The Knowledge Tax

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Government subsidies to higher education have recently become a hot-button political issue. But what if the federal government does not actually subsidize higher education, but taxes it? Labor economists struggle to explain why the rates of return to higher education have remained much higher than the rates of return to other investments. This Article proposes a novel explanation: distortionary taxation. Economic theory suggests that when investments that are substitutes for one another are taxed inconsistently, investors shun the investment option that is taxed more heavily. Unfavorable tax treatment of higher education could therefore create an undersupply of educated labor. This distortion may reduce economic growth and social welfare.

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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 reduce the levels of savings and investment and also encourage consumption.[1]

Tax distortions that reduce investment may stunt economic growth and slow the pace at which the welfare of the typical individual can be improved.[2] To encourage investment, the Internal Revenue Code permits recovery of investment costs, tax deferral, income smoothing, favorable tax rates for capital gains and dividends, conversion of certain kinds of labor income into capital gains income, and deductions from taxable income for borrowing costs.[3] Special provisions encourage specific investments such as retirement savings and owner-occupied housing. However, there is one form of investment for which the tax code offers little encouragement: spending on formal higher education[4]—an investment in human capital that increases wages and contributes to economic growth.

Federal tax rates on labor are much higher than tax rates on capital. In addition, college tuition generally cannot be capitalized or amortized, and interest on student loans is only partly deductible. Although limited education tax credits and deductions

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[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 portions of their earnings that they intend to invest. These are theoretical predictions. Empirical studies of the effects of taxation on savings and investment behavior have produced mixed results. Compare Michael J. Boskin, *Taxation, Saving, and the Rate of Interest*, 86 J Polit Econ S3, S15–16 (1978), and Laurence S. Seidman and Kenneth A. Lewis, *The Consumption Tax and the Saving Elasticity*, 52 Natl Tax J 67, 71–72 (1999), with Robert E. Hall, *Intertemporal Substitution in Consumption*, 96 J Polit Econ 339, 349–50 (1988), and A. Lans Bovenberg, *Tax Policy and National Saving in the United States: A Survey*, 42 Natl Tax J 123, 128–30 (1989).

[2] See N. Gregory Mankiw, Matthew Weinzierl, and Danny Yagan, *Optimal Taxation in Theory and Practice*, 23 J Econ Persp 147, 164–65 (2009). According to the Solow growth model, higher levels of investment and slower population growth lead to higher income per capita. Versions of this model that incorporate human capital explain cross-country data reasonably well. See N. Gregory Mankiw, David Romer, and David N. Weil, *A Contribution to the Empirics of Economic Growth*, 107 Q J Econ 407, 421 (1992).

[3] These provisions are not universally praised. Critics argue that they contribute to misallocation of capital and that they erode the tax base. See, for example, Calvin H. Johnson, *Measure Tax Expenditures by Internal Rate of Return*, 139 Tax Notes 273, 278 (2013). The focus of this discussion is not on the ideal tax system, but on inconsistencies within the extant tax system.

[4] For a discussion of higher education tax benefits and their limitations, see Part V.D.

are available, the rules are complex and the benefits per student are small. Compared to other investments, higher education spending faces higher tax rates and a larger tax base.

Economic theory holds that when investments that are substitutes are taxed inconsistently, investors shun the investment option that is taxed more heavily.[5] Investments in most activities exhibit declining marginal returns, meaning that each additional dollar invested earns a lower return than the previous dollar. If this pattern holds for education, and if students are more likely to pursue additional education when the after-tax returns are higher than those from alternative investments, then the unfavorable tax treatment of higher education could create an undersupply of educated workers relative to physical or financial capital.

Consider the following example. A recent college graduate from a well-to-do family is deciding between two options: (1) attend medical school and then practice medicine, or (2) buy a small vacant building and convert it into rental apartments. Either option will require an initial investment of $300,000 and several years of hard work before reaching profitability. Each option (but not both) can be financed with a combination of family money and external loans. The medical degree is expected to produce higher returns before taxes in the form of a large earnings boost because of a strong demand for health services and a relatively low supply of qualified physicians. The apartments will likely produce more-modest returns before taxes because of an adequate supply of housing.

However, assume that the apartment complex can be expected to produce higher returns after taxes because of the more generous tax treatment of real estate. If the college graduate buys the building, he can recover the cost of the building and improvements through depreciation deductions, deduct interest expenses in full, deduct any state or local property taxes from his income for federal taxes, and ultimately benefit from relatively low capital gains tax rates on the eventual sale of the building,[6] potentially converting his labor on the building renovations into capital gains.

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[5] See Louis Kaplow, *Taxation*, in A. Mitchell Polinsky and Steven Shavell, eds, 1 *Handbook of Law and Economics* 647, 682–83 (Elsevier 2007); Louis Kaplow, *Human Capital under an Ideal Income Tax*, 80 Va L Rev 1477, 1513 (1994); Mankiw, Weinzierl, and Yagan, 23 J Econ Persp at 164–65 (cited in note 2).

[6] This sale, however, is subject to depreciation-recapture rules. See IRC §§ 1245, 1250.

By contrast, if he pursues the medical degree, he will be unable to recover the cost of tuition through amortization. Only a fraction of his student-loan interest (if any) will be deductible. His additional earnings that are attributable to the medical degree will be subject to both federal income and payroll taxes. He will not receive a deduction on his federal income taxes for the employee-paid half of his payroll taxes, and he will have few opportunities to convert his labor income into capital gains.

If, based on nonpecuniary considerations, our college student is either indifferent between medicine and real estate, prefers real estate,[7] or has a nonpecuniary preference for medicine that is smaller than the financial differences after taxes, then he will pursue the real estate option even though medicine would have been socially optimal.[8] This decision—and similar decisions by others who are similarly situated—will perpetuate a suboptimal allocation of investments in which there are relatively too many apartments and relatively too few doctors. Because market actors respond to after-tax marginal rates of return, tax-rate differences will prevent the market from optimizing the allocation of capital and prevent marginal pretax rates of return from converging. Part III below presents a mathematical model illustrating this dynamic.

Disadvantageous tax treatment of investments in human capital relative to physical capital may help explain two mysteries of labor economics: persistently high pretax rates of return on investments in higher education in the United States, and slower-than-expected growth in education levels.[9]

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[7] The college graduate will choose real estate regardless of the magnitude of his nonpecuniary preference for real estate, since both pecuniary and nonpecuniary considerations favor real estate. This decision will be suboptimal only if the pretax financial differences between medicine and real estate are larger than his nonpecuniary preference for real estate.

[8] For the purposes of this Article, efficiency is defined as the maximization of social welfare, and social welfare is defined as the aggregation of individual utilities (assuming that there are no positive or negative externalities of education). The public benefits of education are narrowly defined as the extent to which additional tax revenues exceed subsidies. In other words, the analysis provides a conservative estimate of the ideal level of investment in education: it does not assume that education serves societal purposes above and beyond any other income-producing activities.

[9] See James J. Heckman, Lance J. Lochner, and Petra E. Todd, *Earnings Functions, Rates of Return and Treatment Effects: The Mincer Equation and Beyond*, in Eric A. Hanushek and Finis Welch, eds, 1 *Handbook of the Economics of Education* 307, 434–37 (Elsevier 2006); Bas Jacobs, *Real Options and Human Capital Investment*, 14 Labour Econ 913, 923 (2007). Labor economists have considered differences in pretax and after-tax rates of return to education, but there has been limited discussion of tax rates

If the extant tax system does indeed steer investment away from human capital, this raises the question of what approach should be taken to counter this distortion and increase investment in higher education to its efficient level.

Options include harmonizing the tax treatment of investments in different forms of capital, reducing the differences between tax rates on labor and tax rates on capital, directly subsidizing education, and offering increased downside protection for investments in education. Promising nontax policy options include expanding grants, low-cost education loans, and insurance against adverse outcomes.

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

Part I of this Article reviews empirical evidence linking higher education to increased earnings and economic growth, and it considers student responsiveness to financial incentives. Part II explains why the unusually high rates of return to higher education may indicate underinvestment. Part III presents a mathematical model illustrating the link between tax rates and rates of return. Part IV reviews optimal-tax theory and the distortion problem. Part V contrasts taxation of favored investments with taxation of higher education. Part VI considers policy implications.

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.[10] If the risk-adjusted marginal rate of return on one form of investment is above average, the investment should attract more capital; this influx of capital will then drive down returns. If the risk-adjusted marginal rate of return is below average, investors should seek higher returns elsewhere and capital flight should eventually increase returns to

relative to other investments as a cause of high returns to education. This possibility was briefly mentioned by Professor Gary S. Becker. See Gary S. Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education* 206 (Chicago 3d ed 1993).

[10] See William F. Sharpe, *Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk*, 19 J Fin 425, 441 (1964).

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 *pretax* risk-adjusted marginal rates of return, which reflects an efficient allocation of capital in the absence of externalities.[11] In the presence of taxation, capital markets will equalize *after-tax* risk-adjusted marginal rates of return.[12] This allocation of capital will be less efficient if tax rates on different forms of investment are different and if there are no offsetting externalities or inefficiencies.

This Article proceeds under the assumption that higher education is an investment that typically increases earnings and employment and that 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 (that is, to generate a profit). Also like other business expenditures, higher education has a limited useful life since educated individuals cannot work indefinitely. However, unlike other forms of investment, higher education expenditures are taxed largely as if they were a form of personal consumption rather than investment.[13]

The association of higher education with higher earnings and employment is well established,[14] but this 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.[15] Many of these techniques were

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11 See Mankiw, Weinzierl, and Yagan, 23 J Econ Persp at 167 (cited in note 2).

12 See Kaplow, *Taxation* at 682–83 (cited in note 5).

13 See Part I.B.

14 See Jacob Mincer, *Schooling, Experience, and Earnings* 43–63 (Columbia 1974); Becker, *Human Capital* at 51–53 (cited in note 9).

15 See generally, for example, Lee Epstein and Gary King, *The Rules of Inference*, 69 U Chi L Rev 1 (2002); Stephen L. Morgan and Christopher Winship, *Counterfactuals and Causal Inference: Methods and Principles for Social Research* (Cambridge 2007); Joshua D. Angrist and Jörn-Steffen Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion* (Princeton 2009); Richard J. Murnane and John B. Willett, *Methods Matter: Improving Causal Inference in Educational and Social Science Research* (Oxford

pioneered by labor economists for the specific purpose of estimating causal effects on earnings and employment.[16]

Based on numerous independent peer-reviewed studies of identical twins,[17] instrumental-variable analyses,[18] fixed- and random-effects analyses,[19] regression-discontinuity designs,[20] propensity scores or covariate balancing and matching with ordinary least squares (OLS) regression,[21] and a wide range of

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2011); Guido W. Imbens and Donald B. Rubin, *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction* (Cambridge 2015).

[16] See Angrist and Pischke, *Mostly Harmless Econometrics* at xi–xiii (cited in note 15); John A. List and Imran Rasul, *Field Experiments in Labor Economics*, in Orley Ashenfelter and David Card, eds, 4A *Handbook of Labor Economics* 103, 107–14 (Elsevier 2011); Murnane and Willett, *Methods Matter* at 203–23 (cited in note 15).

[17] See, for example, Orley Ashenfelter and 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 percent, and reporting that this is probably not due to differences in innate ability). See also Dorothe Bonjour, et al, *Returns to Education: Evidence from U.K. Twins*, 93 Am Econ Rev 1799, 1809–10 (2003); Oddbjørn Raaum and Tom Erik Aabø, *The Effect of Schooling on Earnings: Evidence on the Role of Family Background from a Large Sample of Norwegian Twins*, 26 Nordic J Polit Econ 95, 96 (2000); Cecilia Elena Rouse, *Further Estimates of the Economic Return to Schooling from a New Sample of Twins*, 18 Econ Educ Rev 149, 156 (1999); Colm Harmon and Ian Walker, *Estimates of the Economic Return to Schooling for the United Kingdom*, 85 Am Econ Rev 1278, 1284 (1995); Paul Miller, Charles Mulvey, and 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, 597–98 (1995). But see generally David Neumark, *Biases in Twin Estimates of the Return to Schooling*, 18 Econ Educ Rev 143 (1999) (discussing how within-twin estimates may result in an upward bias).

[18] For a brief review, see Michael Simkovic and Frank McIntyre, *The Economic Value of a Law Degree*, 43 J Legal Stud 249, 269 (2014). See also Joshua D. Angrist and Alan B. Krueger, *Does Compulsory School Attendance Affect Schooling and Earnings?*, 106 Q J Econ 979, 980 (1991) (exploiting minimum-dropout-age laws and instrumenting by birth quarter); Douglas Staiger and James H. Stock, *Instrumental Variables Regression with Weak Instruments*, 65 Econometrica 557, 579–82 (1997) (same); Thomas J. Kane and 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); Harmon and Walker, 85 Am Econ Rev at 1281–82 (cited in note 17) (instrumenting by birth cohorts and variation in minimum dropout ages). See also generally Joshua D. Angrist and Alan B. Krueger, *Split-Sample Instrumental Variables Estimates of the Return to Schooling*, 13 J Bus & Econ Stat 225 (1995).

[19] See generally Peter Arcidiacono, Jane Cooley, and Andrew Hussey, *The Economic Returns to an MBA*, 49 Intl Econ Rev 873 (2008).

[20] See Lars J. Kirkebøen, Edwin Leuven, and Magne Mogstad, *Field of Study, Earnings and Self-Selection* *32 (Statistics Norway, Jan 2015), archived at http://perma.cc/B338-PRCE; Justine S. Hastings, Christopher A. Neilson, and Seth D. Zimmerman, *Are Some Degrees Worth More than Others? Evidence from College Admission Cutoffs in Chile* *2 (NBER Working Paper Series, July 2013), archived at http://perma.cc/5G43-SBDW.

[21] See generally Simkovic and McIntyre, 43 J Legal Stud 249 (cited in note 18).

other sophisticated statistical techniques, labor economists can now confidently say that education—including college and advanced degrees—*causes* a large increase in earnings[22] across time, countries,[23] ability levels, and racial and ethnic groups.[24]

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,[25] likely by improving productivity[26] and accelerating the pace of innovation.[27] Education may also help signal

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[22] See David Card, *The Causal Effect of Education on Earnings*, in Orley Ashenfelter and David Card, eds, 3A *Handbook of Labor Economics* 1801, 1834–54 (Elsevier 1999) (reviewing the empirical literature).

