankman & Thomas Griffith, *Social Welfare and the Rate Structure: A New Look at Progressive Taxation*, 75 CALIF. L. REV. 1905, 1947 (1987); Lawrence Zelenak & Kemper Moreland, *Can the Graduated Income Tax Survive Optimal Tax Analysis?*, 53 TAX L. REV. 51 (1999); Edward J McCaffery, *A New Understanding of Tax*, 103 MICH. L. REV. 807, 835 (2005).

[85] James Banks & Peter Diamond, *The Base for Direct Taxation, in* DIMENSIONS OF TAX DESIGN: THE MIRRLEES REVIEW 548 (Stuart Adam et al. eds., 2010).

depends on the extent to which the models accurately reflect and predict the most important features of real world behavior.[86]

Pioneering optimal tax models, such as those of Ramsey,[87] Atkinson and Stiglitz,[88] Diamond and Mirrlees,[89] and Kaplow[90] focused on simple assumptions and mathematical elegance, often reaching dramatic conclusions. Subsequent work has extended optimal tax theory using more complex models and a wider array of assumptions.[91] More recent work has also attempted to harmonize modeled assumptions with the implications of empirical work.[92]

Early optimal tax models concluded that, under certain simplifying assumptions and ideal conditions, income taxation should exclusively target labor and exempt capital because this produces fewer distortions than taxing both labor and capital. According to these models, a labor income tax creates a distortion that reduces work hours (i.e., a shift from consumption to leisure). However, taxes on capital create two distortions—both a reduction in savings and investment (i.e., a shift from future consumption toward present consumption) and a reduction in work hours (a shift from labor toward leisure). This second

---

[86] Chris William Sanchirico, *A Critical Look at the Economic Argument for Taxing Only Labor Income,* 63 TAX L. REV. 867 (2010).

[87] F. P. Ramsey, *A Contribution to the Theory of Taxation*, 37 ECON J. 47 (1927).

[88] A.B. Atkinson & J.E. Stiglitz, *The Design of Tax Structure: Direct Versus Indirect Taxation,* 6. J. PUB. ECON. 55 (1976).

[89] Peter A. Diamond & James A. Mirrlees, *Optimal Taxation and Public Production I: Production Efficiency,* 61 AM. ECON. REV. 8 (1971); Peter A. Diamond & James A. Mirrlees, *Optimal Taxation and Public Production II: Tax Rules,* 61 AM. ECON. REV. 261 (1971).

[90] Kaplow, *supra* note 5; Louis Kaplow, *The Optimal Supply of Public Goods and the Distortionary Cost of Taxation*, 49 NAT'L TAX J. 513 (1996).

[91] Whereas earlier models generally assumed linear or flat taxes, more recent models allow non-linear or progressive taxes. Early models tended to assume homogeneity. More recent models allow for heterogeneous individuals. Early models assumed infinite lives or finite lives with a specific number of periods; more recent models have considered life cycles. *See* Banks & Diamond, *supra* note 85; Gamage, *supra* note 73.

[92] *See* Banks & Diamond, *supra* note 85; Gamage, *supra* note 73; Emmanuel Saez, Joel Slemrod & Seth H. Giertz, *The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review,* 50 J. ECON. LIT. 3 (2012); Jane G. Gravelle, *Capital Gains Tax Options: Behavioral Responses and Revenues,* CONGRESSIONAL RESEARCH SERVICE REPORT TO CONGRESS (2010).

distortion occurs because individuals deciding how hard to work also consider the potential return on the portion of their labor earnings that they save and invest. This is sometimes referred to as the "double distortion" literature.

More recent optimal tax studies using more complex models and empirically calibrated assumptions have generally tempered the prescription of a pure labor tax, instead favoring an eclectic tax system with somewhat lower tax rates on investment than on labor.[93] In particular, the introduction of decisions about investment in human capital into models calls into question sharply different tax treatment of capital and labor because the return on investment in human capital will generally be characterized as labor income, and such sharply divergent treatment could lead to underinvestment in human capital.[94]

The danger of distortions contributing to underinvestment in human capital is particularly high when human capital investment does not simply involve giving up time and opportunity cost of lower wages, but rather involves cash outlays and consumption of goods.[95] For example, working a lower paid job in return for superior on-the-job training or pursuing educating at an institution that is free at the point of service, such as a taxpayer-funded public high school or many graduate PhD programs, does not involve cash outlays.[96] Attending college or a masters degree program or professional school typically

---

[93] *See* Banks & Diamond, *supra* note 85; Gamage, *supra* note 73. Sanchirico, *supra* note20; Joseph Bankman & David Weisbach, *A Critical Look at a Critical Look—Reply to Sanchirico,* 64 TAX L. REV. 539 (2011).

[94] Paul A. David, *Reforming the Taxation of Human Capital: A Modest Proposal for Promoting Economic* Growth, *in* ECONOMICS FOR AN IMPERFECT WORLD: ESSAYS IN HONOR OF JOSEPH STIGLITZ 439 (Richard Arnott et al. eds., 2003); Bas Jacobs & A. Lans Bovenberg, *Human Capital and Optimal Positive Taxation of Capital Income,* 17 INT. TAX. PUB. FIN. 451 (2010); Banks & Diamond, *supra* note 85.

[95] Paul B. Stephan III, *Federal Income Taxation and Human Capital*, 70 VA. L. REV. 1357 (1984); Philip A. Trostel, *The Effect of Taxation on Human Capital,* 101 J. POL. ECON. 327 (1993); Gian Maria Milesi-Ferretti & Nouriel Roubini, *On the Taxation of Human and Physical Capital in Models of Endogenous Growth,* 70 J. PUB. ECON. 237 (1998); Andres Erosa & Tatyana Koreshkova, *Progressive Taxation in a Dynastic Model of Human Capital,* 54 J. MONETARY ECON. 667 (2007).

[96] Bill Dupor et al., *Some Effects of Taxes on Schooling and Training,* 86 AM. ECON. REV. 340, 341 (1996).

involves substantial cash outlays for tuition payments, fees, and books.[97]   The danger of distortion is greater for human capital investments that require cash outlays because foregone wages are not taxed while cash outlays are treated less favorably by the tax code than other investments.

IV.   Comparison of Taxation of Human, Physical, and Financial Capital

Early "double distortion" arguments have been highly influential, with many tax scholars concluding that a consumption tax—which is theoretically equivalent to an income tax in which all income that is saved and invested is exempt from taxation—is superior to a broad based income tax.[98]   Under a pure consumption tax, the tax system would be neutral with respect to different forms of investment. [99] Although the U.S. tax system has not transitioned toward a pure consumption tax, the U.S. provides tax benefits for various forms of investment that move the system incrementally closer to a consumption tax.[100]

The discussion that follows focuses first on the general treatment of investments under the tax code. Next, it considers a few special cases that may be more important economically than

---

[97] PhD programs primarily involve tax-free investments of time rather than taxable investments of tuition. However, PhDs likely account for a minority of investment in post-secondary education. As of 2013, only about 1.7 percent of the U.S. population had a PhD compared to about 32 percent with a bachelor's degree and about 10 percent with a Master's or Professional degree. An additional 5.7 percent had some graduate school with no degree (it is unclear whether these students were enrolled in PhD, Master's or Professional degree programs). U.S. CENSUS BUREAU, CURRENT POPULATION SURVEY, ANNUAL SOCIAL AND ECONOMIC SUPPLEMENT; AMERICAN COMMUNITY SURVEY.

[98] Joseph Bankman & David A. Weisbach, *The Superiority of an Ideal Consumption Tax over an Ideal Income Tax*, 58 STAN. L. REV. 1413 (2005); Alan J. Auerbach, *The Choice Between Income and Consumption Taxes: A Primer* 27-29, *in* INSTITUTIONAL FOUNDATIONS OF PUBLIC FINANCE: ECONOMIC AND LEGAL PERSPECTIVES (A. Auerbach & D. Shaviro eds., 2009).

[99] N. Gregory Mankiw et al., *Optimal Tax in Theory and Practice*, 23 J. ECON. PERSP., Fall 2009, at 147, 164-65.

[100] *Id*.; Edward J. McCaffery, *Tax Policy Under a Hybrid Income-Consumption Tax*, 70 TEX. L. REV. 1145 (1992)

the general treatment of investment, because these special cases account for a disproportionately large fraction of the investment portfolios of most individuals and households—specifically retirement accounts and housing. Investment is defined broadly as cash outlays or uses of time that are reasonably expected to produce a financial return.

C. Taxation of Investments in General

The tax base for the income tax is not gross income, but rather, net income; business-related costs of producing revenue are generally not taxed.[101] The Internal Revenue Code defines gross income broadly,[102] but permits taxpayers to deduct trade and business expenses from gross income to arrive at adjusted gross income (AGI)[103] and taxable income.[104]   In contrast, personal and family expenses are generally not deductible.[105]

Expenditures that create long-lived assets generally cannot be immediately deducted.[106]   Instead, such expenditures are capitalized and added to basis. Basis is a point system used to track taxpayer eligibility for future exclusions or deductions from taxable income.[107]   The costs of investments in long-lived capital assets are recovered over time through partial deductions from basis over several years.[108]

---

[101] Daniel I. Halperin, *Business Deduction for Personal Living Expenses: A Uniform Approach to an Unsolved Problem,* 122 U. PA. L. REV. 859 (1974); Marc G. Kelman, *Personal Deductions Revisited: Why They Fit Poorly in an "Ideal" Income Tax and Why They Fit Worse in a Far from Ideal World,* 31 STAN. L. REV. 831, 833-34 (1979); David A. Weisbach, *Line Drawing, Doctrine, and Efficiency in the Tax Law*, 84 CORNELL L. REV. 1627 (1999).

[102] I.R.C. § 61 (2012).

[103] I.R.C. § 62(a)(1) (2012), 162. More limited deductions are permitted if the trade or business consists or providing services as an employee. I.R.C. § 62(a)(2), 162 (2012). *See also* I.R.S. Publication 535 (2013).

[104] I.R.C. §§ 161, 162, 212, 217 (2012).

[105] I.R.C. § 262 (2012).