[23] See *Education at a Glance 2013: OECD Indicators* *126–47 (OECD, Sept 2013), archived at http://perma.cc/98VF-3JRX; Eric A. Hanushek and Ludger Woessmann, *Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation*, 17 J Econ Growth 267, 299–300 (2012).

[24] See Lisa Barrow and Cecilia Elena 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). See also generally Orley Ashenfelter and Cecilia Rouse, *Schooling, Intelligence, and Income in America*, in Kenneth Arrow, Samuel Bowles, and Steven Durlauf, eds, *Meritocracy and Economic Inequality* 89 (Princeton 2000) (reviewing the econometrics literature and concluding that the economic returns on schooling do not differ significantly by family background or by measures of the ability of the student); James J. Heckman, *Lessons from the Bell Curve*, 103 J Polit Econ 1091 (1995).

[25] See Mankiw, Romer, and Weil, 107 Q J Econ at 433 (cited in note 2); Paul M. Romer, *Endogenous Technological Change*, 98 J Polit Econ S71, S90–96 (1990) (finding that the stock of human capital determines the rate of growth and suggesting that "too little human capital is devoted to research"); Philippe Aghion and 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 Fiscal Stud 1, 16–19 (1999); Alan B. Krueger and Mikael Lindahl, *Education for Growth: Why and for Whom?*, 39 J Econ Lit 1101, 1102, 1108, 1130 (2001).

[26] See David A. Wise, *Academic Achievement and Job Performance*, 65 Am Econ Rev 350, 364 (1975). See also generally Becker, *Human Capital* (cited in note 9); Hanushek and Woessmann, 17 J Econ Growth 267 (cited in note 23) (linking investments in education to cognitive-skill development and cognitive-skill development to economic growth).

[27] See Romer, 98 J Polit Econ at S71 (cited in note 25); Aghion and Howitt, 60 Econometrica at 324 (cited in note 25); Philippe Aghion, et al, *The Causal Impact of Education on Economic Growth: Evidence from the United States* *38–39 (Brookings Papers on Economic Activity, Mar 2009), archived at http://perma.cc/FJ8U-92H3 (instrumenting state-level investment in higher education by appointments to federal appropriations committees and finding evidence that increased investment in four-year educational institutions increases the rate of economic growth, likely by increasing the pace of innovation).

ability levels or motivation, thereby matching employees with employers much like sales and marketing expenditures create value by matching customers with products and services.[28]

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 to difficulties measuring the quantity and quality of higher education and human capital.[29]

Other recent studies with higher-quality data generally find a causal link between education and growth.[30] 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 postsecondary education appears to be a more important driver of growth for high-income, advanced economies[31] such as those of the United States and Western Europe.

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

B. Consumption versus Investment

One important objection to viewing higher education as an investment is that higher education expenditures are at least in

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But see generally Fabian Lange and Robert Topel, *The Social Value of Education and Human Capital*, in Hanushek and Welch, eds, 1 *Handbook of the Economics of Education* 459 (cited in note 9) (expressing skepticism that education has either positive or negative externalities and suggesting that the boost to individual earnings is likely a good measure of the social effect of education on the economy).

[28] See Joseph E. Stiglitz, *The Theory of "Screening," Education, and the Distribution of Income*, 65 Am Econ Rev 283, 283 (1975); Paul J. Taubman and Terence J. Wales, *Higher Education, Mental Ability, and Screening*, 81 J Polit Econ 28, 43 (1973).

[29] See Krueger and Lindahl, 39 J Econ Lit at 1102 (cited in note 25); Angel de la Fuente and Rafael Doménech, *Human Capital in Growth Regressions: How Much Difference Does Data Quality Make?*, 4 J Eur Econ Assoc 1, 1 (2006); Hanushek and Woessmann, 17 J Econ Growth at 277 (cited in note 23).

[30] See, for example, Mark Bils and Peter J. Klenow, *Does Schooling Cause Growth?*, 90 Am Econ Rev 1160, 1170 (2000) (finding that education may cause only about one-third of the economic growth with which it is correlated).

[31] See Aghion and Howitt, 60 Econometrica at 349 (cited in note 25); James B. Ang, Jakob B. Madsen, and Md. Rabiul Islam, *The Effects of Human Capital Composition on Technological Convergence*, 33 J Macroecon 465, 465 (2011).

part a form of consumption rather than a form of investment.[32] According to one version of this objection, students chase expensive degrees of little economic value to enjoy the consumption benefits of social prestige.[33] According to another version, students select into fields with low earnings potential rather than higher-earnings fields because they enjoy studying the lower-earnings fields and find the work associated with such degrees more rewarding.[34] Still another version focuses on amenities such as aesthetically pleasing campuses and the availability of sporting and social events for students.[35]

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 instruction generally boost earnings by more than lower-cost institutions and may also have higher completion rates.[36] Degrees are not simply commodities, and institutions do not simply sort students by parental socioeconomic status or by levels of innate intellectual ability. There are differences in quality and value added across institutions, and higher quality correlates with higher costs.[37]

Some economists have tried to measure the consumption value of education by comparing the earnings of high-achieving students in low-earnings-potential majors to the earnings those students could have achieved with higher-earnings-potential majors.[38] Earnings and employment outcomes vary across fields

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[32] 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, 939, 953–61 (1993).

[33] See Robert B. Archibald and David H. Feldman, *Why Does College Cost So Much?* 93–95 (Oxford 2010).

[34] Id.

[35] Id at 96.

[36] See Stacy Berg Dale and 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."). The direction of this relationship—that higher educational spending is associated with higher benefits—does not mean that the relationship is necessarily linear.

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

[38] See Annette Alstadsæter, *Measuring the Consumption Value of Higher Education*, 57 CESifo Econ Stud 458, 468 (2011).

of study.[39] These differences appear to be caused partly by differences in the students who select into certain fields and partly by differences in the causal effects of the fields of study themselves.[40]

What these analyses often overlook, however, is that students tend to underestimate earnings differences across majors when choosing a major.[41] Measuring the actual differences in earnings may overestimate the consumption value of lower-earnings degrees.

Another problem with estimating consumption value among those who have completed college based on earnings differences across majors is that completion rates tend to be lower for more-challenging majors associated with higher earnings, such as those in the mathematical, scientific, and engineering fields.[42] Many students initially intend to major in higher-earnings fields but switch after receiving low grades.[43]

In other words, the lower earnings potential of certain majors may be offset in part by lower risks of noncompletion or by a higher likelihood of completion in a shorter period of time. Faster completion means lower opportunity costs of forgone earnings. Taking the noncompletion risk into account increases expected returns to many low-earnings majors and reduces the expected returns to many high-earnings majors. Noncompletion risk is substantial at the undergraduate level. Among the cohort that started college in 2005, only 38.6 percent of students

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39 See Michael Simkovic, *Risk-Based Student Loans*, 70 Wash & Lee L Rev 527, 625 (2013); Peter Arcidiacono, *Ability Sorting and the Returns to College Major*, 121 J Econometrics 343, 343–45 (2004).

40 See Kirkebøen, Leuven, and Mogstad, *Field of Study, Earnings and Self-Selection* at *4 (cited in note 20) (exploiting a quasi-random assignment of college students in Norway to institutions and majors based on ranked preferences and on arbitrary, shifting cutoffs); Hastings, Neilson, and Zimmerman, *Are Some Degrees Worth More than Others?* at *21–22 (cited in note 20).

41 See Peter Arcidiacono, V. Joseph Hotz, and Songman Kang, *Modeling College Major Choices Using Elicited Measures of Expectations and Counterfactuals*, 166 J Econometrics 3, 8–9 (2012); Julian R. Betts, *What Do Students Know about Wages? Evidence from a Survey of Undergraduates*, 31 J Hum Res 27, 49–50 (1996).

42 See Sylvia Hurtado, et al, *Degrees of Success: Bachelor's Degree Completion Rates among Initial STEM Majors* *3 (Higher Education Research Institute, Jan 2010), archived at http://perma.cc/N8MC-UMXF ("[S]tudents who initially enter undergraduate STEM programs have substantially lower degree completion rates than their same-race peers who enter other academic disciplines.").

43 See Kevin Rask, *Attrition in STEM Fields at a Liberal Arts College: The Importance of Grades and Pre-collegiate Preferences*, 29 Econ Educ Rev 892, 894–97 (2010). See also generally Ben Ost, *The Role of Peers and Grades in Determining Major Persistence in the Sciences*, 29 Econ Educ Rev 923 (2010).

completed college within four years.[44] Within six years, the percentage of completers increased to 58.8 percent.[45] 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[46] may suggest that education has *negative* consumption value (disutility) for many actual and potential students.[47] Several econometric studies suggest that the "psychic costs" of schooling may help explain why many individuals who would benefit financially from additional education do not pursue it.[48] Taste for education is likely heterogeneous throughout the population, with those who enjoy education and related work being more likely to pursue additional education.[49] Thus, while highly educated individuals may find education enjoyable, their tastes are unusual.[50] Most Americans spend their time and money in ways that suggest that education is not a preferred leisure activity.[51]

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44 National Center for Education Statistics, *Table 376: Percentage of First-Time Full-Time Bachelor's Degree-Seeking Students at 4-Year Institutions Who Completed a Bachelor's Degree, by Race/Ethnicity, Time to Completion, Sex, and Control of Institution; Selected Cohort Entry Years, 1996 through 2005* (Department of Education, Nov 2012), archived at http://perma.cc/U5EW-CHSH.

45 If data more than six years out were available, completion rates would likely be higher still, but noncompletion rates could remain substantial.

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

47 See Mantz Yorke, *The Quality of the Student Experience: What Can Institutions Learn from Data Relating to Non-completion?*, 6 Quality Higher Educ 61, 65–67 (2000) (summarizing UK students' self-reported reasons for noncompletion of higher education degrees, which frequently included the perceived low quality of the students' experiences).

48 James J. Heckman, Jora Stixrud, and Sergio Urzua, *The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior*, 24 J Labor Econ 411, 413 (2006); Heckman, Lochner, and Todd, *Earnings Functions* at 434–37 (cited in note 9).

49 See Card, *The Causal Effect* at 1815 (cited in note 22). See also generally M. Keith Chen and Judith A. Chevalier, *The Taste for Leisure, Career Choice, and the Returns to Education*, 99 Econ Letters 353 (2008) (arguing that taste for leisure helps explain the choice between training to be either a physician or a physician's assistant).

50 See Zühal Okan, *Edutainment: Is Learning at Risk?*, 34 Brit J Educ Tech 255, 259 (2003); Diane L. Coutu, *The Anxiety of Learning*, 80 Harv Bus Rev 100, 103 (Mar 2002).

51 For example, around 80 percent of Americans watch television each day, compared to around 8 percent who engage in educational activities. Americans spend more than six times as many hours watching television as they spend on educational activities. Bureau of Labor Statistics, *Table 1: Time Spent in Primary Activities and Percent of the Civilian Population Engaging in Each Activity, Averages per Day by Sex, 2014 Annual Averages* (Department of Labor, June 24, 2015), archived at http://perma.cc/S7MZ-PBXT. On

Indeed, it is difficult to explain how such high rates of return to education and relatively low enrollment, completion, and education-attainment rates could persist in equilibrium without some nonfinancial "psychic costs" of education, liquidity constraints, high levels of risk aversion, or inaccurate expectations about the value of education.[52]

A mixture of consumption and investment motives should not disqualify an activity from being viewed primarily through the framework of business and investment activities as long as the rate of return is high. Many other activities that are enjoyable (at least for some)—for example, starting a business or selecting securities and real property in which to invest[53]—are nevertheless treated as business or investment activities for purposes of the income tax.[54] Indeed, as discussed below, many of these activities appear less investment-like than the pursuit of 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 nonpecuniary motivations, driving down the rate of return. A high rate of return suggests that an activity has at least a substantial investment component.

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average, Americans spend more than twice as much money on entertainment as they spend on out-of-pocket education costs. Bureau of Labor Statistics, *Table 1101: Quintiles of Income before Taxes; Shares of Annual Aggregate Expenditures and Sources of Income, Consumer Expenditure Survey, 2014* *2–3 (Sept 2015), archived at http://perma.cc/69SF-3A4M.

[52] See Heckman, Lochner, and Todd, *Earnings Functions* at 436–37 (cited in note 9).

[53] Because entrepreneurship has an extremely high failure rate (even among venture-backed entrepreneurs, most would earn substantially more in a salaried position), entrepreneurship is sensible only for those with extremely low risk aversion, high assets, or strong nonpecuniary preferences for entrepreneurial activity over more-traditional work. See Robert E. Hall and Susan E. Woodward, *The Burden of the Nondiversifiable Risk of Entrepreneurship*, 100 Am Econ Rev 1163, 1182–83 (2010).

[54] 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 untaxed. See Lawrence Zelenak, *The Reification of Metaphor: Income Taxes, Consumption Taxes and Human Capital*, 51 Tax L Rev 1, 26 (1995); Jeff Strnad, *Periodicity and Accretion Taxation: Norms and Implementation*, 99 Yale L J 1817, 1833–46 (1990).

C. Behavioral Response to Financial Incentives

Students respond to financial incentives (albeit imperfectly) in choosing between more-expensive and less-expensive institutions,[55] among fields of study,[56] and between attending and not attending graduate or professional school.[57] Financial incentives such as merit scholarships can affect college-enrollment levels, student achievement, and college-completion rates.[58] Even at the primary school level, students' perceptions of financial returns to education can affect educational attainment.[59] At least in the short run, households make trade-offs between investments in higher education and investments in alternatives such as real estate.[60]

Student decisions about investment in higher education respond to financial incentives, whether those incentives are in the form of pretax earnings differences,[61] grant aid,[62] or tax

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55 See Wilbert van der Klaauw, *Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression-Discontinuity Approach*, 43 Intl Econ Rev 1249, 1268–81 (2002).

56 See Arcidiacono, Hotz, and Kang, 166 J Econometrics at 13–15 (cited in note 41).

57 See Richard B. Freeman, *A Cobweb Model of the Supply and Starting Salary of New Engineers*, 29 Indust & Labor Rel Rev 236, 241–46 (1976); R.B. Freeman, *Supply and Salary Adjustments to the Changing Science Manpower Market: Physics, 1948-1973*, 65 Am Econ Rev 27, 31–36 (1975); Richard B. Freeman, *Legal "Cobwebs": A Recursive Model of the Market for New Lawyers*, 57 Rev Econ & Stat 171, 173–75 (1975). See also generally Richard B. Freeman, *The Market for College-Trained Manpower: A Study in the Economics of Career Choice* (Harvard 1971).