[106] I.R.C. §§ 263, 263A (2012); INDOPCO, Inc. v. Commissioner, 503 U.S. 79 (1992).

[107] I.R.C. §§ 1011, 1012, 1016 (2012).

[108] I.R.C. §§ 168, 195 (2012). If the long-lived assets are tangible, this deduction is called "depreciation." I.R.C. § 167 (2012). If the long-lived assets

Immediate deductions are more valuable than deductions pushed into the future (assuming constant tax rates). This is because deductions reduce taxable income and therefore the final tax bill, and because of the time value of money. Ignoring present value considerations, the economic value of a deduction is equal to the marginal tax rate multiplied by the amount deducted. Deductions are therefore more valuable to taxpayers with higher marginal tax rates—typically taxpayers with higher incomes.[109]

Basis is not indexed for inflation or for the cost of capital to compensate taxpayers for the delay from capitalization requirements. However, the tax code provides depreciation and amortization schedules at an accelerated pace that are much faster than the real-world useful life of the asset.[110]

In addition, certain long-term investments, such as research and development costs, some new equipment purchases, and advertising, can be immediately deducted.[111] There are also many provisions providing for advantageous treatment for investments in natural resource exploitation,[112] or for investments of time in entrepreneurial activity.[113]

---

are intangible, this deduction is called "amortization." I.R.C. §§ 169, 178, 197 (2012).

[109] For example, a $10,000 deduction will be worth $2,800 to a taxpayer with a 28 percent marginal tax rate, but will be worth $3,500 to taxpayer with a 35 percent marginal tax rate.

[110] I.R.C. § 168 (2012); Douglas A. Kahn*, Accelerated Depreciation—Tax Expenditure or Proper Allowance for Measuring Net Income?*, 78 MICH. L. REV. 1 (1979); Alan J. Auerbach, *The New Economics of Accelerated Depreciation,* 23 B.C. L. REV. 1327 (1982); Victor Thuronyi, *Tax Expenditure: A Reassessment,* 1988 DUKE L.J. 1155, 1161 (1988); David A. Weisbach & Jacob Nussim, *The Integration of Tax and Spending Programs,* 113 YALE L.J. 955 (2004); *cf.* Johnson, *supra* note 3.

[111] I.R.C. §§ 263(a)(1)(A)-(G)&(c), 179 (2012); Calvin H. Johnson, *Capitalize Costs of Software Development*, 124 TAX NOTES 603 (August 10, 2009).

[112] Calvin H. Johnson, *Accurate and Honest Tax Accounting for Oil and Gas*, 125 TAX NOTES 575 (Nov. 2, 2009); Calvin H. Johnson, *Percentage Depletion of Imaginary Costs*, 122 Tax Notes 1619 (March 30, 2009).

[113] Ronald J. Gilson & David M. Schizer, *Understanding Venture Capital Structure: A Tax Explanation for Convertible Preferred Stock*, 116 HARV. L. REV. 874, 910 (2003); Victor Fleischer, *Taxing Founders' Stock*, 59 UCLA L. REV. 60 (2011); *cf.* Gregg D. Polsky & Brant J. Hellwig, *Examining the Tax Advantage of Founders' Stock,* 97 IOWA. L. REV. 1085 (2012).

Appreciation of individual investments in property such as securities or real estate are generally taxed at advantageously low long-term capital gains rates,[114] and, because of the realization requirement, are not taxed until sold.[115] In other words, in addition to a lower tax rate on gains from investment compared to labor income, investors who use effective tax planning can benefit from interest-free deferral of taxes on gains, early realization of losses, and timing gains to smooth income.[116] Dividends are also currently taxed at an advantageous rate that is substantially lower than ordinary income tax rates.[117]

The effective tax rates on investments are *even lower than* the already advantageous statutory capital gains rates.[118] For families who have sufficient wealth to hold appreciated assets until the death of the individual owner, taxes will often be close to zero because the decedent's heirs will receive basis equal to the market value of the asset at the time of death (step-up basis at death).[119] Individuals can obtain liquidity without triggering a realization event prior to death by borrowing against appreciated assets.[120] Only a tiny minority of decedents have sufficient assets at death to trigger any estate tax liability.[121]

---

[114] There are several long-term capital gains rates, depending on the kind of property and the taxable income of the taxpayer. Capital gains rates range from about zero to 28 percent, and are always lower than comparable ordinary income tax rates. I.R.S. Publication 544, Sales and Other Dispositions of Assets (2013).

[115] David M. Schizer, *Realization as Subsidy*, 73 N.Y.U. L. REV. 1549 (1998).

[116] Alan M. Auerbach, *Reforming Capital Gains Taxation,* 135 TAX NOTES 1399, 1399-1400 (2012).

[117] I.R.S. Publication 550, Investment Income and Expenses (Including Capital Gains and Losses) (2013).

[118] James M. Poterba, *How burdensome are capital gains taxes?: Evidence from the United States*, 33 J. PUBLIC ECON. 157–172 (1987); Daniel Bergstresser & Jeffrey Pontiff, *Investment Taxation and Portfolio Performance,* 97 J. PUB. ECON. 245 (2013).

[119] Auerbach, *supra* note 116.

[120] Mark L. Louie, Note, *Realizing Appreciation without Sale: Accrual Taxation of Capital Gains on Marketable Securities*, 34 STAN. L. REV. 857 (1982)..

[121] George Cooper, *A Voluntary Tax - New Perspectives on Sophisticated Estate Tax Avoidance*, 77 COLUM. L. REV. 161 (1977); Yanna Krupnikov et al., *Public Ignorance and Estate Tax Repeal: The Effect of Partisan Differences and Survey Incentives*, 59 NAT'L. TAX J. 425–437 (2006); MICHAEL J. GRAETZ & IAN SHAPIRO, DEATH BY A THOUSAND CUTS: THE FIGHT OVER TAXING INHERITED

Lower tax rates for capital gains and dividends are sometimes rationalized as offsetting "double taxation" of investments at the corporate level.[122] However, there is a disagreement among economists about whether the corporate income tax falls predominantly on capital or labor,[123] and effective corporate tax rates are often quite low because of tax planning.[124] Moreover, many investments eligible for capital gains treatment use business structures that combine limited liability with pass-through (single level) taxation, such as limited liability companies, limited liability partnerships, and limited partnerships.[125]

D. Taxation of Investments in Retirement Accounts

Most taxpayers who are eligible for tax-advantaged retirement accounts can effectively convert the income tax into a consumption tax.[126] Tax-advantaged retirement accounts such as 401(k)s, IRAs, 403(b)s, 457 plans and supplemental retirement accounts enable workers to shield thousands of dollars per year from income and payroll taxes, place the money in investments

---

WEALTH (1 ed. 2006); Edward J. McCaffery, *Distracted from Distraction by Distraction: Reimagining Estate Tax Reform*, 40 PEPP. L. REV. 1235 (2012).

[122] Noel B. Cunningham & Deborah H. Schenk, *The Case for a Capital Gains Preference,* 48 TAX L. REV. 319, 331-36 (1993); Jennifer Arlen & Deborah M Weiss, *A Political Theory of Corporate Taxation*, 105 YALE L.J. 325 (1995).

[123] Jennifer C. Gravelle, *Corporate Tax Incidence: A Review of Empirical Estimates and Analysis* (Cong. Budget Office, Working Paper No. 2011-01, 2011); Kimberly A. Clausing, *In Search of Corporate Tax Incidence,* 65 TAX L. REV. 433 (2012); Li Liu & Rosanne Altshuler, *Measuring the Burden of the Corporate Income Tax Under Imperfect Competition,* 66 NAT'L TAX J. 215 (2013).

[124] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-520, CORPORATE INCOME TAX: EFFECTIVE TAX RATES CAN DIFFER SIGNIFICANTLY FROM THE STATUTORY RATE (2013).

[125] William A. Klein, & Eric M. Zolt, *Business Form, Limited Liability, and Tax Regimes: Lurching Toward a Coherent Outcome?*, 66 U. COLO. L. REV. 1001 (1995); William F. Fox & LeAnn Luna, *Do Limited Liability Companies Explain Declining State Corporate Tax Revenues,* 33 PUB. FIN. REV. 690 (2005).

[126] *See, e.g.,* Roger Gordon, Laura Kalambokidis & Joel Slemrod, *Do we now collect any revenue from taxing capital income?*, 88 J. PUB. ECON. 981–1009 (2004) (describing the U.S. tax system as a hybrid of an income and consumption tax).

where it can grow untaxed, and only pay income taxes on the funds when they are withdraw, presumably in retirement to fund consumption.[127]

Most individuals eligible for 401(k)s (or similar plans) can defer taxes on substantially all of their savings from earnings,[128] *provided* that they choose the limited set of investments available within employer-sponsored 401(k) accounts.[129] Tax-advantaged accounts have grown rapidly since they were introduced in 1978

---

[127] Christopher R. Cunningham & Gary V. Engelhardt, *Federal Tax Policy, Employer Matching, and 401(k) Saving: Evidence from HRS W-2 Records*, 55 NAT'L TAX J. 617 (2002); I.R.C. §§ 62(6)&(7), 219, 401-04, 408 (2012).

[128] In 2014, the annual limit on contributions to 401(k)s alone was between $17,500 and $23,000 (The limit was $23,000 per year for those over age 50). I.R.S. Publication 560, Retirement Plans for Small Businesses (2013). This is substantially more than what the overwhelming majority of eligible individuals are likely to save in a year, given personal savings rates and typical income levels. From the first quarter of 2009 to the fist quarter of 2014, the personal savings rate averaged 5.4 percent. In the previous 10 years it averaged 4.1 percent. BUREAU OF ECONOMIC ANALYSIS, U.S. DEPT. OF COMMERCE, BEA 14-29, PERSONAL INCOME AND OUTLAYS (June 2014).