58 See Judith Scott-Clayton, *On Money and Motivation: A Quasi-Experimental Analysis of Financial Incentives for College Achievement*, 46 J Hum Res 614, 637–43 (2011); Joshua Angrist, Daniel Lang, and Philip Oreopoulos, *Incentives and Services for College Achievement: Evidence from a Randomized Trial*, 1 Am Econ J: Applied Econ 136, 148–57 (2009); Christopher Cornwell, David B. Mustard, and Deepa J. Sridhar, *The Enrollment Effects of Merit-Based Financial Aid: Evidence from Georgia's HOPE Program*, 24 J Labor Econ 761, 772–82 (2006).

59 See Robert Jensen, *The (Perceived) Returns to Education and the Demand for Schooling*, 125 Q J Econ 515, 532–44 (2010).

60 Michael F. Lovenheim, *The Effect of Liquid Housing Wealth on College Enrollment*, 29 J Labor Econ 741, 755–65 (2011).

61 See Arcidiacono, Hotz, and Kang, 166 J Econometrics at 13–15 (cited in note 41); Freeman, 57 Rev Econ & Stat at 173–75 (cited in note 57); Jensen, 125 Q J Econ at 532–44 (cited in note 59).

62 See Thomas J. Kane, *Evaluating the Impact of the D.C. Tuition Assistance Grant Program*, 42 J Hum Res 555, 560–79 (2007); Cornwell, Mustard, and Sridhar, 24 J Labor Econ at 772–82 (cited in note 58); Katharine G. Abraham and Melissa A. Clark, *Financial Aid and Students' College Decisions: Evidence from the District of Columbia Tuition Assistance Grant Program*, 41 J Hum Res 578, 586–606 (2006); Susan Dynarski, *The New Merit Aid*, in Caroline M. Hoxby, ed, *College Choices: The Economics of Where to Go, When to Go, and How to Pay for It* 63, 74–90 (Chicago 2004); Marcus Stanley, *College Education and the Midcentury GI Bills*, 118 Q J Econ 671, 681–88, 693–98 (2003); John

incentives.[63] While responsiveness may vary by type of higher education or by student characteristics, it appears that educational attainment is generally responsive to incentives.[64] The most effective incentives are simple and straightforward,[65] but this is not inconsistent with viewing education as an investment. When faced with sufficient complexity and information-processing costs, even sophisticated institutional investors struggle to properly value financial assets.[66]

II. EVIDENCE OF UNDERINVESTMENT IN HIGHER EDUCATION

Whether there is underinvestment or overinvestment in higher education turns on the total marginal public and private rates of return to higher education compared to the return to other investments.[67] If the risk-adjusted marginal return on education is higher than the return on alternatives, this suggests underinvestment in education. If the return on education is lower than on other investments, this suggests overinvestment in education. The following analysis suggests both that there is

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Bound and Sarah Turner, *Going to War and Going to College: Did World War II and the G.I. Bill Increase Educational Attainment for Returning Veterans?*, 20 J Labor Econ 784, 796–806 (2002); van der Klaauw, 43 Intl Econ Rev at 1268–81 (cited in note 55).

63 See Nicholas Turner, *The Effect of Tax-Based Federal Student Aid on College Enrollment*, 64 Natl Tax J 839, 852–57 (2011) (finding that tax incentives have similar effects on enrollment to grant aid). An earlier study did not find that tax incentives affected enrollment, possibly because of more-limited data, because of a treatment group that included some individuals who were ineligible for the tax credit, or because the tax incentive became more effective over time as knowledge of its existence and the process to obtain it spread. See Bridget Terry Long, *The Impact of Federal Tax Credits for Higher Education Expenses*, in Hoxby, ed, *College Choices* 101, 136–42 (cited in note 62). See also generally Susan Dynarski and Judith Scott-Clayton, *Financial Aid Policy: Lessons from Research* (NBER Working Paper Series, Jan 2013), archived at http://perma.cc/8YAC-RRDA.

64 See Craig Gallet, *A Comparative Analysis of the Demand for Higher Education: Results from a Meta-analysis of Elasticities*, 9 Econ Bull 1, 5–7 (2007); Kelly Bedard and Douglas A. Herman, *Who Goes to Graduate/Professional School? The Importance of Economic Fluctuations, Undergraduate Field, and Ability*, 27 Econ Educ Rev 197, 205–07 (2008); Jung Cheol Shin and Sande Milton, *Student Response to Tuition Increase by Academic Majors: Empirical Grounds for a Cost-Related Tuition Policy*, 55 Higher Educ 719, 726–32 (2008).

65 See, for example, Eric P. Bettinger, et al, *The Role of Application Assistance and Information in College Decisions: Results from the H&R Block FAFSA Experiment*, 127 Q J Econ 1205, 1225–40 (2012).

66 See Robert P. Bartlett III, *Inefficiencies in the Information Thicket: A Case Study of Derivative Disclosures during the Financial Crisis*, 36 J Corp L 1, 50–57 (2010); Michael Simkovic, *Secret Liens and the Financial Crisis of 2008*, 83 Am Bankr L J 253, 271–89 (2009).

67 See Becker, *Human Capital* at 205–14 (cited in note 9) (comparing public and private social gains from college education with those from other investments).

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 pretax education earnings premium—that is, 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. These studies take into account both the public and private costs of education (respectively, subsidies and tuition) in calculating returns.[68] They generally assume no externalities to education other than tax revenue. If the positive externalities or nonpecuniary 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.[69]

Recent estimates suggest that the rate of return on higher education is high relative to other investments, and that the rate of return has increased since the 1970s, even as educational attainment and tuition have increased.[70] Tables 1 and 2 illustrate growth in the annual higher education earnings premiums for men and women since the 1980s.[71] Estimates by the Organisation for Economic Co-operation and Development (OECD) suggest that public and private internal rates of return to a college degree are in the low double digits in the United States.[72] The OECD calculates public returns based on both public subsidies to education and higher tax revenues from educated labor. The OECD calculates private returns based on tuition expenditures and increases in after-tax earnings. The OECD has found

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68 See, for example, *Education at a Glance* at *136–37 (cited in note 23).

69 Several studies suggest that there may be positive externalities of education, such as reduced crime or improved marital stability or health. See, for example, Lance Lochner and Enrico Moretti, *The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports*, 94 Am Econ Rev 155, 183–84 (2004). The evidence for either positive or negative externalities of education is less robust than the evidence that education increases earnings and employment. See generally Lange and Topel, *The Social Value of Education and Human Capital* (cited in note 27).

70 See Heckman, Lochner, and Todd, *Earnings Functions* at 330–42, 433–34, 442–46 (cited in note 9).

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

72 *Education at a Glance* at *144–47 (cited in note 23).

that the public rate of return is higher than the private rate, which suggests that taxes on higher education exceed subsidies.[73]

The rate of return to master's degrees was recently estimated to be 5.6 to 7.3 percent.[74] The returns to professional degrees were recently estimated to be 13.9 to 16.6 percent.[75] Similarly, the real return to a law degree was recently estimated to be around 10 to 20 percent before taxes.[76] Estimates for professional degrees are higher than for college degrees, 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 compare them to the real return to equity. The return to global equity above a risk-free rate is called the equity risk premium.[77] The risk-free-rate baseline is generally modestly higher than inflation—around 1.2 percent on average over the last thirty years and 2.6 percent over the last sixty years.[78] Recent studies suggest that the real equity risk premiums are around only 3 to 4 percent.[79] In other words, the real pretax return to a bachelor's

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73 Id at *134, 144–47.

74 Moohoun Song, Peter F. Orazem, and Darin Wohlgemuth, *The Role of Mathematical and Verbal Skills on the Returns to Graduate and Professional Education*, 27 Econ Educ Rev 664, 672 (2008).

75 Id.

76 See Simkovic and McIntyre, 43 J Legal Stud at 278–80 (cited in note 18).

77 Comparing higher education returns to global equity makes sense for the following reasons: First, United States–based investors can easily diversify through international-equity mutual funds, even though citizens cannot as readily work internationally. Second, the high returns to equity over the last several decades may be an outlier—a longer-term, more global perspective may offer a more realistic assessment of equity risk premiums going forward. Indeed, long-term global data are more consistent with recent subjective expectations of CFOs. See note 79. Recent returns to the Standard & Poor's 500 and popular measures of the stock market may also be higher than the equity risk premiums reported in the studies below, because popular measures often suffer from survivorship bias, the use of arithmetic means rather than geometric means, and the use of nominal returns rather than real returns.

78 This is based on the ten-year treasury nominal yields minus annual growth in the consumer price index (CPI). During the thirty years from 1985 to 2014, the average was 1.2 percent. During the sixty-one years of available data from 1954 to 2014, the average was around 2.6 percent. See *Daily Treasury Yield Curve Rates* (Department of the Treasury, June 5, 2015), archived at http://perma.cc/US6Y-5QRZ.

79 See, for example, Eugene F. Fama and Kenneth R. French, *The Equity Premium*, 57 J Fin 637, 640–45 (2002) (arguing that equity premiums should be estimated based on dividends and earnings rather than on observed returns); Ravi Jagannathan, Ellen R. McGrattan, and Anna Scherbina, *The Declining U.S. Equity Premium*, 24 Fed Res Bank Minneapolis Q Rev 3, 8–9 (Fall 2000) (estimating that equity premiums declined from 7 percent in the years 1926–1970 to 0 percent in the years 1982–1999); Elroy Dimson, Paul Marsh, and Mike Staunton, *The Worldwide Equity Premium: A Smaller Puzzle*, in Rajnish Mehra, ed, *Handbook of the Equity Risk Premium* 467, 498–99 (Elsevier 2008)

degree appears to be around two times as high as the return to global equity, and the return to some professional degrees may be three times as high.

Pretax returns on bonds and real estate are generally lower than returns to equity.[80] Alternative investments, such as hedge funds and private equity, typically underperform the stock market net of fees by a wide margin.[81]

These are all average returns rather than marginal returns, and they are gross rather than risk adjusted; but the marginal returns to education appear to be not too much lower than the average rate of return to education.[82]

Limited liquidity of investments in higher education[83] 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.[84] Nor do idiosyncratic risks of

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(presenting long-term, worldwide historical data suggesting that equity premiums are between 3.0 and 3.5 percent); John R. Graham and Campbell R. Harvey, *The Equity Risk Premium in 2014* *8 (unpublished manuscript, Apr 7, 2014), archived at http://perma.cc/XH2C-ZMPN (estimating the ten-year equity risk premium at 3.5 to 4.0 percent based on surveys of American CFOs).

80 See Jeremy J. Siegel, *Stocks for the Long Run: The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies* 11 (McGraw-Hill 4th ed 2007). See also Jim Clayton and Greg MacKinnon, *The Relative Importance of Stock, Bond and Real Estate Factors in Explaining REIT Returns*, 27 J Real Est Fin & Econ 39, 47 (2003) (estimating that returns to real estate and real estate investment trusts are generally below stock market returns).

81 See, for example, Ludovic Phalippou and Oliver Gottschalg, *The Performance of Private Equity Funds*, 22 Rev Fin Stud 1747, 1774 (2009) (finding that private equity funds underperform the Standard & Poor's 500 by 3 percent net of fees and by 6 percent after adjusting for risk); Carl Ackermann, Richard McEnally, and David Ravenscraft, *The Performance of Hedge Funds: Risk, Return, and Incentives*, 54 J Fin 833, 851 (1999) (finding that hedge funds typically underperform stock indexes after adjusting for risk).

82 See Card, *The Causal Effect* at 1840–42 (cited in note 22) (arguing that the fact that instrumental-variable estimates of returns are higher than OLS estimates may suggest that returns are higher for the marginal student than for the average student).

83 Educated workers can rent their labor or borrow against a portion of their future incomes, but they cannot sell their degrees or convert a lifetime of future earnings into a lump sum.

84 Illiquidity can contribute to higher returns because investors typically prefer greater liquidity. Therefore, illiquid asset prices are depressed. Researchers have attempted to estimate illiquidity premiums 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. See, for example, Viral V. Acharya and Lasse Heje Pedersen, *Asset Pricing with Liquidity Risk*, 77 J Fin Econ 375, 387 (2005). Pure illiquidity premiums appear to be lower than the excess returns to higher education. To the extent that illiquidity explains returns to higher education, one would expect returns to education to fall when liquidity is ample. See, for example, Gerald R. Jensen and Theodore Moorman, *Inter-temporal Variation in the Illiquidity Premium*, 98 J Fin Econ 338, 338–39 (2010); George O. Aragon, *Share Restrictions and Asset Pricing: Evidence*

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.[85] (Assuming that liquidity and risk contribute to the higher education earnings premium, disadvantageous tax treatment would still likely also explain a portion of the premium.)[86] In other words, the relatively high *pretax* returns to higher education suggest underinvestment in higher education.[87]

Some may wonder how it is possible to simultaneously have both underinvestment in education and highly educated individuals who are unemployed. Some unemployment is necessary in a market economy to facilitate the matching of employers and employees.[88] Decades ago, economists theorized a minimum or "natural" rate of unemployment.[89] Mainstream macroeconomists continue to discuss trade-offs between unemployment and inflation, accepting that neither unemployment nor inflation can be reduced to zero.[90] 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.[91] The likelihood

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from the Hedge Fund Industry, 83 J Fin Econ 33, 56 (2007); Howard W. Chan and Robert W. Faff, *Asset Pricing and the Illiquidity Premium*, 40 Fin Rev 429, 442–43 (2005); Yakov Amihud, *Illiquidity and Stock Returns: Cross-Section and Time-Series Effects*, 5 J Fin Mkt 31, 32 (2002).

85 See Jacobs, 14 Labour Econ at 914 (cited in note 9).

86 See id at 922.

87 See Claudia Goldin and Lawrence F. Katz, *The Race between Education and Technology* 41–43 (Harvard 2010).

88 Many attempts have been made to measure this "natural rate of unemployment" and its economic determinants. See generally, for example, Mary C. Daly, et al, *A Search and Matching Approach to Labor Markets: Did the Natural Rate of Unemployment Rise?*, 26 J Econ Persp 3 (2012); Edmund Phelps, *The Origins and Further Development of the Natural Rate of Unemployment*, in Rod Cross, ed, *The Natural Rate of Unemployment: Reflections on 25 Years of the Hypothesis* 15 (Cambridge 1995); Chinhui Juhn, Kevin M. Murphy, and Robert H. Topel, *Why Has the Natural Rate of Unemployment Increased over Time?*, 1991 Brookings Papers Econ Activity 75; Edmund S. Phelps, *Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time*, 34 Economica 254 (1967).

89 See generally Phelps, *The Origins* (cited in note 88); Edmund S. Phelps, *Money-Wage Dynamics and Labor-Market Equilibrium*, 76 J Polit Econ 678 (1968). See also Milton Friedman, *The Role of Monetary Policy*, 58 Am Econ Rev 1, 8 (1968) (coining the phrase "natural rate of unemployment").

90 See, for example, Phelps, 34 Economica at 255–56 (cited in note 88).

91 See, for example, Simkovic and McIntyre, 43 J Legal Stud at 277 (cited in note 18).

and 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.[92] Younger workers typically have higher unemployment rates than midcareer workers, but among younger workers, those with higher levels of education are more likely to be employed. This also holds true for experienced workers and continues to hold true for young graduates during the recent recession.[93]

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 lower levels of education than themselves and that do not officially require their levels 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 less-helpful social connections or characteristics (other than education level) associated with lower earnings and because additional education helps them compensate for these disadvantages.[94] After properly controlling for differences in earnings potential prior to higher education, those with higher levels of education are more likely to be employed

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92 See, for example, id at 258. See also W. Craig Riddell and Xueda Song, *The Impact of Education on Unemployment Incidence and Re-employment Success: Evidence from the U.S. Labour Market*, 18 Labour Econ 453, 462 (2011); *Education at a Glance* at *76–98 (cited in note 23).

93 See Simkovic, 70 Wash & Lee L Rev at 545 (cited in note 39); Jaison R. Abel and Richard Deitz, *Do the Benefits of College Still Outweigh the Costs?*, 20 Current Issues Econ & Fin 1, 3–4 & n 11 (2014). See also Jaison R. Abel, Richard Deitz, and Yaqin Su, *Are Recent College Graduates Finding Good Jobs?*, 20 Current Issues Econ & Fin 1, 2 (2014).

94 See Thomas K. Bauer, *Educational Mismatch and Wages: A Panel Analysis*, 21 Econ Educ Rev 221, 222, 228 (2002) ("The estimated effects [of educational mismatch] 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."); Arcidiacono, Cooley, and Hussey, 49 Intl Econ Rev at 876, 894–95 (cited in note 19) ("[A]dditional schooling could compensate for low workplace skills [or fewer job contacts]. . . . [T]hose who do not obtain an MBA are actually stronger in areas not generally measured by standard survey data."). See also generally 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 overeducation does not lower earnings but rather that nonrandom work assignments explain the wage differential).

full time and they earn more per hour of work, even among the underemployed.[95]

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.[96] Job-opening projections are notoriously inaccurate, and the benefits of education extend across multiple occupations and industries.[97] Within every occupational category, individuals with higher levels of education—including those who are underemployed—typically earn more than those with lower levels of education.[98]

Another question is: If distortions within the United States lead to underinvestment in higher education and unusually high rates of return to education, why doesn't an influx of educated immigrant labor from other countries without such distortions correct this imbalance?[99] There are two likely explanations. First, similar distortions may exist in other countries, which are also experiencing increased demand for highly educated skilled

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95 See National Center for Education Statistics, *Fast Facts: Income of Young Adults* (Department of Education), archived at http://perma.cc/F8VG-VPJT.

96 See Michael W. Horrigan, *Employment Projections to 2012: Concepts and Context*, Monthly Labor Rev 3, 15–16 (Feb 2004) (noting that "[t]he general problem with . . . [projections for] specific occupations over the next 10 years is the difficulty of projecting . . . dynamic labor market responses" and that 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* *3 (NBER Working Paper Series, Sept 2006), archived at http://perma.cc/2HWB-GA93 ("[Bureau of Labor Statistics] [p]rojections of future demands for skills lack the reliability to guide policies on skill development.").

97 See David Neumark, Hans Johnson, and Marisol Cuellar Mejia, *Future Skill Shortages in the U.S. Economy?*, 32 Econ Educ Rev 151, 165 (2013) (finding "substantial economic returns to higher educational degrees in occupations where, according to the [Bureau of Labor Statistics] skill requirements, those degrees were not required"). See also Simkovic and McIntyre, 43 J Legal Stud at 252 (cited in note 18) (finding a substantial degree earnings premium, even among the 40 percent of law degree holders who do not practice law).

98 See Neumark, Johnson, and Mejia, 32 Econ Educ Rev at 156 (cited in note 97):

> [F]or nearly every occupational grouping, wage returns are higher for more highly educated workers even when [the Bureau of Labor Statistics] does not categorize the higher level of education as required. For example . . . for management occupations, the estimated coefficients for Master's, professional, and doctoral degrees are all above the estimated coefficient for a Bachelor's degree, which is the [Bureau of Labor Statistics] required level.

99 Immigrants whose home countries paid for their higher education would not suffer nondeductibility of tuition and student-loan interest, but they would still face US payroll and income tax rates.

labor and which may also tax labor at higher rates than capital.[100] Second, immigration laws and other frictions limit the free flow of educated labor.

The appropriate method by which to measure the value of education is through the earnings premium, and the appropriate method by which to determine whether there is over- or underinvestment in education is to compare the returns to education with returns to other investments. These methods suggest that there is underinvestment in education, and that the degree of this underinvestment has likely become more severe over the last thirty years as the demand for educated labor (relative to uneducated labor) has increased.

Although educational attainment has increased in the United States and the rest of the developed world, the increase in the supply of educated workers has not kept pace with demand, and there remains substantial room for growth.[101] In 2013, 31.7 percent of the civilian noninstitutional US population[102] ages twenty-five and over had a bachelor's degree or a higher-level degree.[103] Among those ages twenty-five to thirty-four, the proportion with a bachelor's degree or above was only slightly higher—34.7 percent.[104] In 2013, only 8.4 percent of Americans above the age of twenty-five had a master's degree, only 1.5 percent had a professional degree, and only 1.7 percent had a PhD.[105]

Although there has been growth in the proportion of bachelor's degree, master's degree, and PhD holders, professional-

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[100] See *Tax Policy Reform and Economic Growth* *34, 41 (OECD, 2010), archived at http://perma.cc/72VU-JQDU (presenting data on the top and average income tax rates as well as the household-level capital-income tax rates).

[101] See *Education at a Glance* at *38 (cited in note 23).

[102] The Bureau of Labor Statistics defines the "civilian noninstitutional population" as "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, homes for the aged), and who are not on active duty in the Armed Forces." Bureau of Labor Statistics, *BLS Information: Glossary* (Department of Labor, Feb 28, 2008), archived at http://perma.cc/5P7A-9GN3. The Current Population Survey conducted by the US Census Bureau is designed to measure this group. US Census Bureau and US Bureau of Labor Statistics, *Design and Methodology: Current Population Survey* *3-1 (Oct 2006), archived at http://perma.cc/L3ES-B4XJ.

[103] US Census Bureau, *Educational Attainment: CPS Historical Time Series Tables* *table A-1 (Department of Commerce, Jan 20, 2015), online at http://www.census.gov/hhes/socdemo/education/data/cps/historical (visited Oct 23, 2015) (Perma archive unavailable).

[104] Minnesota Population Center, *Integrated Public Use Microdata Series, Current Population Survey* (University of Minnesota), archived at http://perma.cc/T8DX-J4ZP.

[105] USCB, *Educational Attainment* at *table A-4 (cited in note 103).

degree holders as a share of the population have been essentially flat for decades, despite high returns.

III. MATHEMATICAL MODEL LINKING TAXATION TO RETURNS

To what extent can differences in effective tax rates (net of subsidies) between higher education and other investments explain persistently high pretax rates of return to higher education?

Assume that investment decisions other than the decision to invest in higher education are driven by after-tax rates of return. For the sake of simplicity, assume that there are no consumption motives in noneducation investments. Equations and notations describing the relationship between tax rates and returns for noneducation investments appear below.

t_m = Effective tax rate on returns to the market—investments other than higher education, net effective subsidies

p_m = Pretax rate of return to the market—investments other than higher education with similar risk and liquidity profiles to higher education

a_m = After-tax rate of return to the market—investments other than higher education with similar risk and liquidity profiles to education

$$a_m = p_m \cdot (1 - t_m)$$

$$p_m = \frac{a_m}{1 - t_m}$$

By contrast, assume that investments in higher education are driven by a combination of nonpecuniary considerations (consumption value) as well as after-tax rates of return. Equations and notations describing the relationship between tax rates, consumption value, and returns to investment in education appear below.

t_e = Effective tax rate on investments in higher education, net effective subsidies

p_e = Pretax rate of return to investments in higher education

a_e = After-tax rate of return to investments in higher education

c_e = Consumption value of higher education[106]

$$a_e = p_e \cdot (1 - t_e)$$

$$p_e = \frac{a_e}{1 - t_e}$$

The efficient (socially optimal) outcome would be for the pretax rates of return between education and other similar risky investments to be equal, taking consumption value into account.

$$p_m = p_e + c_e$$

$$p_e = p_m - c_e$$

Assume that the market will equalize after-tax rates of return plus consumption value. Equations describing the relationship between after-tax rates of return to investment in education, after-tax rates of return to other investments, and consumption value of education appear below.

$$a_m = a_e + c_e$$

$$a_e = a_m - c_e$$

[106] If noneducation investments also have consumption value, c_e can represent the difference in consumption value between education and other investments.

For this to be true, the pretax rate of return to education must equal:

$$p_e = \frac{a_e}{1 - t_e}$$

$$p_e = \frac{a_m - c_e}{1 - t_e}$$

$$p_e = \frac{[p_m \cdot (1 - t_m)] - c_e}{1 - t_e}$$

From this final form of the equation, we can observe the following. Holding all else equal:

- The higher the tax rate on investment in education (t_e), the higher the pretax rate of return to education (p_e), both
    - in absolute terms, and
    - relative to the pretax rate of return to equally risky investments (p_m).
- Higher taxes on education will increase the pretax returns to education
    - even though educational decisions are driven in part by the consumption value of education (c_e), and
    - even if educational decisions are driven *primarily* by the consumption value of education (c_e).
- The higher (the more positive) the consumption value of education (c_e), the *lower* the pretax rate of return to education.
- The higher (the more positive) the consumption value of education, the higher the tax rate on education (t_e).
- Pretax rates of return to education exceeding pretax rates of return to similarly risky investments suggest that either
    - the consumption value of education (c_e) is *negative*,

- the tax rate on education (t_e) is greater than the tax rate on similarly risky investments (t_m), or
- both of the above are true.

Under reasonable assumptions, effective tax rate differences between investments in higher education and other investments can account for a substantial proportion of the unusually high pretax rates of return to education. For example, assume that:

$$p_m = 6\%$$

$$t_m = 10\%$$

$$t_e = 40\%$$

$$c_e = 0\%$$

Then, applying the final form of the equation developed above:

$$p_e = 9\%$$

The equation indicates a 9 percent rate of return to higher education with a 6 percent pretax market rate of return on noneducation investments if the effective tax rate on investments in higher education is 40 percent, the effective tax rate on other investments is 10 percent, and education has no consumption value. With a negative 1 percent consumption value of education, the pretax rate of return to education increases to 11 percent.

Under more-modest assumptions, such as a 30 percent tax rate on higher education versus a 10 percent tax rate on other investments, assuming no consumption value, the equation suggests an 8 percent rate of return to education. With negative 1 percent consumption value of education, we again reach a 9 percent rate of return to investments in higher education.

As discussed in greater detail below,[107] these hypothetical numbers may not be too far from those seen in the real world, and effective tax rate differences may account for a substantial proportion of the unusually high pretax rates of return to investments in higher education.

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[107] See Part V.

IV. OPTIMAL-TAX THEORY AND THE DISTORTION PROBLEM

Optimal-tax theory has influenced the Internal Revenue Code and contributed to a system that is generally investment friendly.[108] However, recent optimal-tax studies suggest that the current tax system may be discouraging investments in higher education.[109]

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 minimizing economic distortions and deadweight loss.[110] Optimal-tax models assume that taxpayers prefer not to be taxed.[111] 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.[112] 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 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 maximizes social welfare, which is conceived of as the aggregation of individual utilities,[113] assuming perfect markets

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[108] See Robin Boadway, *From Optimal Tax Theory to Tax Policy: Retrospective and Prospective Views* 1–6 (MIT 2012) (arguing that the indirect influence of normative tax theory on policymakers has been responsible for recent worldwide trends in tax policy, such as the development of value-added taxes and refundable tax credits, as well as the continued tax sheltering of investments).

[109] See, for example, Paul A. David, *Reforming the Taxation of Human Capital: A Modest Proposal for Promoting Economic Growth*, in Richard Arnott, et al, eds, *Economics for an Imperfect World: Essays in Honor of Joseph Stiglitz* 439, 441–42 (MIT 2003) (explaining that the current structure of the personal income tax discourages investment in human capital).

[110] See Kaplow, *Taxation* at 651–52 (cited in note 5); Louis Kaplow, *The Theory of Taxation and Public Economics* 317 (Princeton 2008); David Gamage, *How Should Governments Promote Distributive Justice? A Framework for Analyzing the Optimal Choice of Tax Instruments*, 68 Tax L Rev 1, 4 (2014). This approach is not without its critics. See, for example, Chris William Sanchirico, *A Critical Look at the Economic Argument for Taxing Only Labor Income*, 63 Tax L Rev 867, 886 (2010).

[111] Paying taxes subtracts from the utility that 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 robust taxation system writ large, those individuals or firms will still seek to reduce their own tax burdens.

[112] See Kaplow, *Taxation* at 654–66 (cited in note 5).