Census data suggests that in 2012, 90 percent of men and 97 percent of women age 15 years and over had had annual incomes below $100,000. U.S. Census Bureau, Current Population Survey 2013 Annual Social and Economic Supplement, Table PINC-11. Income Distribution to $250,000 or More for Males and Females: 2012. In 2012 and 2013, disposable income per capita was approximately $39,000. BUREAU OF ECONOMIC ANALYSIS, U.S. DEPT. OF COMMERCE, BEA 14-29, PERSONAL INCOME AND OUTLAYS (June 2014)

Although savings rates increase with income, retirement contribution limits will comfortably exceed savings for most individuals. Karen E. Dynan, Jonathan Skinner & Stephen P. Zeldes, *Do the Rich Save More?* 112 J. POL. ECON. 397 (2004) (finding a positive relationship between lifetime income and both average savings rates and marginal propensity to save); Christopher D. Carroll, *Why Do the Rich Save so Much?, in* DOES ATLAS SHRUG? THE ECONOMIC CONSEQUENCES OF TAXING THE RICH (Joel B. Slemrod ed., 2000); BUREAU OF LABOR STATISTICS, U.S. DEPT. OF LABOR, CONSUMER EXPENDITURE SURVEY tbls.1, 2 & 2301 (2011), *available at* http://www.bls.gov/cex/csxstnd.htm.

[129] For a discussion of eligibility and participation in 401(k) accounts by income level, and the growing use of such accounts, see James M. Poterba, Steven F. Venti & David A. Wise, *The Rise of 401(k) Plans, Lifetime Earnings, and Wealth at Retirement, in* RESEARCH FINDINGS IN THE ECONOMICS OF AGING 271 (David A. Wise, ed., 2010); David Joulfaian & David Richardson, *Who Takes Advantage of Tax-Deferred Savings Programs? Evidence from Federal Income Tax Data,* 54 NAT'L TAX J. 669 (2001).

and now account for half of all long-term mutual fund assets.[130] For those who save and invest exclusively through such retirement accounts, the U.S. tax system effectively is a consumption tax.

However, this favorable treatment is generally limited to stocks, bonds, mutual funds, annuities and similar financial investments available within employer sponsored retirement accounts. This may lead to substitution away from other forms of investment,[131] under-diversification and excessively high management fees.[132]

E. Taxation of Investments in Real Estate

Substantial tax advantages are also offered for investments in real estate. Investments in real estate other than owner occupied housing carry benefits in the form of accelerated depreciation,[133] full deductibility of interest up to the amount of

---

[130] Clemens Sialm & Laura Starks, *Mutual Fund Tax Clienteles*, 67 J. FIN. 1397, 1398 (2012); Investment Company Institute, Report: The U.S. Retirement Market, First Quarter 2014 tbl.23 (2014), *available at* http://www.ici.org/research/stats/retirement.

[131] Daniel J. Benjamin, *Does 401(k) Eligibility Increase Saving? Evidence From Propensity Score Subclassification,* 87 J. PUB. ECON. 1259 (2003) (finding that about one half of 401(k) balances represent new private savings, and that the biggest contributors are generally contributing funds they would have saved anyway); Eric M. Engen & William G. Gale, *The Effects of 401(k) Plans on Household Wealth: Differences Across Earnings Groups,* (Nat'l Bureau of Econ. Research, Working Paper No. 8032, 2000) (finding that 0 to 30 percent of 401(k) contributions are new savings); Karen M. Pence, *401(k)s and Household Saving: New Evidence from the Survey of Consumer Finances, in* 2 FINANCE AND ECONOMICS DISCUSSION SERIES 2002-6 (2002) (finding that households fund 401(k)s in part by reducing investments in ineligible assets).

[132] Edwin J. Elton, Martin J. Gruber & Christopher R. Blake, *The Adequacy of Investment Choices Offered by 401(k) Plans*, 90 J. PUB. ECON. 1299 (2006); John Angus, William O. Brown, Janet Kiholm Smith & Richard *Smith, What's in Your 403(b)? Academic Retirement Plans and the Costs of Underdiversification,* 36 FIN. MGM'T 1 (2007) (discussing the high costs of limited options available in TIAA-CREF plans, in particular the lack of low-cost indexed mutual funds).

[133] I.R.C. § 168 (2012).

income from the investment,[134] favorable long-term capital gains rates upon sale,[135] and opportunities for deferral such as like kind exchanges.[136]

With respect to investments in owner occupied housing, up to $250,000 in gains can be excluded from income ($500,000 for a married couple filing jointly),[137] interest can be deducted on a mortgage of up to $1.1 million,[138] and property taxes are also deductible as an itemized deduction.[139] Owner-occupiers also derive substantial benefits from the exclusion of imputed rental income from taxation.[140]

Typical housing values and growth rates suggest that most households will be able to exclude from income all of the gain on the sale of a property they occupy, and deduct substantially all of the interest on their home mortgages.[141] The compound annual growth rate growth rate of nominal housing prices is relatively modest—approximately 5.5 percent measured since the 1960s and 2.5 percent over the last 15 years.

The overwhelming majority of mortgages are for less than $1.1 million—and the interest is therefore fully deductible[142]—

---

[134] I.R.S. Publication 550; I.R.C. § 163.

[135] I.R.S. Publication 550; I.R.S. Publication 544. However, depreciation may be "recaptured" upon sale for purposes of calculating the portion of the gain that will be taxed at favorable long-term capital gains rates.

[136] I.R.S. Publication 544.

[137] I.R.S. Publication 523 (2013); I.R.C. § 121 (2012).

[138] The $1.1 million includes $1 million in home acquisition debt and $100 thousand in home equity debt. I.R.S. Publication 936 (2013); I.R.C. § 163(h)(2)(D)&(3)(B)&(C) (2012).

[139] I.R.C. § 164(a)(1) (2012).

[140] James Poterba & Todd Sinai, *Tax Expenditures for Owner-Occupied Housing: Deductions for Property Taxes and Mortgage Interest and the Exclusion of Imputed Rental Income*, 98 AM. ECON. REV. 84 (2008).

[141] In May 2014, the median sales price of existing homes sold in the United States was approximately $210,000 and the mean price was approximately $260,000. NATIONAL ASSOCIATION OF REALTORS: EXISTING HOME SALES, *Summary of May 2014 Existing Home Sales Statistics*. Only 3 percent of existing homes sold for more than $1,000,000. The sales prices for new construction homes were only slightly higher—$280,000 at the median and $320,000 at the mean. U.S. DEPARTMENT OF COMMERCE: CENSUS BUREAU, NEW RESIDENTIAL SALES.

[142] Home equity interest may not be fully deductible for some high-income taxpayers in high tax states because of the Alternative Minimum Tax. Daniel R. Feenberg & James M. Poterba, *The Alternative Minimum Tax and Effective Marginal Tax Rates*, 57 NAT'L TAX J. 407 (2004).

and the gain on sale of most owner-occupied houses will be substantially less than $250,000, and therefore fully excludible.[143] Recent estimates suggest that investments in owner occupied housing carry tax benefits worth approximately $3,400 per year for the average home owning household.[144] However, for high-income households age 25-35, the annual value of tax savings is closer to $10,000 to $20,000 per year.[145]

Using the following strategy, homeowners can effectively obtain a *zero* tax rate on their labor: purchase and reside in a run-down property, supply the labor to improve the property and surrounding area, then resell the property for a gain of less than $250,000 ($500,000 for a married couple).

F. Taxation of Investments in Higher Education

Compared to the favorable tax treatment of investments in general and of retirement accounts and owner occupied housing in particular, the treatment of investments in human capital in the form of tuition-funded higher education is disadvantaged.[146] There is evidence, at least in the short run, that households make tradeoffs between investments in higher education and alternatives such as real estate.[147]

1. Higher Education and Federal Income Taxes

Business expenditures such as research or advertising are immediately and fully deductible. Other forms of business investment are capitalized and deducted over time through accelerated depreciation or amortization. Like research,

---

[143] NATIONAL ASSOCIATION OF REALTORS: EXISTING HOME SALES.

[144] Poterba and Sinai, *supra* note 140 at 88–89. The authors report separate figures for mortgage interest, property taxes, and exclusion of imputed rental income in 2003 dollars. In the text above, these figures have been summed and inflation-adjusted to 2014 dollars.

[145] *Id.*

[146] Philip A. Trostel, *The Effect of Taxation on Human Capital*, J. POL. ECON. 327 (1993); Paul B. Stephan, *Federal Income Taxation and Human Capital*, 70 VA. L. REV. 1357 (1984).

[147] Michael F. Lovenheim, *The Effect of Liquid Housing Wealth on College Enrollment*, 29 J. LAB. ECON. 741 (2011).

advertising, or investments in equipment or intellectual property, expenditures on higher education tend to boost long-term earnings and promote economic growth.[148]

However, direct expenditures by households on tuition and books can only be deducted under very limited circumstances, or are subject to low dollar caps.[149] Education required by law or by an employer for the taxpayer to continue in his or her current trade or profession can be deducted as a business expense under section 162.[150] Such expenditures will generally be minimal—a certificate or brief training program, perhaps continuing education classes mandated by a licensing authority.

However, the bulk of high-dollar education investments—education that would qualify the taxpayer to enter a job or licensed profession, such as a degree in engineering, medicine, accounting, pharmacy, nursing, or law—cannot be deducted under section 162.[151] A patchwork of specific deductions, credits and tax advantaged savings accounts are available,[152] but the rules governing the use of such provisions are complex and change frequently, many provisions cannot be stacked with one another, the potential tax savings to each household from each provision are small, and the costs of learning the rules are prohibitively high for many taxpayers.[153] Because of the

---

[148] *See supra* Part I.

[149] John K. McNulty, *Tax Policy and Tuition Credit Legislation: Federal Income Tax Allowances for Personal Costs of Higher Education*, 61 CALIF. L. REV. 1 (1973); Stephan, *supra* note 146; Joseph M. Dodge, *Taxing Human Capital Acquisition Costs–Or Why Costs of Higher Education Should Not Be Deducted or Amortized*, 54 OHIO ST. L.J. 927 (1993).

[150] I.R.C. § 162 (2012); Treas. Reg. § 1.162-5 (as amended in 1967).

[151] I.R.S. Publication 970, Tax Benefits for Education (2013); Treas. Reg. § 1.162-5 (as amended in 1967); Carroll v. Commissioner, 418 F.2d 91 (7th Cir. 1969) (disallowing deduction for pre-law liberal arts classes for police officer where college and professional education was encouraged but not required by police department).

[152] I.R.S. Publication 970; I.R.C. §§ 25A, 221, 222, 529 (2012).

[153] Albert J. Davis, *Choice Complexity in Tax Benefits for Higher Education*, 55 NAT'L TAX J. 509 (2002); Susan M. Dynarski & Judith E. Scott-Clayton, *The Cost of Complexity in Federal Student Aid: Lessons from Optimal Tax Theory and Behavioral Economics*, 59 NAT'L TAX J. 319 (2006); Susan M. Dynarski & Judith E. Scott-Clayton, *The Feasibility of Streamlining Aid for College Using the Tax System*, *in* Proceedings of the Annual Conference on Taxation 250 (2006), *available at*

excessive complexity and fragmented nature of tax benefits for higher education, many taxpayers who are eligible for such provisions do not use them,[154] and because of phase-outs and complex eligibility rules, many taxpayers are not eligible.

Even among those taxpayers who are sufficiently sophisticated and determined to navigate the higher education tax benefit rules, the low dollar caps ensure that many students exceed the investment limits and pay substantially higher taxes than they would have if higher education were treated consistently with other forms of investment (i.e, deducted under section 162 or capitalized and amortized on an accelerated basis).

a. Higher education tax expenditures per-student

It is difficult to precisely estimate the total annual benefit per student from these higher education related tax-incentives, but a range of values based on tax expenditure budget estimates and the number of students enrolled suggests that the benefits are insufficient to put investments in higher education on an equal footing with other forms of investment, particularly when payroll taxes are taken into account.[155]

Estimates from the College Board based on the Internal Revenue Service Statistics of Income data suggest that tax

---

http://search.proquest.com.ezproxy.shu.edu/docview/195449361/51470711EFEF4084PQ/13?accountid=146984 (last visited Jul 14, 2014); Deborah H. Schenk & Andrew L. Grossman, *The Failure of Tax Incentives for Education,* 61 TAX L. REV. 295 (2008); Susan M. Dynarski & Judith E. Scott-Clayton, *Complexity and Targeting in Federal Student Aid: A Quantitative Analysis*, 22 TAX POL'Y & ECON. 109 (2008).

There is currently legislation pending to consolidate several tax benefits, but the American Council on Education is opposed because the new legislation would eliminate many provisions that benefit graduate students. http://www.acenet.edu/news-room/Documents/Letter-Full-House-Tax-Simplification-Bill.pdf

[154] Thomas J. Kane, *Savings Incentives for Higher Education*, NAT'L TAX J. 609 (1998); U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-560, HIGHER EDUCATION: IMPROVED TAX INFORMATION COULD HELP FAMILIES PAY FOR COLLEGE (2012), *available at* http://eric.ed.gov/?id=ED533006 (last visited Jul 14, 2014).

[155] *See infra* Part IV.F.2.

benefits per student from all higher education deductions and credits in 2011 were approximately $1,800.[156]

Original estimates prepared for this article and presented in Table 1 below are similar, suggesting annual higher education tax expenditures of approximately $1,700 to $2,000 per post-secondary student in 2012.[157] The aggregate tax expenditures total around $38 billion.   Aggregate expenditures are divided by the number of students to calculate expenditures per student. This approach ignores interaction effects and tax incidence, and may overestimate or underestimate the actual benefit to students.

In Table 1, Tax expenditure estimates come from two sources—the U.S. Office of Management and Budget[158] and the Joint Committee on Taxation.[159]   Estimates of the number of postsecondary students come from two sources—the U.S. Census Bureau Current Population Survey[160] and the Department of Education's Integrated Postsecondary Education Data System (IPEDS).[161]   The OMB estimates of tax expenditures tend to be

---

[156] COLLEGE BOARD, *Education Tax Credits and Tuition Deduction, in* TRENDS IN HIGHER EDUCATION SERIES: TRENDS IN STUDENT AID 2013 fig.16A, https://trends.collegeboard.org/student-aid/figures-tables/total-education-tax-benefits-over-time (last visited Jul 15, 2014).

[157] To be comprehensive, the table includes both expenditures that likely benefit post-secondary students directly and only indirectly. Some education related expenditures were excluded if they related primarily to K-12 education rather than post-secondary education. The table includes the exclusion of scholarship and fellowship income per OMB and JCT tax expenditure budget conventions. However, these arguably should not be included as tax expenditures. Exclusion of tuition discounts from income is consistent with the tax treatment of bargain purchases and gifts in other contexts.

[158] OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, ANALYTICAL PERSPECTIVES: BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2014 tbls.17-1 & 17-2 (2013).

[159] JOINT COMM. ON TAXATION, ESTIMATES OF FEDERAL TAX EXPENDITURES FOR FISCAL YEARS 2012-2017, JCS-1-13 tbl.1 at 36–37 (2013), https://www.jct.gov/publications.html?func=startdown&id=4503.

[160] U.S. CENSUS BUREAU, U.S. DEPT. OF COMMERCE, SCHOOL ENROLLMENT: CPS HISTORICAL TIME SERIES TABLES ON SCHOOL ENROLLMENT tbl.A-1 (2013), *available at* http://www.census.gov/hhes/school/data/cps/historical/ (last revised Sep. 3, 2013).

[161] NAT'L CTR. FOR EDUC. STATISTICS, U.S. DEPT. OF EDUC., DIGEST OF EDUCATION STATISTICS tbl.303.10 (2013), *available at*

somewhat lower than the JCT estimates. The two estimates of the number of students are similar. The average of the estimates of number of students is used to calculate the per-student expenditures. Tax expenditure estimates from OMB and JCT are shown separately, and the average of these estimates is also shown.

b. *Specific higher education tax expenditures*

One of the more generous provisions, the American Opportunity Credit, is limited by statute to $2,500 per year per student for up to 4 years of undergraduate education, cannot be used in conjunction with many other provisions, and begins to phase out for taxpayers with a Modified Adjusted Gross Income of $80,000, with a full phase-out at $90,000.[162] Notwithstanding the $2,500 per student statutory limit, the average tax expenditure is only around $700 to $900 per post-secondary student per year.[163]

At a 30 percent marginal tax rate, a $2,500 benefit would be equivalent to a deduction on at most $8,300 in expenditures per year. An $800 benefit would equivalent to a deduction on at most $2,700 per year in expenses.

To put these limit into context, in 2013-2014, average annual full tuition at 4-year institutions was approximately $30,000.[164] After subtracting institutional scholarships and grants (i.e., tuition discounting), this figure falls to about $20,000, and after subtracting government grants it falls further, but the average

---

http://nces.ed.gov/programs/digest/d13/tables/dt13_303.10.asp (last visited Jul. 14, 2014).

[162] I.R.S. Publication 970, *supra* note 151; I.R.C. § 25(a)(1) (2012); JOINT COMM. ON TAXATION, BACKGROUND AND PRESENT LAW RELATED TO TAX BENEFITS FOR EDUCATION, JCX-70-14, at 6 (2014). Note that the phaseout income is double for married couples filing joint returns.

[163] *See infra* Table 3.

[164] The NCES Fast Facts Tool provides quick answers to many education questions (National Center for Education Statistics), *available at* http://nces.ed.gov/fastfacts/display.asp?id=76 (last visited Jul 14, 2014); COLLEGE BOARD, *Average Net Price for Full-Time Students over Time — Private Institutions*, *in* TRENDS IN HIGHER EDUCATION SERIES: TRENDS IN COLLEGE PRICING, https://trends.collegeboard.org/college-pricing/figures-tables/published-tuition-and-fees-net-tuition-and-fees-and-room-and-board-2012-dollars-full-time (last visited Jul 14, 2014).

cost still exceeds the effective caps on deductibility by a wide margin. Many students pay full tuition and are eligible neither for means-tested federal grant programs, nor for deductions.

The American Opportunity Credit is only available to undergraduates. The provisions available to graduate students, such as the lifetime learning credit, are less generous, providing at most a $2,000 tax credit per year and a phase out at an income of $54,000 to $64,000 per year.[165] The actual average tax expenditure per student is only around $160 to $200 per year.[166]

Similarly, a limited deduction is available for student loan interest—at most $2,500 per year.[167] The student loan interest deduction is limited by an initial phaseout at an income of $65,000 and a complete phase-out at $80,000[168]—incomes that will readily be reached by some college graduates and by a substantial proportion of professional degree holders within a few years of graduation.[169] By contrast, interest on business loans is fully deductible.[170]

At a 30 percent marginal tax rate, and assuming $25,000 in debt per student[171] and a 6 percent interest rate,[172] one would

---

[165] I.R.S. Publication 970, *supra* note 151; JOINT COMMITTEE ON TAXATION, *supra* note 112 at 6. 151; I.R.C. § 25(a)(2) (2012). Note that the phaseout income is double for married couples filing joint returns.

[166] *See infra* Table 3.

[167] I.R.S. Publication 970, *supra* note 151; 151 *supra* note 146; I.R.C. § 221 (2012).

[168] JOINT COMM. ON TAXATION, *supra* note 161 at 18.

[169] ANTHONY P. CARNEVALE ET AL., THE COLLEGE PAYOFF: EDUCATION, OCCUPATIONS, LIFETIME EARNINGS (2011), *available at* http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/collegepayoff-complete.pdf. For example, median starting salaries for law graduates are around $60,000 and typically increase rapidly after graduation. *See* Simkovic & McIntyre, *infra* note 172; After the JD and After the JD II, *supra* note 175.

[170] I.R.C. § 163 (2012).

[171] In 2009, the average student debt level of a recent college graduate was approximately $25,000. Jennie H. Woo, *Degrees of Debt: Student Borrowing and Loan Repayment of Bachelor's Degree Recipients 1 Year after Graduating: 1994, 2001, and 2009* fig.3 at 7 (Stats in Brief, NCES 2014-011 2013), http://eric.ed.gov/?id=ED544217 (last visited Jul 14, 2014) ; *Student Loan Debt by Age Group*, FED. RESERVE BANK OF N.Y. (Mar. 29, 2013).