[113] See id at 656; J.A. Mirrlees, *An Exploration in the Theory of Optimum Income Taxation*, 38 Rev Econ Stud 175, 178–81 (1971).

and no externalities.[114] Distortions reduce taxed activities from their optimal levels, which simultaneously reduces the welfare of the individual being taxed and erodes the tax base, thereby reducing tax revenue.[115]

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 the aggregate.[116]

The implication of optimal-tax models is generally that activities or taxpayers with lower marginal elasticity—that is, 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. Such a system of taxation minimizes the total amount of distortion or behavioral response to taxation for a given level of desired revenue.[117]

The conclusions of optimal-tax models vary depending on the assumptions used and the structural limits imposed.[118] The usefulness of recommendations derived from such models depends on the extent to which the models accurately reflect and predict the most important features of real-world behavior.[119]

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[114] If there are externalities—that is, costs and benefits not reflected in market transactions—efficiency can be increased both by taxing activities that generate negative externalities so as to reduce the level of the activities to their optimal levels and by subsidizing activities that produce positive externalities to increase their levels to the optimal levels. The classic example of a negative externality is pollution. Commonly used examples of activities generating positive externalities include sanitation, basic scientific research, infrastructure development, and education. See A.C. Pigou, *The Economics of Welfare* 174–75, 183–87 (Macmillan 4th ed 1932); William J. Baumol, *On Taxation and the Control of Externalities*, 62 Am Econ Rev 307, 307 (1972); Louis Kaplow and Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation*, 4 Am L & Econ Rev 1, 1–2 (2002); Kaplow, *Taxation* at 654, 701 (cited in note 5).

[115] For example, suppose that several individuals prefer wool pants to cotton pants. If the government taxes wool at a higher rate than cotton, and if this price increase is passed on to the consumer, then some of the individuals who prefer wool pants at the pretax 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 after-tax allocation of consumption between wool and cotton is inefficient and welfare reducing compared to the pretax allocation.

[116] See Emmanuel Saez, Joel Slemrod, and Seth H. Giertz, *The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review*, 50 J Econ Lit 3, 4–5 (2012).

[117] See Gamage, 68 Tax L Rev at 19 (cited in note 110).

[118] See James Banks and Peter Diamond, *The Base for Direct Taxation*, in Stuart Adam, et al, eds, *Dimensions of Tax Design: The Mirrlees Review* 548, 554–57 (Oxford 2010).

[119] See Sanchirico, 63 Tax L Rev at 873–75 (cited in note 110).

Pioneering optimal-tax models (such as those developed by Frank Ramsey,[120] Sir Anthony Atkinson and Professor Joseph Stiglitz,[121] Professor Peter Diamond and Sir James Mirrlees,[122] and Professor Louis Kaplow[123]) focused on simple assumptions and mathematical elegance, often reaching dramatic conclusions. Early optimal-tax models concluded that, under certain simplifying assumptions and ideal conditions, income taxation should exclusively target labor and should exempt capital because this produces fewer distortions than taxing both labor and capital.[124] This is sometimes referred to as the "double distortion" literature.[125] More-recent optimal-tax studies 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.[126]

Traditional optimal-tax models generally do not consider the effect of taxation on the level of human-capital investment. Once models incorporate human-capital investment as a decision that responds to taxation, the traditional conclusion that capital should not be taxed but labor should be taxed becomes more tenuous. This is because the return on investment in human capital is generally characterized as labor income, and sharply divergent tax treatment between labor and capital could lead to underinvestment in human capital.[127]

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[120] See generally F.P. Ramsey, *A Contribution to the Theory of Taxation*, 37 Econ J 47 (1927).

[121] See generally A.B. Atkinson and J.E. Stiglitz, *The Design of Tax Structure: Direct versus Indirect Taxation*, 6 J Pub Econ 55 (1976).

[122] See generally Peter A. Diamond and James A. Mirrlees, *Optimal Taxation and Public Production I: Production Efficiency*, 61 Am Econ Rev 8 (1971); Peter A. Diamond and James A. Mirrlees, *Optimal Taxation and Public Production II: Tax Rules*, 61 Am Econ Rev 261 (1971).

[123] See generally Kaplow, *Taxation* (cited in note 5); Louis Kaplow, *The Optimal Supply of Public Goods and the Distortionary Cost of Taxation*, 49 Natl Tax J 513 (1996).

[124] According to these models, a labor income tax creates a distortion that reduces work hours (a shift from consumption to leisure). See Kaplow, 49 Natl Tax J at 517 (cited in note 123). However, taxes on capital create two distortions: a reduction in savings and investment (a shift from future consumption toward present consumption) and a reduction in work hours (a shift from labor toward leisure). This second 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.

[125] See, for example, Gamage, 68 Tax L Rev at 4 (cited in note 110).

[126] See, for example, Banks and Diamond, *The Base for Direct Taxation* at 549–50 (cited in note 118); Gamage, 68 Tax L Rev at 1 (cited in note 118); Sanchirico, 63 Tax L Rev at 868 (cited in note 110); Joseph Bankman and David Weisbach, *A Critical Look at* A Critical Look—*Reply to Sanchirico*, 64 Tax L Rev 539, 550 (2011).

[127] See David, *Reforming the Taxation of Human Capital* at 439 (cited in note 109); Bas Jacobs and A. Lans Bovenberg, *Human Capital and Optimal Positive Taxation of*

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 the opportunity cost of lower wages but rather involves cash outlays.[128] For example, working a lower-paid job in return for superior on-the-job training or pursuing education at an institution that is free at the point of service, such as a taxpayer-funded public high school or many PhD programs, does not involve cash outlays.[129] Attending college, a master's program, or a professional school typically involves substantial cash outlays for tuition payments, fees, and books.[130] The danger of distortion is greater for human-capital investments that require cash outlays, because forgone wages are not taxed while cash outlays are treated less favorably by the tax code than other investments are.

V. COMPARISON OF THE 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.[131] Under a pure

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Capital Income, 17 Intl Tax & Pub Fin 451, 453 (2010); Banks and Diamond, *The Base for Direct Taxation* at 579, 635–36 (cited in note 118).

[128] See Andres Erosa and Tatyana Koreshkova, *Progressive Taxation in a Dynastic Model of Human Capital*, 54 J Monetary Econ 667, 668–69 (2007); Gian Maria Milesi-Ferretti and Nouriel Roubini, *On the Taxation of Human and Physical Capital in Models of Endogenous Growth*, 70 J Pub Econ 237, 238–40 (1998); Philip A. Trostel, *The Effect of Taxation on Human Capital*, 101 J Polit Econ 327, 328–29 (1993); Paul B. Stephan III, *Federal Income Taxation and Human Capital*, 70 Va L Rev 1357, 1361, 1422 (1984).

[129] See Bill Dupor, et al, *Some Effects of Taxes on Schooling and Training*, 86 Am Econ Rev 340, 341 (1996).

[130] PhD programs primarily involve tax-free investments of time rather than taxable investments of tuition. However, PhDs likely account for a minority of investments in post-secondary education. As of 2013, only about 1.8 percent of the population ages twenty-five and over had PhDs compared to about 32.0 percent with bachelor's degrees and about 10.0 percent with master's or professional degrees. US Census Bureau, *Current Population Survey (CPS): A Joint Effort between the Bureau of Labor Statistics and the Census Bureau; 2013 Person Income Table of Contents* *table PINC-11 (Department of Commerce, Sept 16, 2014), online at http://www.census.gov/hhes/www/cpstables/032014/perinc/pinc11_000.htm (visited Oct 23, 2015) (Perma archive unavailable).

[131] See Joseph Bankman and David A. Weisbach, *The Superiority of an Ideal Consumption Tax over an Ideal Income Tax*, 58 Stan L Rev 1413, 1414 (2006); Alan J. Auerbach, *The Choice between Income and Consumption Taxes: A Primer*, in Alan J. Auerbach and Daniel N. Shaviro, eds, *Institutional Foundations of Public Finance: Economic and Legal Perspectives* 13, 27–29 (Harvard 2008).

consumption tax, the tax system would be neutral with respect to different forms of investment.[132] Although the US tax system has not transitioned toward a pure consumption tax, the Internal Revenue Code provides tax benefits for various forms of investment that move the system incrementally closer to a consumption tax.[133]

This Part focuses first on the general treatment of investments under the tax code. "Investment" is defined broadly as cash outlays or uses of time that are reasonably expected to produce financial returns. Next, this Part considers a few special cases that may be more important economically than 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 real estate.

A. 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.[134] The Internal Revenue Code defines gross income broadly,[135] but it permits taxpayers to deduct trade and business expenses from gross income to arrive at adjusted gross income[136] and taxable income.[137] In contrast, personal and family expenses are generally not deductible.[138]

Expenditures that create long-lived assets generally cannot be immediately deducted.[139] Instead, such expenditures are

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[132] See Mankiw, Weinzierl, and Yagan, 23 J Econ Persp at 167–68 (cited in note 2).

[133] See Mankiw, 107 Q J Econ at 432–33 (cited in note 2); Edward J. McCaffery, *Tax Policy under a Hybrid Income-Consumption Tax*, 70 Tex L Rev 1145, 1152–55 (1992).

[134] See David A. Weisbach, *Line Drawing, Doctrine, and Efficiency in the Tax Law*, 84 Cornell L Rev 1627, 1641 (1999); Mark 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, 876 (1979); Daniel I. Halperin, *Business Deduction for Personal Living Expenses: A Uniform Approach to an Unsolved Problem*, 122 U Pa L Rev 859, 860 (1974).

[135] IRC § 61.

[136] IRC §§ 62(a)(1), 162. More-limited deductions are permitted if the trade or business consists of providing services as an employee. IRC §§ 62(a)(2), 162. See also Internal Revenue Service, *Publication 535: Business Expenses* *7 (Department of the Treasury, Feb 12, 2015), archived at http://perma.cc/RL7C-T68M.

[137] IRC §§ 161–62, 212, 217.

[138] See IRC § 262.

[139] See IRC §§ 263, 263A. See also *INDOPCO, Inc v Commissioner of Internal Revenue*, 503 US 79, 90 (1992) (outlining capital expenditures for the purposes of § 263 as those "made [for] . . . the corporation's operations and betterment, sometimes with a continuing

capitalized and added to basis. Basis is a point system used to track taxpayer eligibility for future exclusions or deductions from taxable income.[140] The costs of investments in long-lived capital assets are recovered over time through partial deductions from basis over several years.[141]

Immediate deductions are more valuable than deductions pushed into the future (assuming constant tax rates). This is because deductions reduce taxable income and in turn reduce the final tax bill, and also 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 the taxpayers with higher incomes.[142]

Basis is not indexed for inflation or for the cost of capital to compensate taxpayers for the delays imposed by capitalization requirements. However, the tax code provides depreciation and amortization schedules at accelerated paces that are much faster than the real-world useful lives of the assets.[143]

In addition, certain long-term investments—such as research and development costs, some new equipment purchases, and advertising—can be immediately deducted.[144] There are also

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capital asset, for the duration of its existence or for the indefinite future or for a time somewhat longer than the current taxable year").

140 IRC §§ 1011–12, 1016.

141 See IRC § 168. If the long-lived assets are tangible, this deduction is called "depreciation." IRC § 167. If the long-lived assets are intangible, this deduction is called "amortization." IRC § 197.

142 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 a taxpayer with a 35 percent marginal tax rate.

143 See IRC § 168. See also David A. Weisbach and Jacob Nussim, *The Integration of Tax and Spending Programs*, 113 Yale L J 955, 976 (2004) ("[A]ccelerated depreciation . . . provides faster cost recovery than economic depreciation."); Victor Thuronyi, *Tax Expenditures: A Reassessment*, 1988 Duke L J 1155, 1161 & n 37 (describing the real-world application of the accelerated depreciation system to dairy farmers' livestock and equipment and noting that, "[a]ssuming a constant tax rate, [this system] has the same effect as if the government lent an amount to the asset owner without charging interest"); Alan J. Auerbach, *The New Economics of Accelerated Depreciation*, 23 BC L Rev 1327, 1354 (1982); Douglas A. Kahn, *Accelerated Depreciation—Tax Expenditure or Proper Allowance for Measuring Net Income?*, 78 Mich L Rev 1, 2 (1979). But see Johnson, 139 Tax Notes at 283–86 (cited in note 3) (admitting that accelerated depreciation causes a "distortion," but pointing out that "[t]he alternative baseline schedule is straight line," which "understates economic life and does not measure economic depreciation").

144 IRC §§ 179, 263(a)(1)(A)–(G), (c). See also, for example, Calvin H. Johnson, *Capitalize Costs of Software Development*, 124 Tax Notes 603, 603–05 (2009) (describing how

many provisions providing for advantageous treatment for investments in natural resource exploitation[145] or for investments of time in entrepreneurial activities.[146] In other words, the connection between real-world ascertainable useful life and the depreciation and amortization schedules for tax purposes is attenuated; policy considerations dominate durability estimates.

Appreciation of individual investments in property such as securities or real estate are generally taxed at advantageously low long-term capital gains tax rates,[147] and because of the realization requirement, they are not taxed until they are sold.[148] In other words, in addition to a lower tax rate on gains from investments 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.[149] Dividends are also currently taxed at an advantageous rate that is substantially lower than ordinary income tax rates.[150]

The effective tax rates on investments are *even lower* than the already-advantageous statutory capital gains tax rates.[151]

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the costs of computer-software development are deductible when they are paid for or accrued as opposed to being capitalized).

145 For a discussion of tax advantages within the oil and gas industries, see generally Calvin H. Johnson, *Accurate and Honest Tax Accounting for Oil and Gas*, 125 Tax Notes 573 (2009); Calvin H. Johnson, *Percentage Depletion of Imaginary Costs*, 122 Tax Notes 1619 (2009).

146 See Victor Fleischer, *Taxing Founders' Stock*, 59 UCLA L Rev 60, 62–64 (2011); Ronald J. Gilson and David M. Schizer, *Understanding Venture Capital Structure: A Tax Explanation for Convertible Preferred Stock*, 116 Harv L Rev 874, 910 (2003). But see generally Gregg D. Polsky and Brant J. Hellwig, *Examining the Tax Advantage of Founders' Stock*, 97 Iowa L Rev 1085 (2012) (arguing that founders' stock is not necessarily tax advantaged).

147 There are several long-term capital gains tax rates, depending on the kind of property and the taxable income of the taxpayer. Capital gains tax rates range from about 0 to 28 percent and are generally lower than comparable ordinary income tax rates. See Internal Revenue Service, *Publication 544: Sales and Other Dispositions of Assets* *38 (Department of the Treasury, Feb 3, 2015), archived at http://perma.cc/E8UG-N7H5.

148 For a discussion of the realization requirement and its advantage as a subsidy, see generally David M. Schizer, *Realization as Subsidy*, 73 NYU L Rev 1549 (1998).