[172] 6 percent nominal interest is likely close to the rate faced by professional degree students. The rate for undergraduates may be substantially lower. *See* Michael Simkovic & Frank McIntyre, *The Economic Value of a Law Degree,* working paper (2013).

expect a tax benefit of around $450 per student, even if each student only had loans outstanding for one year. Assuming loans are repaid over 10 years, the annual tax expenditure should be close to $2,000 per year per student. The actual tax expenditure per student per year is only $50.[173]

The $2,500 in interest limit is roughly equal to a deduction on at most $42,000 of student loans.[174] This will limit deductibility for a large proportion of those with professional degrees, at least shortly after graduation.[175]

A provision allowing for tax-advantaged higher education investment accounts administered through the states (qualified tuition programs, also called 529 plans) is nominally attractive.[176] 529 plans resemble Roth retirement accounts. Contributions are not deductible for purposes of federal income taxes (but may be deductible for purposes of state income taxes). Investment earnings that accumulate within a 529 plan are tax-free as long as the funds are used to pay for qualified higher education expenses. Withdrawals for other purposes incur both taxes and penalties.

Because interest paid to a student within a 529 plan is tax free, but interest paid by a student on student loans will often not be deductible, the tax system favors saving for college or professional school over borrowing.

529 plans provide the greatest benefits to students from well-off families whose parents or other relatives plan ahead, can

---

[173] *See infra* Table 3.

[174] Assuming a 6 percent average nominal interest rate. The higher the interest rate, the lower the student loan balance eligible for a deduction.

[175] COLLEGE BOARD, *Average Undergraduate Debt, Graduate Debt, and Total Debt for Graduate Degree Recipients, 2007-2008*, *in* TRENDS IN HIGHER EDUCATION SERIES: TRENDS IN STUDENT AID fig.2009_8B, https://trends.collegeboard.org/student-aid/figures-tables/average-undergraduate-debt-graduate-debt-and-total-debt-graduate-degree-recipients-2007-08 (last visited July 14, 2014) (reporting total student loan debt for recent professional degree recipients of approximately $90,000 in 2008); National Postsecondary Student Aid Study (NPSAS).

[176] I.R.S. Publication 970, *supra* note 151; JOINT COMM. ON TAXATION, *supra* note 161 at 13–14; Jennie H. Woo, *Degrees of Debt: Student Borrowing and Loan Repayment of Bachelor's Degree Recipients 1 Year after Graduating: 1994, 2001, and 2009* fig.3 at 7 (Stats in Brief, NCES 2014-011 2013), http://eric.ed.gov/?id=ED544217 (last visited Jul 14, 2014); I.R.C. § 529 (2012).

commit to setting aside substantial funds exclusively for higher education, and contribute early to the 529 account, allowing the maximum accumulation of tax-free investment income over the ensuing years.

Because of these requirements, in practice, 529 plans do not provide much benefit to the majority of students.[177] Students are far more likely to finance higher education investments with loans than with tax-advantaged savings. By the end of 2012, the total value held in 529 plans was approximately $200 billion,[178] while the total outstanding balance of student loans was approximately $970 billion.[179] The average tax expenditure per student per year from qualified tuition plans is only about $60.[180]

Another education-related tax benefit is the deduction for donations to charities, including non-profit institutions of higher education.[181] For a number of reasons, it is difficult to estimate the extent to which this provision benefits students as opposed to donors or other constituencies of universities.

Economists disagree on the extent to which the deduction increases charitable contributions.[182] Some contributions may be earmarked for purposes that do not provide benefits to most students. For-profit colleges, which educate approximately 10 percent of students,[183] are ineligible, and most non-profit higher education institutions receive only a small fraction of their

---

[177] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-64, HIGHER EDUCATION: A SMALL PERCENTAGE OF FAMILIES SAVE IN 529 PLANS (2012).

[178] Investment Company Institute, Release: 529 Plan Program Statistics, Fourth Quarter 2013, http://www.ici.org/research/stats/529s/529s_14_q4 (2013).

[179] *Student Loan Debt by Age Group*, FED. RESERVE BANK OF N.Y. (Mar. 29, 2013).; *FRBNY Consumer Credit Panel / Equifax*, FED. RESERVE BANK OF N.Y., http://www.newyorkfed.org/microeconomics/ccp.html.

[180] *See infra* Table 3.

[181] JOINT COMM. ON TAXATION, *supra* note 161 at 21.

[182] John Peloza & Piers Steel, *The Price Elasticities of Charitable Contributions: A Meta-Analysis*, 24 J. PUB. POL'Y & MARKETING 260 (2005); Dean Karlan & John A. List, *Does Price Matter in Charitable Giving? Evidence from a Large-Scale Natural Field Experiment*, 97 AM. ECON. REV. 1774 (2007)..

[183] NAT'L CTR. FOR EDUC. STATISTICS, U.S. DEPT. OF EDUC., DIGEST OF EDUCATION STATISTICS tbl.303.10 (2013), *available at* http://nces.ed.gov/programs/digest/d13/tables/dt13_303.10.asp (last visited Jul. 14, 2014).

revenue in the form of charitable gifts.[184] The average tax expenditure per student per year is about $225.[185]

Pell Grants, the largest federal subsidy program to the costs of college education, on average contribute around $1,300 per post-secondary student because eligibility is sharply restricted through exclusion of graduate students and means testing.[186]

2. *Progressivity and timing*

Early economic analysis of the tax treatment of higher education sometimes concluded that investments in higher education were tax *advantaged* compared to other forms of investment. They reasoned as follows: The primary cost of higher education is opportunity cost—time that could have been spent working. Because foregone wages are not taxed, education is taxed advantaged.[187]

Today, these assumptions are must less likely to hold true for very important categories of higher education—high end bachelor's and master's and professional degrees. The higher education landscape has radically changed over the last several decades.

The opportunity cost of higher education has fallen. Real earnings and employment opportunities for young and inexperienced workers with less than a bachelor's degree have declined.[188] In contrast, real earnings for those with bachelor's

---

[184] Laura G. Knapp, Janice E. Kelly-Reid & Scott A. Ginder, *Enrollment in Postsecondary Institutions, Fall 2010; Financial Statistics, Fiscal Year 2010; and Graduation Rates, Selected Cohorts, 2002-07* (First Look, NCES 2012-280, 2012), http://eric.ed.gov/?id=ED530514 (last visited Jul 14, 2014).. In 2010, the fraction of revenue from gifts ranged from a high of 7.4 percent at private non-profit 4-year-and-above institutions to a low of 0.4 percent at 2-year-and-below public institutions. *See also* NAT'L CTR. FOR EDUC. STATISTICS, *supra* note 183 at tbls.333.10-333.60; 183.

[185] *See infra* Table 3.

[186] [Insert citation]

[187] Stephan, *supra* note 146; Trostel, *supra* note 167.

[188] Thomas Lemieux, *Postsecondary Education and Increasing Wage Inequality*, 96 AM. ECON. REV. 195 (2006); Jaison R. Abel & Richard Deitz, *Do the Benefits of College Still Outweigh the Costs?*, 20 CURRENT ISSUES ECON. & FIN. 1 (2014).

degrees and above have increased, especially for those with both higher education and subsequent work experience.[189]

College (and law school) completion rates have increased,[190] shortening the number of years spent obtaining a given level of education. At the same time, tuition and fees have increased[191] while per-student public funding for state universities has not kept pace,[192] and as a result, a larger share of the costs of higher education are tax-disadvantaged direct expenditures. In other words, students are spending more in after-tax dollars and finishing their degrees sooner. More of the cost of higher education is in the form of after-tax direct expenditures and less is in the form of untaxed foregone earnings, and so the tax disadvantages of investments in higher education have increased relative to the tax advantages (i.e., direct expenditures have increased relative to opportunity costs).

---

[189] Lemieux, *supra* note 137; Michael Simkovic, *Risk-Based Student Loans*, 70 WASH. & LEE L. REV. 527 (2013).

[190] NAT'L CTR. FOR EDUC. STATISTICS, U.S. DEPT. OF EDUC., DIGEST OF EDUCATION STATISTICS tbl.376 (2012), *available at* http://nces.ed.gov/programs/digest/d12/tables/dt12_376.asp; AMERICAN BAR ASSOCIATION, *Enrollment and Degrees Awarded 1963-2012 Academic Years*, *in* SECTION OF LEGAL EDUCATION AND ADMISSIONS TO THE BAR (2014), *available at* http://www.americanbar.org/content/dam/aba/administrative/legal_education_a nd_admissions_to_the_bar/statistics/enrollment_degrees_awarded.authcheckda m.pdf.

[191] NAT'L CTR. FOR EDUC. STATISTICS, U.S. DEPT. OF EDUC., DIGEST OF EDUCATION STATISTICS tbl.303.10 (2013), *available at* http://nces.ed.gov/programs/digest/d13/tables/dt13_303.10.asp (last visited Jul. 14, 2014). Average undergraduate tuition and fees and room and board rates charged for full–time students in degree–granting postsecondary institutions, by level and control of institution: 1963–64 through 2012–13, http://nces.ed.gov/programs/digest/d13/tables/dt13_330.10.asp (last visited Jul 15, 2014); Table 330.50.   Average graduate tuition and required fees in degree–granting postsecondary institutions, by control of institution and percentile: 1989–90 through 2012–13, http://nces.ed.gov/programs/digest/d13/tables/dt13_330.10.asp (last visited Jul 15, 2014).

[192] State grants per student grew faster than CPI from the early 1990s through the mid 2000s, but college costs increased faster, and as a result state funding provides a lower percentage of total funding than it once did. COLLEGE BOARD, TRENDS IN HIGHER EDUCATION SERIES: TRENDS IN STUDENT AID 2013 10–16, 28–29 (2013), http://trends.collegeboard.org/sites/default/files/student-aid-2013-full-report.pdf.

The return on investment in education can be measured as an earnings premium—an increase in earnings over the course of a lifetime compared to what the individual could have earned with a lower level of education.[193] (This ignores externalities or non-pecuniary benefits of education).