149 See generally Alan J. Auerbach, *Reforming Capital Gains Taxation*, 135 Tax Notes 1399 (2012).

150 See Internal Revenue Service, *Publication 550: Investment Income and Expenses (Including Capital Gains and Losses)* *20–21 (Department of the Treasury, Feb 12, 2015), archived at http://perma.cc/E6EK-AB5E (describing the taxation of dividends).

151 See generally Daniel Bergstresser and Jeffrey Pontiff, *Investment Taxation and Portfolio Performance*, 97 J Pub Econ 245 (2013); James M. Poterba, *How Burdensome Are Capital Gains Taxes? Evidence from the United States*, 33 J Pub Econ 157 (1987).

For families that 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 (also known as a stepped-up basis at death).[152] Individuals can obtain liquidity without triggering a realization event prior to death by borrowing against appreciated assets.[153] Only a tiny minority of decedents have sufficient assets at death to trigger any estate tax liability.[154]

Lower tax rates for capital gains and dividends are sometimes rationalized as offsetting the "double taxation" of investments at the corporate level.[155] However, there is a disagreement among economists about whether the corporate income tax falls predominantly on capital or on labor,[156] and effective corporate tax rates are often quite low because of tax planning.[157] Moreover, many investments that are eligible for capital gains treatment use business structures that combine limited liability with pass-through (that is, single-level) taxation, such as limited liability companies, limited liability partnerships, and limited partnerships.[158]

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[152] See Auerbach, 135 Tax Notes at 1399 (cited in note 149).

[153] For a discussion of this phenomenon, see Mark L. Louie, Note, *Realizing Appreciation without Sale: Accrual Taxation of Capital Gains on Marketable Securities*, 34 Stan L Rev 857, 863–64 (1982).

[154] See generally Yanna Krupnikov, et al, *Public Ignorance and Estate Tax Repeal: The Effect of Partisan Differences and Survey Incentives*, 59 Natl Tax J 425 (2006); Michael J. Graetz and Ian Shapiro, *Death by a Thousand Cuts: The Fight over Taxing Inherited Wealth* (Princeton 2005); George Cooper, *A Voluntary Tax? New Perspectives on Sophisticated Estate Tax Avoidance*, 77 Colum L Rev 161 (1977). See also Edward J. McCaffery, *Distracted from Distraction by Distraction: Reimagining Estate Tax Reform*, 40 Pepperdine L Rev 1235, 1236 (2013) (explaining that "the so-called death tax will now affect far fewer than 1% of decedents each year").

[155] See Jennifer Arlen and Deborah M. Weiss, *A Political Theory of Corporate Taxation*, 105 Yale L J 325, 338–40 (1995); Noël B. Cunningham and Deborah H. Schenk, *The Case for a Capital Gains Preference*, 48 Tax L Rev 319, 331–37 (1993).

[156] See generally Li Liu and Rosanne Altshuler, *Measuring the Burden of the Corporate Income Tax under Imperfect Competition*, 66 Natl Tax J 215 (2013); Kimberly A. Clausing, *In Search of Corporate Tax Incidence*, 65 Tax L Rev 433 (2012); Jennifer C. Gravelle, *Corporate Tax Incidence: A Review of Empirical Estimates and Analysis* (Congressional Budget Office, June 2011), archived at http://perma.cc/Z4H4-S5LS.

[157] See *Corporate Income Tax: Effective Tax Rates Can Differ Significantly from the Statutory Rate* *14 (GAO, May 2013), archived at http://perma.cc/BRY9-FF4N.

[158] See generally William F. Fox and LeAnn Luna, *Do Limited Liability Companies Explain Declining State Corporate Tax Revenues?*, 33 Pub Fin Rev 690 (2005); William A. Klein and Eric M. Zolt, *Business Form, Limited Liability, and Tax Regimes: Lurching toward a Coherent Outcome?*, 66 U Colo L Rev 1001 (1995); Daniel S. Goldberg, *The Tax Treatment of Limited Liability Companies: Law in Search of Policy*, 50 Bus Law 995 (1995).

B. 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.[159] Tax-advantaged retirement accounts such as 401(k) plans, individual retirement accounts, 403(b) plans, 457 plans, and supplemental retirement accounts enable workers to shield thousands of dollars each year from income and payroll taxes, place the money in investments in which it can grow untaxed, and pay income taxes on the funds only when they are withdrawn, presumably to fund consumption during retirement.[160]

Most individuals eligible for 401(k) plans (or similar plans) can defer taxes on substantially all of their savings from earnings,[161] *provided* that they choose the limited set of investments available within employer-sponsored 401(k) accounts.[162]

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[159] See, for example, Roger Gordon, Laura Kalambokidis, and Joel Slemrod, *Do We Now Collect Any Revenue from Taxing Capital Income?*, 88 J Pub Econ 981, 1000 (2004) (noting that the US tax system is commonly characterized as a hybrid of an income tax and a consumption tax).

[160] See generally Christopher R. Cunningham and Gary V. Engelhardt, *Federal Tax Policy, Employer Matching, and 401(k) Saving: Evidence from HRS W-2 Records*, 55 Natl Tax J 617 (2002). See also IRC § 401.

[161] In 2014, the annual limit on contributions to 401(k) plans alone was between $17,500 and $23,000 (the limit was $23,000 per year for those over the age of fifty). See Internal Revenue Service, *Publication 560: Retirement Plans for Small Business (SEP, SIMPLE, and Qualified Plans)* *3 (Department of the Treasury, Jan 7, 2015), archived at http://perma.cc/V7BA-5WPW. 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 first quarter of 2014, the personal-savings rate averaged 5.4 percent. In the previous ten years, it averaged 4.1 percent. Bureau of Economic Analysis, *Personal Income and Outlays, May 2014* (Department of Commerce, June 26, 2014), archived at http://perma.cc/E4UM-2MH6.

Census data suggest that in 2013, 90 percent of men and 97 percent of women ages fifteen and older had annual incomes below $100,000. USCB, *Current Population Survey* at *table PINC-11 (cited in note 130). In 2012 and 2013, disposable income per capita was approximately $39,000. BEA, *Personal Income and Outlays* (cited in note 161).

Although savings rates increase with income, retirement-contribution limits will comfortably exceed savings for most individuals. See Karen E. Dynan, Jonathan Skinner, and Stephen P. Zeldes, *Do the Rich Save More?*, 112 J Polit Econ 397, 399–400 (2004) (finding positive relationships between lifetime income and both average savings rates and marginal propensity to save); Christopher D. Carroll, *Why Do the Rich Save So Much?*, in Joel B. Slemrod, ed, *Does Atlas Shrug? The Economic Consequences of Taxing the Rich* 465, 466–70 (Harvard 2000).

[162] For a discussion of eligibility and participation in 401(k) accounts by income level and of the growing use of such accounts, see generally James M. Poterba, Steven F. Venti, and David A. Wise, *The Rise of 401(k) Plans, Lifetime Earnings, and Wealth at Retirement*, in David A. Wise, ed, *Research Findings in the Economics of Aging* 271 (Chicago 2010); David Joulfaian and David Richardson, *Who Takes Advantage of Tax-Deferred Savings Programs? Evidence from Federal Income Tax Data*, 54 Natl Tax J 669 (2001).

Tax-advantaged accounts have grown rapidly since they were introduced in 1978 and now account for half of all long-term mutual fund assets.[163] For those who save and invest exclusively through such retirement accounts, the US tax system effectively functions as 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.[164] This may lead to substitution away from other forms of investment,[165] underdiversification, and excessively high management fees.[166]

C. 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,[167] full deductibility of interest up to the amount of income from the investment,[168] favorable long-term capital gains tax rates upon sale,[169] and opportunities for deferral such as like-kind exchanges.[170]

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[163] See Clemens Sialm and Laura Starks, *Mutual Fund Tax Clienteles*, 67 J Fin 1397, 1398 (2012); *Retirement Assets Total $24.8 Trillion in Second Quarter 2015* (Investment Company Institute, Sept 24, 2015), archived at http://perma.cc/9NKG-DVE7.

[164] See Internal Revenue Service, *Publication 590: Individual Retirement Arrangements (IRAs)* *12, 51 (Department of the Treasury, Jan 5, 2014), archived at http://perma.cc/3AAL-C7R8.

[165] See Daniel J. Benjamin, *Does 401(k) Eligibility Increase Saving? Evidence from Propensity Score Subclassification*, 87 J Pub Econ 1259, 1281 (2003) (finding that about one-half of 401(k) balances represent new private savings and that the biggest contributors are generally contributing funds that they would have saved anyway); Karen M. Pence, *401(k)s and Household Saving: New Evidence from the Survey of Consumer Finances* *20 (unpublished manuscript, Dec 2001), archived at http://perma.cc/KYG6-V7B3 (finding that households fund 401(k) plans in part by reducing investments in ineligible assets); Eric M. Engen and William G. Gale, *The Effects of 401(k) Plans on Household Wealth: Differences across Earnings Groups* *2 (NBER Working Paper Series, Dec 2000), archived at http://perma.cc/GX5E-PNPJ (finding that 0 to 30 percent of 401(k) contributions are new savings).

[166] See Edwin J. Elton, Martin J. Gruber, and Christopher R. Blake, *The Adequacy of Investment Choices Offered by 401(k) Plans*, 90 J Pub Econ 1299, 1302 (2006). See also generally John Angus, et al, *What's in Your 403(b)? Academic Retirement Plans and the Costs of Underdiversification*, 36 Fin Mgmt 87 (2007) (discussing the high costs of limited options available in TIAA-CREF plans and, in particular, the lack of low-cost indexed mutual funds).

[167] See IRC § 168.

[168] See IRS, *Publication 550* at *32 (cited in note 150); IRC § 163.

[169] See IRS, *Publication 550* at *51 (cited in note 150); IRS, *Publication 544* at *38 (cited in note 147). However, depreciation may be recaptured upon sale for the purposes

With respect to investments in owner-occupied housing, up to $250,000 in gains can be excluded from income (or up to $500,000 for a married couple filing jointly),[171] interest can be deducted on a mortgage of up to $1.1 million,[172] and property taxes are also deductible as an itemized deduction.[173] Owner-occupiers also derive substantial benefits from the exclusion of imputed rental income from taxation.[174]

Typical housing values and growth rates suggest that most households may exclude from their income all of the gains from the sale of a property that they occupy and may deduct substantially all of the interest on their home mortgages.[175] The compounded annual growth rate of nominal housing prices is relatively modest—approximately 5.5 percent measured since the 1960s and 2.5 percent over the last fifteen years.

The overwhelming majority of mortgages are for less than $1.1 million—and the interest is therefore fully deductible[176]—while the gain on the sale of most owner-occupied houses will be substantially less than $250,000 and therefore fully excludible.[177] Recent estimates suggest that investments in owner-occupied housing carry tax benefits worth approximately $3,400

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of calculating the portion of the gain that will be taxed at favorable long-term capital gains tax rates. IRS, *Publication 544* at *29–30 (cited in note 147).

170 See IRS, *Publication 544* at *12–13 (cited in note 147).

171 See Internal Revenue Service, *Publication 523: Selling Your Home* *2 (Department of the Treasury, Feb 9, 2015), archived at http://perma.cc/FZH7-PA3X; IRC § 121.

172 The $1.1 million includes $1 million in home-acquisition debt and $100,000 in home-equity debt. See Internal Revenue Service, *Publication 936: Home Mortgage Interest Deduction* *2 (Department of the Treasury, Jan 8, 2015), archived at http://perma.cc/83W2-G3ZD; IRC § 163(h)(2)(D), (3)(B)–(C).

173 IRC § 164(a)(1).

174 James Poterba and 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, 84–85 (2008).

175 In May 2014, the median sale price of existing homes sold in the United States was approximately $210,000 and the mean sale price was approximately $260,000. *Existing Home Sales* (National Association of Realtors, 2015), archived at http://perma.cc/A8BK-GKNF. Only 3 percent of existing homes were sold for more than $1,000,000. The sales prices for newly constructed homes were only slightly higher: $285,600 at the median and $323,500 at the mean. US Census Bureau and US Department of Housing and Urban Development, *New Residential Sales in February 2015* (Department of Commerce, Mar 24, 2015), archived at http://perma.cc/3LEL-J7XT.

176 Home-equity interest may not be fully deductible for some high-income taxpayers in high-tax states because of the alternative minimum tax. See Daniel R. Feenberg and James M. Poterba, *The Alternative Minimum Tax and Effective Marginal Tax Rates*, 57 Natl Tax J 407, 419 (2004).

177 See *Existing Home Sales* (cited in note 175).

per year for the average home-owning household.[178] However, for high-income households with owners ages twenty-five to thirty-five, the annual value of tax savings from homeownership is closer to $10,000–$20,000 per year.[179]

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

D. Taxation of Investments in Higher Education

Compared to the favorable tax treatment of investments in general, and 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.[180] There are two primary reasons for this disadvantage[181]—the tax base is larger, and the tax rates are higher.

1. Nondeductibility of expenditures.

Business expenditures such as research or advertising are immediately and fully deductible.[182] Other forms of business investment are capitalized and deducted over time through accelerated depreciation or amortization.[183] Like research, advertising, or investments in equipment or intellectual property, expenditures on higher education tend to boost long-term earnings and promote economic growth.[184] Also like these other expenditures, human capital has a limited useful life, since

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[178] See Poterba and Sinai, 98 Am Econ Rev at 88–89 (cited in note 174). Professors James Poterba and Todd Sinai 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 has been adjusted to 2014 dollars.

[179] See id.

[180] See generally Trostel, 101 J Polit Econ 327 (cited in note 128); Stephan, 70 Va L Rev 1357 (cited in note 128).

[181] Traditional analyses have sometimes assumed that education is tax advantaged because of timing issues. These timing issues are discussed in the Appendix.

[182] IRC §§ 162, 174. See also IRS, *Publication 535* at *4, 22–23 (cited in note 136).

[183] See IRC §§ 167–69, 178–79, 195, 197, 263(a). See also IRS, *Publication 535* at *26–33 (cited in note 136).

[184] See Part I.

productivity and labor force participation eventually decline with age and since life expectancy is limited.[185]

However, direct expenditures by households on tuition and books can be deducted under only very limited circumstances or are subject to low dollar caps.[186] 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 § 162 of the Internal Revenue Code.[187] Such expenditures are generally minimal—for example, they might cover a certificate or brief training program, or 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 § 162.[188] In addition, subject to limited exceptions, student-loan interest is not deductible, whereas business interest typically is fully deductible.