Because the earnings premium comes on top of existing labor earnings, and because the income tax has a progressive rate structure, the earnings premium will be taxed at a higher average and marginal tax rate than other labor earnings.[194] By contrast, the tax rate on other forms of investment is often much flatter and lower because capital gains rate schedules apply.

The earnings premium is spread out over the course of a lifetime, but the initial tax benefits of education—taxes are not paid on foregone earnings while in school—occur early in one's career. This is significant for two reasons—rate structure and present value.

With respect to rate structure, the benefit of the exclusion from income of foregone wages while in school is proportional to the tax rate that applies, and the under the progressive income tax, tax rate depends on annual rather than lifetime earnings. Annual earnings typically rise over the course of a career from the twenties through middle age.[195] Since incomes and tax rates are low early in one's career, the benefit of the exclusion from income is also relatively low.

In order to invest in higher education, students must effectively shift income from early, low-income, low-tax tax years to later, higher-income, higher tax years—thereby increasing their total lifetime tax rate. The more progressive the tax rate structure, the large the potential costs to the taxpayer. In the corporate context, such temporal problems are mitigated through capitalization and amortization and through loss carry-forwards, but income smoothing is not as readily available at the individual level.[196]

---

[193] Simkovic and McIntyre, *supra* note12.

[194] Stephan, *supra* note 146.

[195] Simkovic and McIntyre, *supra* note 193.

[196] The realization requirement makes it easier for individuals to time income from gain (or losses) on property, but timing income from earnings is more difficult.

The present value of a tax benefit also depends on its timing and the discount rate. Because the tax benefit of exclusion of foregone earnings occurs earlier than the tax penalty of higher taxes on subsequent earnings premiums, the tax penalties will be more heavily discounted than the tax benefits.[197]

However, over the last 30 years, prevailing interest rates have dramatically declined, reducing discount rates, and as a result timing matters less to present value today than it did 30 years ago. In other words, in relative terms, early tax benefits associated with investment in higher education are worth less, while later life penalties are worth more, and the data now more strongly suggests that investments in higher education are tax disadvantaged.

The one mitigating factor may be a modest decline in the progressivity of the individual income tax.[198] However, most of the decline in tax progressivity in the United States appears to be due to a decline in estate and gift taxes and corporate income taxes rather than a decline in effective individual income tax rates.[199] Payroll taxes, whose incidence is on labor, have dramatically increased.[200]

3. Payroll taxes

In addition to being subject to relatively high marginal tax rates, the higher education earnings premium will typically also be subject to payroll taxes. Although payroll taxes are formally paid half by employers and half by employees, most economists believe that the incidence falls primarily on labor income and

---

[197] Stephan, *supra* note 146; Simkovic and McIntyre, *supra* note 193.

[198] N. Gregory Mankiw, Matthew Weinzierl & Danny Yagan, *Optimal Taxation in Theory and Practice*, 23 J. ECON. PERSP. Fall 2009, at 147.

[199] Thomas Piketty & Emmanuel Saez, *How Progressive is the U.S. Federal Tax System? A Historical and International Perspective*, 21 J. ECON. PERSP., Winter 2007, at 3.

Top statutory marginal income tax rates have declined dramatically, but effective tax rates have not declined as much.

[200] *Id.*; Social Security Administration, SOCIAL SECURITY AND MEDICARE TAX RATES, http://www.socialsecurity.gov/OACT/ProgData/taxRates.html (last visited Jul 16, 2014).

reduces wages.[201]   This discussion proceeds as if the employee paid payroll taxes in full.[202]

As a result of the progressive benefit structure of social security[203] and the limit of payroll taxes to labor earnings (income from investments are not taxed), payroll taxes disproportionately fall on the higher education earnings premium and likely disincetivize investments in higher education relative to alternative investments.

---

[201] Jonathan Gruber & Alan B. Krueger, *The Incidence of Mandated Employer-Provided Insurance: Lessons from Workers' Compensation Insurance* (Nat'l Bureau of Econ. Research, Working Paper No. 3557, 1990), *available at* http://www.nber.org/papers/w3557 (last visited Jul 17, 2014); Jonathan Gruber, *The Incidence of Payroll Taxation: Evidence from Chile*, 15 J. LAB. ECON. S72 (1997); Patricia M. Anderson & Bruce D. Meyer, *The Effects of the Unemployment Insurance Payroll Tax on Wages, Employment, Claims and Denials*, 78 J. PUB. ECON. 81 (2000); Helge Bennmarker, Erik Mellander & Björn Öckert, *Do Regional Payroll Tax Reductions Boost Employment?*, 16 LABOUR ECON. 480 (2009); *cf.* Guillermo Cruces, Sebastian Galiani & Susana Kidyba, *Payroll Taxes, Wages and Employment: Identification Through Policy Changes*, 17 LABOUR ECON. 743 (2010); Emmanuel Saez, Manos Matsaganis & Panos Tsakloglou, *Earnings Determination and Taxes: Evidence From a Cohort-Based Payroll Tax Reform in Greece*, 127 Q. J. ECON. 493 (2012).

[202] The effective tax rate is somewhat lower than the statutory rate. The employee portion of payroll taxes are not deductible from adjusted gross income in calculating income taxes, but the employer portion is excluded from the employee's income and is deductible by the employer. INTERNAL REVENUE SERVICE, *Self-Employment Tax (Social Security and Medicare Taxes)*, http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/Self-Employment-Tax-Social-Security-and-Medicare-Taxes (last updated Apr. 25, 2014).

[203] It is difficult to estimate the progressivity of payroll taxes and Social Security and Medicare benefits viewed as an integrated system. The taxes themselves are regressive. The formulas determining annual payouts are progressive. The total economic effect depends on differences across income levels in retirement age and life expectancy, family structure (family members may be eligible for survivorship benefits and may share income), health, and discount rates (regressive taxation occurs before progressive benefits). Most estimates suggest the combined effect is mildly progressive. Alan L Gustman & Thomas L Steinmeier, *How Effective is Redistribution under the Social Security Benefit Formula?*, 82 J. PUB. ECON. 1 (2001); Mark McClellan & Jonathan Skinner, *The Incidence of Medicare*, 90 J. PUB. ECON. 257 (2006); Julia Lynn Coronado, Don Fullerton & Thomas Glass, *The Progressivity of Social Security*, 11 B.E. J. ECON. ANALYSIS & POL'Y (2011); Andrew J. Rettenmaier, *The Distribution of Lifetime Medicare Benefits, Taxes and Premiums: Evidence from Individual level Data*, 96 J. PUB. ECON. 760 (2012).

Risk spreading through social insurance is generally believed to be welfare-enhancing,[204] but the narrow tax base—labor income, to the exclusion of income from investments—places investments in higher education at a steep disadvantage relative to alternatives that are exempt from payroll taxes.

The narrow tax base also creates pressure for tax rates and maximum taxable labor income to increase more than they would with a broader tax base. Over time, the U.S. federal tax base has increasingly shifted toward labor, and the relative tax burden on investments in higher education has therefore increased.

As shown in Table 4 below, payroll taxes have increased from around 10 percent of federal revenue in the 1940s to nearly 40 percent of federal revenue in the 2000s.[205]   During this time period, corporate income taxes declined from around 30 percent of federal revenue to around 10 percent of federal revenue,[206] although corporate profits did not decline proportionately as a share of GDP.[207]

As shown in Table 5, payroll tax rates have dramatically increased, from around 6 percent in the 1960s to more than 15 percent in the 2000s (the average effective payroll tax rate is closer to 12 percent).[208]

In addition to increases in tax rates, the maximum earnings subject to the payroll taxes has also increased. In constant 2014 dollars, the maximum earnings subject to social security taxes— which constitute the bulk of payroll taxes—increased from $36,000 in 1965 to $117,000 in 2014.[209]   Earnings subject to

---

[204] R. Glenn Hubbard & Kenneth L. Judd, *Social Security and Individual Welfare: Precautionary Saving, Borrowing Constraints, and the Payroll Tax*, 77 AM. ECON. REV. 630 (1987); Alan B. Krueger & Bruce D. Meyer, *Labor Supply Effects of Social Insurance*, 4 HANDB. PUB. ECON. 2327 (2002).

[205] OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, HISTORICAL TABLES: BUDGET OF THE UNITED STATES GOVERNMENT, FISCAL YEAR 2015 tbl.2.2 (2014).

[206] *Id.*

[207] Fed. Reserve Bank of St. Louis, *FRED Graph*, ECONOMIC RESEARCH (2014), http://research.stlouisfed.org/fred2/graph/?g=FHN.

[208] Piketty and Saez, *supra* note 199; Social Security Administration, *supra* note 200.

[209] Social Security Administration, SOCIAL SECURITY AND MEDICARE TAX RATES, http://www.socialsecurity.gov/OACT/ProgData/taxRates.html (last visited Jul 16, 2014); Social Security Administration, BENEFITS PLANNER:

Medicare taxes ceased to be capped in 1993.[210] Although some highly educated individuals earn more than the social security maximum taxable earnings—particularly PhDs and professional degree holders[211]—the bulk of the earnings premium for most individuals with an associate's degree and above will be subject to social security taxes.

A popular view is that payroll taxes are not actually taxes, but rather "forced-savings"—effectively mandatory contributions to a pension program. There is some merit to this argument, but also many problems and limitations. Retirement benefits now constitute a minority of program expenditures, and it is more difficult to justify other programs as forced savings.[212] Social security is redistributive, both across cohorts and across income levels.[213] Social security revenues overwhelmingly come from taxes on current workers, not investment returns to the social security trust fund.[214] Payment of scheduled benefits to earlier retirees has and will require substantial increases in taxes on subsequent cohorts of workers.[215]

Many government programs are progressive, but in the case of Social Security, the burden of redistribution falls almost

MAXIMUM TAXABLE EARNINGS (1937 - 2014), http://www.ssa.gov/planners/maxtax.htm (last visited Jul 16, 2014).

[210] *Id.*

[211] ANTHONY P. CARNEVALE ET AL., THE COLLEGE PAYOFF: EDUCATION, OCCUPATIONS, LIFETIME EARNINGS (2011), *available at* http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/collegepayoff-complete.pdf.

[212] Social Security Administration, *Total Annual Benefits Paid, by the Type of Benefit and Trust Fund, 1937-2013*, SOCIAL SECURITY AND MEDICARE BENEFITS, http://www.ssa.gov/oact/STATS/table4a4.html (last visited Jul 16, 2014).

[213] Effective rates of return on "investments" in social security were much higher for early cohorts than for more recent cohorts, and the return is also higher for lower income groups than for higher income groups. ORLO NICHOLS, MICHAEL CLINGMAN & ALICE WADE, INTERNAL REAL RATES OF RETURN UNDER THE OASDI PROGRAM FOR HYPOTHETICAL WORKERS (2005), http://www.ssa.gov/oact/NOTES/ran5/an2004-5.html (last visited Aug 11, 2014); *supra* note 203.

[214] The 2014 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, 157 (2014).

[215] *See infra* Table 5. Recent estimates suggest that without additional revenue, the program will only be able to pay around 77 percent of scheduled benefits starting around 2033.

entirely on high wages. Those with high incomes from financial or physical capital are largely exempt.[216] Social security taxes therefore more heavily burden investments in education compared to alternative investments.

The strongest argument for the payroll tax is probably the double distortion argument for an exclusive tax on labor.[217] This argument applies equally strongly to funding sources for other expenditure programs, and it is vulnerable to the same critiques, generally without regard to the specific expenditure in question.[218] Notably for our purposes, an important critique is that payroll taxes are distortionary because they disadvantage investments in education relative to other forms of investment.

V. Conclusion

High pre-tax rates of return to post-secondary education suggest underinvestment in higher education. Labor economists have proposed several possible explanations for why such underinvestment might persist in equilibrium, including "psychic costs" of schooling, risk aversion, liquidity constraints, and information failures.

An additional explanation suggested by the analysis in this article is inconsistent tax treatment.   Although *pre-tax* rates of return on education are extremely high, *after-tax* private rates of return are closer to those available from other forms of investment.   In other words, because the effective tax rate on investments in higher education is much higher than the effective tax rates on other forms of investment, the tax and transfer system in aggregate produces an economic distortion that leads to underinvestment in higher education.

---

[216] Effective income tax rates on capital are also lower than effective income tax rates on labor, but the difference is, by design, larger for payroll taxes.

[217] *See supra* Part III.

[218] The exception would be expenditures that compensate the individuals being taxed in proportion to the taxes paid. Shuanglin Lin, *Labor Income Taxation and Human Capital Accumulation*, 68 J. PUB. ECON. 291 (1998). As noted above, payroll taxes and related benefits do not meet this criteria.

This raises the question of whether the tax and transfer system should be modified to correct this distortion. And if so, how?

Horizontal equity would suggest changes to the tax system to equalize the treatment of investments in higher education with other forms of investment. This could be accomplished either by increasing effective tax rates on forms of investment other than higher education (this may require comprehensive tax reform), reducing effective tax rates on investments in higher education, or some combination.

To reduce effective tax rates on higher education without undertaking comprehensive tax reform, tuition and other direct costs could be made deductible, likely through capitalization and amortization at an accelerated pace. Former students would be given control over the timing of these deductions to facilitate income smoothing.[219]

The tax rate on labor would be reduced while the tax rate on capital would be increased so that the differences in rates would be smaller. For example, payroll taxes could be replaced with revenue neutral broad based income or consumption taxes, capital gains and dividends rates could be increased, and ordinary income tax rates could be decreased, particularly toward the upper end of the distribution. This approach has the advantage of favoring fields of study that more closely resemble investments (as opposed to consumption) because they lead to higher earnings, since deductions are more valuable to those in higher tax brackets.

However, optimal tax theory may suggest a different approach. The appropriate changes to the tax and transfer system, if any, depend on marginal elasticities that can only be verified empirically.

There is evidence that students respond to financial incentives (albeit imperfectly) in choosing between more

---

[219] Paul A. David, *Reforming the Taxation of Human Capital: A Modest Proposal for Promoting Economic* Growth, *in* ECONOMICS FOR AN IMPERFECT WORLD: ESSAYS IN HONOR OF JOSEPH STIGLITZ 439 (Richard Arnott et al. eds., 2003)

expensive and less expensive institutions,[220] between fields of study,[221] and whether to attend graduate and professional school programs.[222] Financial incentives such as merit scholarships can affect college enrollment levels, student achievement, and college completion rates.[223] Even at the primary school level, students' perception of financial returns to education can affect educational attainment.[224]

However, students may be more responsive to some economically equivalent financial incentives than to others for reasons of salience or risk aversion. Additional options for reducing tax-created economic distortions and underinvestment in education include increasing federally funded grant programs, reducing the interest rates and increasing the loan limits on federal student loans, and providing insurance that mitigates downside risk.

If elasticities were known, these transfer programs could be targeted more heavily toward those groups of prospective students with the highest elasticities and highest rates of return on investment, for example based on socioeconomic status or some other observable characteristics. For example, it is

---

[220] Wilbert van der Klaauw, *Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression-Discontinuity Approach*, 43 INT. ECON. REV. 1249–1287 (2002).

[221] Arcidiacono, Hotz, and Kang, *supra* note 32.

[222] RICHARD B. FREEMAN, THE MARKET FOR COLLEGE-TRAINED MANPOWER: A STUDY IN THE ECONOMICS OF CAREER CHOICE (1971); Richard B. Freeman, *Supply and Salary Adjustments to the Changing Science Manpower Market: Physics, 1948–1973*, 65 AM. ECON. REV. 27, 38 (1975); Richard B. Freeman, *Legal Cobwebs: A Recursive Model of the Market for New Lawyers*, 57 REV. ECON. & STAT. 171, 173–75 (1975); Richard B. Freeman, *A Cobweb Model of the Supply and Starting Salary of New Engineers*, 29 INDUS. & LAB. REL. REV. 236, 248 (1976).

[223] Christopher Cornwell, David B. Mustard & Deepa J. Sridhar, *The Enrollment Effects of Merit-Based Financial Aid: Evidence from Georgia's HOPE Program*, 24 J. LABOR ECON. 761–786 (2006); Joshua Angrist, Daniel Lang & Philip Oreopoulos, *Incentives and Services for College Achievement: Evidence from a Randomized Trial*, 1 AM. ECON. J. APPL. ECON. 136–163 (2009); Judith Scott-Clayton, *On Money and Motivation A Quasi-Experimental Analysis of Financial Incentives for College Achievement*, 46 J. HUM. RESOUR. 614–646 (2011).

[224] Robert Jensen, *The (Perceived) Returns to Education and the Demand for Schooling*, 125 Q. J. ECON. 515–548 (2010).

sometimes assumed that groups toward the bottom of the income distribution have the highest elasticities, because they are on the margin with respect to college attendance, and that these groups should be the target recipients for subsidies on efficiency grounds. Such elasticity assumptions are sometimes presented as a justification for means-testing Pell Grants and excluding middle class college students and graduate students from eligibility.[225]

However, the empirical evidence for higher elasticity of investment in education for lower income groups is at best mixed.[226] To the contrary, half of studies suggest that higher socio-economic groups may have higher elasticities of investment in higher education than lower income groups. This makes sense intuitively considering differences in the availability of attractive alternative investments such as family-owned businesses.

Elasticity of investment should be considered with respect to *quality of education* as opposed to merely *quantity of education*. Degrees are not commodities with equal rates of return—higher quality typically comes at higher cost, at least among non-profit institutions.[227] The rate of return on lower-quality degrees disproportionately funded by Pell grants—such as associate's degrees and vocational programs from for-profit institutions[228]— may be lower than the rate of return to higher quality programs that are financed primarily through other government programs,[229] especially when differences in completion rates are

---

[225] Political considerations may play a more important role. Means-testing may be attractive to conservatives because it restricts eligibility, reduces expenditures, and narrows the constituency that will benefit from and support public investment programs. Means testing may be attractive to some liberals because it favors low-income groups over middle-income groups.

[226] Susan Dynarski, *The behavioral and distributional implications of aid for college*, 92 AM. ECON. REV. 279, 285-86 (2002).

[227] Dale & Krueger, *supra* note 27.

[228] *For-Profit Colleges Capitalize on Pell Grant Revenue*, THE CHRONICLE OF HIGHER EDUCATION, 2010, http://chronicle.com/article/Data-Points-For-Profit/63388 (last visited Aug 11, 2014).

[229] A study by the Government Accountability Office suggested that after controlling for student characteristics, graduates of for-profit institutions generally have worse outcomes, although some for-profit programs performed well. *See* GOV'T ACCOUNTABILITY OFF., POSTSECONDARY EDUCATION: STUDENT OUTCOMES VARY AT FOR-PROFIT, NONPROFIT, AND PUBLIC SCHOOLS 5–8 (2011).

taken into account.[230]   Without stronger evidence of higher elasticities or higher rates of return toward the bottom of the income distribution, means-testing education benefits may simply increase complexity and administrative costs and reduce the aggregate level and efficacy of public investment in education.

Much of the labor economics literature has focused on liquidity constraints and risk aversion as likely causes of underinvestment in higher education.[231]

It may therefore be sensible, as a first approximation, to explore augmenting and expanding existing programs such as federal student loans, which provide liquidity,[232] and income based repayment programs with debt forgiveness, which provide a form of insurance and risk spreading.[233] (Modified grant programs that are simpler and more closely tied to rates of return also merit consideration).

Low limits on certain federal student loan programs and high interest rates, especially for graduate students,[234] increase the

---

See also David W. Breneman & Fred J. Galloway, *Rethinking the Allocation of Pell Grants*, (1996), http://eric.ed.gov/?id=ED393328 (last visited Aug 9, 2014); Kane and Rouse, *supra* note 11.

[230] Mariana Alfonso, Thomas R. Bailey & Marc Scott, *The educational outcomes of occupational sub-baccalaureate students: evidence from the 1990s*, 24 ECON. EDUC. REV. 197 (2005).