A patchwork of specific deductions, credits, and tax-advantaged savings accounts are available;[189] 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

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[185] See Sharon G. Levin and Paula E. Stephan, *Research Productivity over the Life Cycle: Evidence for Academic Scientists*, 81 Am Econ Rev 114, 126 (1991). See also generally Vegard Skirbekk, *Age and Individual Productivity: A Literature Survey*, 2 Vienna Yearbook Population Rsrch 133 (2004); Laurence J. Kotlikoff and Jagadeesh Gokhale, *Estimating a Firm's Age-Productivity Profile Using the Present Value of Workers' Earnings*, 107 Q J Econ 1215 (1992).

[186] See John K. McNulty, *Tax Policy and Tuition Credit Legislation: Federal Income Tax Allowances for Personal Costs of Higher Education*, 61 Cal L Rev 1, 16–17 (1973); Stephan, 70 Va L Rev at 1407–08 (cited in note 128); Dodge, 54 Ohio St L J at 944–45 (cited in note 32).

[187] See IRC § 162; Treas Reg § 1.162-5; Mary Louise Fellows and Lily Kahng, *Costly Mistakes: Undertaxed Business Owners and Overtaxed Workers*, 81 Geo Wash L Rev 329, 363–65 (2013).

[188] See Internal Revenue Service, *Publication 970: Tax Benefits for Education* *67–69 (Department of the Treasury, Jan 7, 2014), archived at http://perma.cc/A7A5-LY7D; Treas Reg § 1.162-5; *Carroll v Commissioner of Internal Revenue*, 418 F2d 91, 92, 94–95 & n 5 (7th Cir 1969) (disallowing a deduction for prelaw liberal arts classes for a police officer when college and professional education were encouraged but not required by the police department); Fellows and Kahng, 81 Geo Wash L Rev at 363–66 (cited in note 187).

[189] See IRS, *Publication 970* at *31 (cited in note 188); IRC §§ 25A, 221–22, 529.

high for many taxpayers.[190] Because of the excessive complexity and the fragmented nature of tax benefits for higher education, many taxpayers who are eligible for such provisions do not use them;[191] and because of phaseouts 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 if higher education were treated consistently with other forms of investment (that is, deducted under § 162 or capitalized and amortized on an accelerated basis).

a) Higher education tax expenditures per student. Tax-expenditure budgets are inherently controversial because of disagreement about the appropriate baseline against which they should be measured. Indeed, if education were treated similarly to other investments, many education-related "tax expenditures" would not be regarded as tax benefits or subsidies.

Nevertheless, tax-expenditure conventions facilitate a comparison of the tax treatment of education with the tax treatment of other investments. A range of values based on tax-expenditure budget estimates and the number of students enrolled in higher education institutions suggests that the tax benefits are insufficient to put investments in higher education on equal footing with other forms of investment, particularly when payroll taxes are taken into account.

Estimates from the College Board based on the Internal Revenue Service's Statistics of Income data suggest that tax benefits per student from all higher education deductions and

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[190] See generally Albert J. Davis, *Choice Complexity in Tax Benefits for Higher Education*, 55 Natl Tax J 509 (2002) (analyzing various tax benefits and the choices that taxpayers face); Susan M. Dynarski and Judith E. Scott-Clayton, *The Cost of Complexity in Federal Student Aid: Lessons from Optimal Tax Theory and Behavioral Economics*, 59 Natl Tax J 319 (2006) (arguing that the complexity of the financial-aid system hinders the efficiency and equity of student aid). Legislation has been proposed to consolidate several tax benefits, but the American Council on Education opposes it because the new legislation would eliminate many provisions that benefit graduate students. See generally Mary Corbett Broad, President of the American Council on Education, Letter to Members of the House of Representatives (July 17, 2014), archived at http://perma.cc/TAR9-HPEN.

[191] See Thomas J. Kane, *Savings Incentives for Higher Education*, 51 Natl Tax J 609, 618–19 (1998); *Higher Education: Improved Tax Information Could Help Families Pay for College* *26 (GAO, May 2012), archived at http://perma.cc/6B6D-7MA6.

credits in 2011 were approximately $1,800.[192] Original estimates prepared for this Article and presented in Table 3 are similar, suggesting annual higher education tax expenditures of approximately $1,700 to $2,000 per postsecondary student in 2012.[193] The aggregate tax expenditures for 2012 total around $38 billion. Aggregate expenditures are divided by the number of students in order to calculate expenditures per student. This approach ignores tax incidence and interaction effects between different tax-expenditure provisions, and it may over- or underestimate the actual benefits to students.

In Table 3, tax-expenditure estimates come from two sources: the US Office of Management and Budget (OMB)[194] and the Joint Committee on Taxation (JCT).[195] Estimates of the number of postsecondary students come from two sources: the US Census Bureau's Current Population Survey[196] and the Department of Education's Integrated Postsecondary Education Data System.[197] The OMB estimates of tax expenditures tend to be somewhat lower than the JCT estimates.[198] The two estimates of the number of students are similar. The average of these two estimates is used to calculate the per-student expenditures. Tax-expenditure estimates from the OMB and JCT are shown separately, and the average of these estimates is also shown.

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[192] See *Trends in Student Aid 2013* *27 (College Board, 2013), archived at http://perma.cc/MNT6-XNRT.

[193] To be comprehensive, Table 3 includes both expenditures that likely benefit postsecondary students directly and those that benefit postsecondary students only indirectly. Some education-related expenditures were excluded if they related primarily to K–12 education rather than postsecondary education. Table 3 includes the exclusion of scholarship and fellowship income per Office of Management and Budget and Joint Committee on Taxation 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.

[194] Office of Management and Budget, *Fiscal Year 2014: Analytical Perspectives; Budget of the U.S. Government* *289–301 (GPO, 2013), archived at http://perma.cc/3MNN-6YTY.

[195] Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2012–2017*, JCS-1-13, *36–37 (Feb 1, 2013), archived at http://perma.cc/T43B-94PP.

[196] US Census Bureau, *School Enrollment: CPS Historical Time Series Tables on School Enrollment* *table A-1 (Department of Commerce, Oct 15, 2015), online at http://www.census.gov/hhes/school/data/cps/historical/ (visited Oct 23, 2015) (Perma archive unavailable).

[197] National Center for Education Statistics, *Table 303.10: Total Fall Enrollment in Degree-Granting Postsecondary Institutions, by Attendance Status, Sex of Student, and Control of Institution; Selected Years, 1947 through 2023* (Department of Education, July 2014), archived at http://perma.cc/6EQ9-M3LT.

[198] Compare OMB, *Fiscal Year 2014* at *289–301 (cited in note 194), with JCT, JCS-1-13 at *36–37 (cited in note 195).

b) Specific higher education tax expenditures. One of the more generous higher education tax-expenditure provisions, the American Opportunity Credit, is limited by statute to $2,500 per student per year for up to four years of undergraduate education; cannot be used in conjunction with many other provisions; and begins to phase out for taxpayers with modified adjusted gross incomes of $80,000, with a full phaseout at $90,000.[199] Notwithstanding the $2,500-per-student statutory limit, the average tax expenditure is around only $700 to $900 per post-secondary student per year.[200]

At a 30 percent marginal tax rate, a $2,500 benefit would be equivalent to a deduction on at most $8,333 in expenditures per year. An $800 benefit would be equivalent to a deduction on at most $2,666 per year in expenses.

To put these limits into context, in the 2013–2014 academic year, average annual full tuition at four-year institutions was approximately $30,000.[201] After subtracting institutional scholarships and grants (forms of tuition discounting), this figure falls to about $20,000; and after subtracting government grants, it falls further, but the average cost still exceeds the effective caps on deductibility by a wide margin. Many students pay full tuition and are eligible for neither means-tested federal grant programs nor deductions.

The American Opportunity Credit is available only to undergraduates.[202] 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 phaseout at an income of $54,000 to $64,000 per year.[203] The actual average tax expenditure per student is around only $160 to $200 per year.[204]

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[199] See IRS, *Publication 970* at *8–20 (cited in note 188); IRC § 25A(i); Joint Committee on Taxation, *Background and Present Law Related to Tax Benefits for Education*, JCX-70-14 *6 (June 20, 2014), archived at http://perma.cc/G27N-6U8U. Note that the phaseout income is double for married couples filing joint returns. See IRC § 25A(i)(4)(A)(ii).

[200] See Table 3.

[201] The National Center for Education Statistics' Fast Facts tool provides quick answers to many education questions. See National Center for Education Statistics, *Fast Facts: Tuition Costs of Colleges and Universities* (Department of Education), archived at http://perma.cc/R7PC-B6MS. See also *Average Net Price over Time for Full-Time Students, by Sector* (College Board, 2015), archived at http://perma.cc/W6S7-BLBF.

[202] See IRC § 25A(i)(2).

[203] See IRS, *Publication 970* at *21–28 (cited in note 188); JCT, JCX-70-14 at *6 (cited in note 199); IRC § 25A(a)(2). Note that the phaseout income is double for married couples filing joint returns. IRC § 25A(i)(4)(A)(ii).

[204] See Table 3.

Similarly, a limited deduction is available for student-loan interest—at most $2,500 per year.[205] The student-loan-interest deduction is limited by an initial phaseout at an income of $65,000 and a complete phaseout at $80,000[206]—incomes that will be readily reached by some college graduates and by a substantial proportion of professional-degree holders within a few years of graduation.[207] By contrast, interest on business loans is fully deductible.[208]

At a 30 percent marginal tax rate, assuming $25,000 in debt per student[209] and a 6 percent interest rate,[210] one would expect a tax benefit of around $450 per student, even if each student had loans outstanding for only one year. If loans were repaid over ten years, the annual tax expenditure would be close to $2,000 per student per year. The actual tax expenditure per student per year is only about $50.[211]

The $2,500-in-interest limit is roughly equal to a deduction on at most $42,000 of student loans.[212] This limits deductibility for a large proportion of those with professional degrees, at least shortly after graduation.[213]

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205 See IRS, *Publication 970* at *29 (cited in note 188); IRC § 221.

206 JCT, JCX-70-14 at *18 (cited in note 199).

207 See Anthony P. Carnevale, Stephen J. Rose, and Ban Cheah, *The College Payoff: Education, Occupations, Lifetime Earnings* *3–4 (Georgetown University Center on Education and the Workforce), archived at http://perma.cc/76GV-FZNX. For example, median starting salaries for law graduates are around $60,000 and typically increase rapidly after graduation. See Simkovic and McIntyre, 43 J Legal Stud at 259 (cited in note 18); Ronit Dinovitzer, et al, *After the JD: First Results of a National Study of Legal Careers* *44 (NALP Foundation, 2004), archived at http://perma.cc/PS99-VA5D; Ronit Dinovitzer, et al, *After the JD II: Second Results from a National Study of Legal Careers* *44 (NALP Foundation, 2009), archived at http://perma.cc/SC5S-RABS.

208 IRC § 163.

209 In 2009, the average student-debt level of recent college graduates was approximately $25,000. See Jennie H. Woo, *Degrees of Debt: Student Borrowing and Loan Repayment of Bachelor's Degree Recipients 1 Year after Graduating; 1994, 2001, and 2009* *7 (Department of Education, Oct 2013), archived at http://perma.cc/F5C3-MT2K; *Student Loan Debt by Age Group* (Federal Reserve Bank of New York, Mar 29, 2013), archived at http://perma.cc/TT7K-7K5T.

210 Six percent nominal interest is likely close to the rate faced by professional-degree students. The rate for undergraduates may be substantially lower. See Simkovic and McIntyre, 43 J Legal Stud at 278–81 (cited in note 18).

211 See Table 3.

212 This assumes a 6 percent average nominal interest rate. The higher the interest rate, the lower the student-loan balance eligible for a deduction.

213 See *Doctoral Degree Recipient Debt, Percentage Borrowing and Average Borrowed, 2011-12* (College Board, 2015), archived at http://perma.cc/V6PN-K4VQ (reporting statistics on student-loan borrowing among students pursuing professional degrees in the United States during the 2011–2012 academic year).

A provision allowing for tax-advantaged higher education investment accounts administered through the states (called qualified-tuition programs, or 529 plans) is nominally attractive.[214] A 529 plan resembles a Roth retirement account. Contributions are not deductible for the 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.[215]

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.

The greatest beneficiaries of 529 plans are students from well-off families whose parents or other relatives plan ahead, can commit to setting aside substantial funds exclusively for higher education, and contribute early to their 529 accounts, allowing the maximum accumulation of tax-free investment income over the ensuing years. In practice, because of these requirements, 529 plans do not provide much benefit to the majority of students.[216] 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 $190 billion,[217] while the total outstanding balance of student loans was approximately $970 billion.[218] The average tax expenditure per student per year from qualified-tuition plans is only about $60.[219]

Another education-related tax benefit is the deduction for donations to charities, including nonprofit institutions of higher education.[220] 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.

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214 For descriptions of qualified-tuition programs, see IRS, *Publication 970* at *56–57 (cited in note 188); JCT, JCX-70-14 at *13–14 (cited in note 199); IRC § 529(b).

215 See IRC § 529.

216 See *Higher Education: A Small Percentage of Families Save in 529 Plans* *14–21 (GAO, Dec 2012), archived at http://perma.cc/TV57-H9KC (reporting that "less than 3 percent of US families [have] 529 plans").

217 *529 Plan Program Statistics: December 2014* (Investment Company Institute, Mar 10, 2015), archived at http://perma.cc/47FB-4MXV.

218 *Student Loan Debt* (cited in note 209).

219 See Table 3.

220 See JCT, JCX-70-14 at *21 (cited in note 199).

Economists disagree on the extent to which the deduction increases charitable contributions.[221] 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[222]) are ineligible, and most nonprofit higher education institutions receive only a small fraction of their revenue in the form of charitable gifts.[223] The average tax expenditure per student per year is about $225.[224]

Pell Grants, the largest federal subsidy program for college education, contribute on average around $1,600 per postsecondary student per year.[225] Eligibility is restricted through the exclusion of graduate students and through means testing.