[231] Claire Callender & Jonathan Jackson, *Does the Fear of Debt Deter Students from Higher Education?*, 34 J. SOC. POL'Y 509 (2005); Heckman, Lochner, and Todd, *supra* note 39; Catherine C. Eckel et al., *Debt Aversion and the Demand for Loans for Postsecondary Education*, 35 PUB. FIN. REV. 233 (2007); Lance J. Lochner & Alexander Monge-Naranjo, *The Nature of Credit Constraints and Human Capital*, 101 AM. ECON. REV. 2487 (2011); Lance Lochner & Alexander Monge-Naranjo, *Credit Constraints in Education*, 4 ANN. REV. ECON. 225 (2012); Ben Ost & Weixiang Pan, *The Impact of Parental Layoff on Higher Education Investment*, ECON. EDUC. REV., http://www.sciencedirect.com/science/article/pii/S0272775714000636 (last visited Jul 26, 2014).

[232] Jonathan D. Glater, *The Other Big Test: Why Congress Should Allow College Students to Borrow More Through Federal Aid Programs*, 14 N.Y.U. J. LEGIS. & PUB. POL'Y 11 (2011).

[233] Simkovic, *supra* note 189.; Philip G. Schrag & Charles W. Pruett, *Coordinating Loan Repayment Assistance Programs with New Federal Legislation*, 50 J. LEGAL EDUC. 583, 590–97 (2011).

[234] The interest rates on federal Stafford and Graduate PLUS loans currently exceed rates that are available from some private lenders to fund degrees in Medicine, Law, Business, Engineering and Computer Science. (See DRB Bank).

costs of financing a degree, both by forcing students to pay more for their federal loans and increasing the use of higher cost private consumer loans.[235] Unlike increases in tuition, which can fund improvements in the quality of education students receive, increases in financing costs are unlikely to provide any benefits to students.

Income based repayment programs currently cap debt repayments and provide forgiveness. In theory, this may have the unintended consequence of disproportionately benefiting fields of study that are both expensive and lead to relatively low earnings. A better approach may be to insure only against downward deviations from expected income in light of the individual's field of study, ex-ante characteristics, and institutional characteristics.

Thus for example, a graduate in Field A where the average expected income is $100,000 per year and the 25th percentile income is $60,000 per year could receive debt forgiveness to the extent that his or her long-term income fell below $60,000 per year, whereas a graduate in Field B, where expected income is $50,000 per year and 25th percentile income is $30,000 per year would only receive debt forgiveness to the extent that his or her long-term income fell below $30,000 per year. In practice, this may not be very different from how Income Based Repayment programs currently work, since more expensive programs will generally be associated with higher earnings and higher debt levels.[236]

To the extent that risk aversion is reducing educational investment, insurance programs may provide a large benefit at minimal cost because far more students can be reassured and encouraged to invest than will actually need to use the insurance.[237]

Ultimately, the specific reforms that should be undertaken to correct extant distortions should be determined through

---

[235] Lochner and Monge-Naranjo, *supra* note 231.

[236] [Cite John Brooks]

[237] ROBERT J. SHILLER, THE NEW FINANCIAL ORDER: RISK IN THE 21ST CENTURY 130-150 (2003)*; Felicia Ionescu, *The Federal Student Loan Program: Quantitative implications for college enrollment and default rates*, 12 REV. ECON. DYNAMICS 205 (2009).

empirical studies of student responsiveness, elasticities, and rates of return.

The analysis in this article suggests that either tax reform or additional subsidies to higher education (or both) are likely necessary to correct tax-system-created distortions that lead to underinvestment in higher education. Correcting these distortions would hasten economic growth and improve social welfare.

Table 1: Average Annual Earnings by Education, Prime-Age Males, 1970-2010 (2012 USD)

	High School or less	Some College or 2-year degree	Bachelor's degree	Above bachelor's degree
Earnings (2012 USD)				
1970	49,900	67,100	88,000	98,500
1980	46,400	56,200	72,200	79,100
1990	43,500	57,200	78,600	103,800
2000	42,800	57,800	85,900	116,100
2010	35,400	50,500	82,300	119,000
Earnings premium relative to high school (2012 USD)				
1970		17,300	38,200	48,700
1980		9,800	25,800	32,700
1990		13,700	35,100	60,300
2000		15,000	43,100	73,400
2010		15,100	46,900	83,700
Earnings premium relative to high school (percent)				
1970		35	77	98
1980		21	56	70
1990		32	81	139
2000		35	101	172
2010		43	133	237

Note: Cross-tabulations. Earnings calculated as sum of wage, farm and business income. Person-weights used in all years. Age 30-54. Data quality flags applied to filter out imputes for components of earnings and for education level. Includes employed or unemployed, but excludes those not in labor force. Earnings inflation adjusted to 2012 dollars using the Consumer Price Index (CPI) and rounded to nearest hundred dollars.

Source: United States Census Bureau; IPUMS-USA, University of Minnesota, www.ipums.org

Table 2: Average Annual Earnings by Education,
Prime-Age Females, 1970-2010 (2012 USD)

	High School or less	Some College or 2-year degree	Bachelor's degree	Above bachelor's degree
Earnings (2012 USD)				
1970	21,400	27,300	35,200	47,700
1980	20,800	25,600	30,100	39,400
1990	23,500	32,200	42,100	56,200
2000	26,600	35,800	49,800	66,600
2010	23,900	33,900	51,100	72,700
Earnings premium relative to high school (2012 USD)				
1970		5,900	13,800	26,300
1980		4,800	9,300	18,600
1990		8,700	18,600	32,700
2000		9,100	23,200	40,000
2010		10,000	27,200	48,900
Earnings premium relative to high school (percent)				
1970		27	65	123
1980		23	45	90
1990		37	79	139
2000		34	87	150
2010		42	114	204

Note: Cross-tabulations. Earnings calculated as sum of wage, farm and business income. Person-weights used in all years. Age 30-54. Data quality flags applied to filter out imputes for components of earnings and for education level. Includes employed or unemployed, but excludes those not in labor force. Earnings inflation adjusted to 2012 dollars using the Consumer Price Index (CPI) and rounded to nearest hundred dollars.

Source: United States Census Bureau; IPUMS-USA, University of Minnesota, www.ipums.org

Table 3: Per-student and Aggregate Higher Education Tax Expenditures (2012)

	Per-Student (USD)			Aggregate (USD millions)		
	Tax Expenditure Estimates			Tax Expenditure Estimates		
	OMB	JCT	Average	OMB	JCT	Average
Total:	1704	1,996	1,852	34,560	40,500	37,580
Tuition Credits	865	1,001	933	17,540	20,300	18,920
American Opportunity Tax Credit	704		704	14,290		14,290
Lifetime Learning Tax Credit	160		160	3,250		3,250
Deduction for higher education expenses	23	39	31	470	800	635
Deductibility of student-loan interest	42	64	53	850	1,300	1,075
Discharge of student loan indebtedness	1	10	5	20	200	110
Exclusion of scholarship and fellowship income	156	118	137	3,170	2,400	2,785
Qualified tuition programs	88	35	61	1,780	700	1,240
Education Individual Retirement Accounts	4		4	80		80
Exclusion of interest on savings bonds redeemed to finance educational expenses	1		1	20		20
Parental personal exemption for students age 19 or over	154	237	195	3,120	4,800	3,960
Exclusion of employer-provided educational assistance	37	64	51	750	1,300	1,025
Deductibility of charitable contributions (education)	193	256	225	3,910	5,200	4,555
Exclusion of interest on bonds for private nonprofit educational facilities	114	153	134	2,320	3,100	2,710
Exclusion of interest on student-loan bonds	26	20	23	530	400	465

Per-student figures calculated by dividing aggregate tax expenditures by the number of post-secondary students. The number of post-secondary students is the average (20.3 million) of estimates from the U.S. Census Bureau's Current Population Survey (19.9 million) and the Department of Education's Integrated Post-secondary Education Data System (20.6 million). Real 2012 dollars.

Table 4: Payroll and Corporate Taxes
as a Percent of Federal Government Revenue, 1934-2013

Years	Social Security and Retirement Receipts (percent)	Corporate Income Tax Receipts (percent)
1934 - 1938	10	17
1939 - 1943	17	27
1944 - 1948	8	29
1949 - 1953	10	29
1954 - 1958	12	27
1959 - 1963	17	22
1964 - 1968	20	21
1969 - 1973	24	16
1974 - 1978	30	14
1979 - 1983	32	10
1984 - 1988	36	9
1989 - 1993	37	10
1994 - 1998	35	11
1999 - 2003	36	9
2004 - 2008	36	13
2009 - 2013	37	9

Note: 5 year averages weight each year equally.

Source: Budget of the United States Government: Historical Tables Fiscal Year 2015, Table 2.2 — Percentage Composition of Receipts by Source: 1934–2019

Table 5: Maximum Annual Earnings Subject to Social Security Taxes
and Payroll Tax rates, selected years, 1938-2013

Years	Maximum annual earnings subject to Social Security Taxes (real 2014 dollars)	Payroll Tax Rates (percent)		
		Total Payroll Tax Rate	Social Security Tax Rate (OASDI)	Medicare Tax Rate (HI)
1938	50,600	2.00	2.00	
1943	41,200	2.00	2.00	
1948	29,600	2.00	2.00	
1953	32,000	3.00	3.00	
1958	34,600	4.50	4.50	
1963	37,300	7.25	7.25	
1968	53,300	8.80	7.60	1.20
1973	57,900	11.70	9.70	2.00
1978	64,600	12.10	10.10	2.00
1983	85,300	13.40	10.80	2.60
1988	90,500	15.02	12.12	2.90
1993	94,800	15.30	12.40	2.90
1998	99,800	15.30	12.40	2.90
2003	112,500	15.30	12.40	2.90
2008	112,700	15.30	12.40	2.90
2013	117,000	15.30	12.40	2.90

Note: Employer and employee portions of payroll tax rates have been summed. Maximum earnings subject to Social Security Taxes are inflation adjusted to 2014 dollars using the Consumer Price Index (CPI) and rounded to nearest hundred dollars.

Source: United States Social Security Administration, Social Security Online Trust Data.