There are a handful of other supply-side subsidies to nonprofit institutions of higher education,[226] such as exemptions from state and local property taxes, exemptions from entity-level taxation other than with respect to unrelated business taxable income, and government research grants.[227] However, it is unclear in practice to what extent these subsidies place nonprofits at an advantage relative to for-profits. For example, many large for-profit employers are able to negotiate substantial tax concessions and subsidies in return for locating facilities in particular

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221 Compare John Peloza and Piers Steel, *The Price Elasticities of Charitable Contributions: A Meta-analysis*, 24 J Pub Pol & Mktg 260, 267–68 (2005) (finding that tax deductions directly increase charitable contributions), with Dean Karlan and John A. List, *Does Price Matter in Charitable Giving? Evidence from a Large-Scale Natural Field Experiment*, 97 Am Econ Rev 1774, 1787–92 (2007) (suggesting that deductions do not necessarily lead to direct increases in charitable contributions).

222 NCES, *Table 303.10* (cited in note 197).

223 Laura G. Knapp, Janice E. Kelly-Reid, and Scott A. Ginder, *Enrollment in Postsecondary Institutions, Fall 2010; Financial Statistics, Fiscal Year 2010; and Graduation Rates, Selected Cohorts, 2002–07* *6–8 (Department of Education, Mar 2012), archived at http://perma.cc/R3HC-E3Q2. In 2010, the fraction of revenue from gifts ranged from a high of 7.4 percent at private nonprofit four-year-and-above institutions to a low of 0.4 percent at two-year-and-below public institutions. See National Center for Education Statistics, *List of 2013 Digest Tables* *tables 333.10–333.60 (Department of Education, 2015), online at http://nces.ed.gov/programs/digest/2013menu_tables.asp (visited Oct 23, 2015) (Perma archive unavailable).

224 See Table 3.

225 *Pell Grants: Total Expenditures, Maximum and Average Grant, and Number of Recipients over Time* (College Board, 2015), archived at http://perma.cc/5MWW-8377 (reporting total Pell Grant expenditures of $33 billion in 2012–2013 and 9.2 million recipients). As noted in Table 3, there were approximately 20.3 million postsecondary students in 2012.

226 Note that some educational institutions are for-profit entities. See text accompanying note 222.

227 See Henry B. Hansmann, *The Role of Nonprofit Enterprise*, 89 Yale L J 835, 881–83 (1980).

locales,[228] while many universities voluntarily make payments in lieu of taxes to support local governments and privately provide services such as public safety and sanitation to their surrounding communities.[229] It is also unclear to what extent federal research grants spill over into subsidies for education.[230] In addition, the benefits of grants may be externalized to private industries and neighboring communities.[231]

2. High marginal tax rates on ordinary income.

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.[232] (This ignores externalities and nonpecuniary 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 higher average and marginal tax rates than other labor earnings.[233] By contrast, the tax rates on other forms of investments are often much flatter and lower because capital gains–tax-rate schedules apply.

The earnings premium is spread out over the course of a lifetime, but the initial tax benefits of education (in the form of taxes not paid on forgone earnings while in school) occur early in

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[228] See Brian Galle, *The Tragedy of the Carrots: Economics and Politics in the Choice of Price Instruments*, 64 Stan L Rev 797, 842 (2012); Kevin R. Cox, *Globalisation, Competition and the Politics of Local Economic Development*, 32 Urban Stud 213, 214 (1995).

[229] See John J. Siegfried, Allen R. Sanderson, and Peter McHenry, *The Economic Impact of Colleges and Universities*, 26 Econ Educ Rev 546, 554 (2007).

[230] See Stephen R. Porter and Robert K. Toutkoushian, *Institutional Research Productivity and the Connection to Average Student Quality and Overall Reputation*, 25 Econ Educ Rev 605, 614 (2006) (reporting findings from an empirical study indicating that there is "a possible negative relationship between research and teaching"); J. Fredericks Volkwein and David A. Carbone, *The Impact of Departmental Research and Teaching Climates on Undergraduate Growth and Satisfaction*, 65 J Higher Educ 147, 147–48 (1994) (describing various conflicting views as to whether research enhances or hinders professors' performance in the classroom). Grants may benefit PhD students more than they benefit undergraduate or professional students.

[231] See generally Ammon J. Salter and Ben R. Martin, *The Economic Benefits of Publicly Funded Basic Research: A Critical Review*, 30 Rsrch Pol 509 (2001) (surveying studies confirming that publicly funded research indirectly benefits private industries); Adam B. Jaffe, *Real Effects of Academic Research*, 79 Am Econ Rev 957 (1989) (reporting findings that universities create positive spillover effects for private firms).

[232] See Simkovic and McIntyre, 43 J Legal Stud at 276–80 (cited in note 18).

[233] See generally Stephan, 70 Va L Rev 1357 (cited in note 128).

one's career. This is significant for two reasons: rate structure and present value.[234]

With respect to rate structure, the benefit of excluding forgone wages while in school is larger at higher marginal tax rates. But under the progressive income tax, marginal tax rates depend on annual earnings. Annual earnings typically rise over the course of a career from one's twenties through middle age.[235] Since incomes and tax rates are low early in one's career, the benefit of the exclusion from income is also relatively low.

To invest in higher education, students must effectively shift income from early, low-income, low-tax years to later, higher-income, higher-tax years—thereby increasing their total lifetime tax rates. The more progressive the tax-rate structure, the larger the potential cost to the taxpayer. In the corporate context, such temporal problems are mitigated through capitalization and amortization and through loss carryforwards, but income smoothing is not as readily available to individuals.[236]

3. Payroll taxes.

In addition to being subject to relatively high marginal tax rates, the higher education earnings premium is also typically 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 reduces wages.[237] This discussion proceeds as if employees paid payroll taxes in full.[238]

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234 For additional discussion of present value and timing issues, see Appendix.

235 See Simkovic and McIntyre, 43 J Legal Stud at 261 (cited in note 18).

236 The realization requirement makes it easier for individuals to time taxable income from gains (or losses) on property, but timing taxable income from earnings is more difficult. See Ronald M. Copeland, *Income Smoothing*, 6 J Accounting Rsrch 101, 104 (1968).

237 See, for example, Patricia M. Anderson and Bruce D. Meyer, *The Effects of the Unemployment Insurance Payroll Tax on Wages, Employment, Claims and Denials*, 78 J Pub Econ 81, 87 (2000); Jonathan Gruber, *The Incidence of Payroll Taxation: Evidence from Chile*, 15 J Labor Econ S72, S73 (1997). For a discussion of the incidence of payroll taxes outside the United States, see Emmanuel Saez, Manos Matsaganis, and Panos Tsakloglou, *Earnings Determination and Taxes: Evidence from a Cohort-Based Payroll Tax Reform in Greece*, 127 Q J Econ 493, 520–27 (2012); Guillermo Cruces, Sebastian Galiani, and Susana Kidyba, *Payroll Taxes, Wages and Employment: Identification through Policy Changes*, 17 Labour Econ 743, 743 (2010); Helge Bennmarker, Erik Mellander, and Björn Öckert, *Do Regional Payroll Tax Reductions Boost Employment?*, 16 Labour Econ 480, 484 (2009).

238 The effective tax rate is somewhat lower than the statutory rate. The employee portion of payroll taxes is not deductible from adjusted gross income in calculating income taxes, but the employer portion is excluded from the employee's income and is

As a result of the progressive benefit structure of social security[239] 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 disincentivize investments in higher education relative to alternative investments.

Risk spreading through social insurance is generally believed to be welfare enhancing,[240] 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 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, payroll taxes have increased from around 10 percent of federal revenue in the 1940s to nearly 40 percent of federal revenue in the 2000s.[241] During this time period, corporate income taxes declined from around 30 percent of

deductible by the employer. *Self-Employment Tax (Social Security and Medicare Taxes)* (IRS, Mar 13, 2015), archived at http://perma.cc/35VS-U7XM (noting that the employer-equivalent portion of self-employment taxes is deductible).

[239] 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 that the combined effect is mildly progressive. See, for example, Andrew J. Rettenmaier, *The Distribution of Lifetime Medicare Benefits, Taxes and Premiums: Evidence from Individual Level Data*, 96 J Pub Econ 760, 761 (2012); Julia Lynn Coronado, Don Fullerton, and Thomas Glass, *The Progressivity of Social Security*, 11 BE J Econ Analysis & Pol 1, 2 (2011); Mark McClellan and Jonathan Skinner, *The Incidence of Medicare*, 90 J Pub Econ 257, 262 (2006) (characterizing taxes at the individual level as "somewhat progressive"); Alan L. Gustman and Thomas L. Steinmeier, *How Effective Is Redistribution under the Social Security Benefit Formula?*, 82 J Pub Econ 1, 27 (2001) (concluding that "the general perception that a great deal of redistribution from the rich to the poor is accomplished by the progressive social security benefit formula is greatly exaggerated").

[240] See R. Glenn Hubbard and Kenneth L. Judd, *Social Security and Individual Welfare: Precautionary Saving, Borrowing Constraints, and the Payroll Tax*, 77 Am Econ Rev 630, 637–43 (1987); Alan B. Krueger and Bruce D. Meyer, *Labor Supply Effects of Social Insurance*, in Alan J. Auerbach and Martin Feldstein, 4 *Handbook of Public Economics* 2327, 2365–67 (Elsevier 2002).

[241] Office of Management and Budget, *Fiscal Year 2015: Historical Tables; Budget of the U.S. Government* *34–35 (GPO, 2014), archived at http://perma.cc/4T87-X6UJ.

federal revenue to around 10 percent of federal revenue,[242] although corporate profits did not decline proportionately as a share of GDP.[243]

As shown in Table 5, payroll tax rates have dramatically increased from around 7 percent in the early 1960s to more than 15 percent in the 2000s (the average effective payroll tax rate is closer to 12 percent).[244] In addition to increases in tax rates, the maximum earnings subject to the payroll taxes have 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.[245] Earnings subject to Medicare taxes ceased to be capped in 1993.[246] Although some highly educated individuals earn more than the maximum earnings subject to social security taxes—particularly PhDs and professional-degree holders[247]—the bulk of the earnings premium for most individuals with an associate's degree or above is subject to social security taxes.

A popular view is that payroll taxes are not actually taxes but rather are "forced savings"—effectively mandatory contributions to a pension program.[248] There is some merit to this argument, but it also has 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.[249] Social security is redistributive, across both cohorts and income levels.[250] Social security revenues

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242 Id.

243 See *FRED Graph* (Federal Reserve Bank of St Louis), archived at http://perma.cc/C6KQ-NRH5.

244 Thomas Piketty and Emmanuel Saez, *How Progressive Is the U.S. Federal Tax System? A Historical and International Perspective*, 21 J Econ Persp 3, 3 (2007); *Social Security and Medicare Tax Rates* (Social Security Administration), archived at http://perma.cc/4A83-8A6R.

245 See *Benefits Planner: Maximum Taxable Earnings (1937 - 2015)* (Social Security Administration), archived at http://perma.cc/W7HM-DTLG.

246 *Contribution and Benefit Base* (Social Security Administration), archived at http://perma.cc/LS2A-77KQ.

247 See Carnevale, Rose, and Cheah, *The College Payoff* at *5 (cited in note 207).

248 For a discussion on this view, see Deborah A. Geier, *Integrating the Tax Burdens of the Federal Income and Payroll Taxes on Labor Income*, 22 Va L Rev 1, 35, 43–44 (2002).

249 See *Social Security and Medicare Benefits* (Social Security Administration), archived at http://perma.cc/PMH6-SPVU.

250 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, and Alice Wade, *Internal Real Rates of Return under the OASDI Program for Hypothetical Workers*

overwhelmingly come from taxes on current workers, not from investment returns to the social security trust fund.[251] Payment of scheduled benefits to earlier retirees has required substantial increases in taxes for subsequent cohorts of workers and will continue to do so.[252]

Many government programs are progressive, but in the case of social security, the burden of redistribution falls almost entirely on high wages. Those with high incomes from financial or physical capital are largely exempt.[253] 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 in favor of exclusively taxing labor.[254] This argument applies with equal strength to funding sources for other expenditure programs, and it is vulnerable to the same critiques, generally without regard to the specific expenditure in question.[255] 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.

VI. POLICY IMPLICATIONS

If taxes and subsidies distort investment decisions and contribute to underinvestment in education, how should policies be modified?

(Social Security Administration, Mar 2005), archived at http://perma.cc/YG67-55A3. See also note 239 and accompanying text.

[251] *The 2014 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* *6–7 (GPO, July 28, 2014), archived at http://perma.cc/SL4N-2CAJ.

[252] See Table 5. Recent estimates suggest that without additional revenue, the program will be able to pay only around 77 percent of scheduled benefits starting around 2033. Social Security and Medicare Board of Trustees, *Status of the Social Security and Medicare Programs: A Summary of the 2014 Annual Reports* *10 (2014), archived at http://perma.cc/J4SR-URCN.

[253] See *Summary of How Major Types of Remuneration are Treated* (Social Security Administration, Jan 23, 2015), archived at http://perma.cc/4UJ5-GZL9. 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.

[254] See Part IV.

[255] The exception would be expenditures that compensate the individuals being taxed in proportion to the taxes that they pay. See Shuanglin Lin, *Labor Income Taxation and Human Capital Accumulation*, 68 J Pub Econ 291, 292 (1998). As noted above, payroll taxes and related benefits do not meet this criterion.

Horizontal equity would suggest changes to the tax system to equalize the treatment of investments in higher education with other forms of investment.[256] This could be accomplished either by increasing effective tax rates on forms of investment other than higher education (which may require comprehensive tax reform), reducing effective tax rates on investments in higher education, or some combination of the two.

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 could be given control over the timing of these deductions to facilitate income smoothing.[257]

The tax rate on labor could be reduced while the tax rate on capital could 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 half 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 be verified only empirically.[258]

Student decisions about enrollment and completion respond to financial incentives, at least on the margin.[259] However, students may be more responsive to some financial incentives than to others that are economically equivalent because of, for example, salience or risk aversion. Additional options for reducing distortions and underinvestment in education include increasing federally funded grant programs, reducing the interest rates and

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[256] See Richard A. Musgrave, *Horizontal Equity, Once More*, 43 Natl Tax J 113, 113 (1990) ("The call for equity taxation is generally taken to include a rule of horizontal equity [ ], requiring equal treatment of equals, and one of vertical equity [ ], calling for an appropriate differentiation among unequals.").

[257] See generally David, *Reforming the Taxation of Human Capital* (cited in note 109).

[258] See text accompanying notes 110–30.

[259] See Part I.C.

increasing the loan limits on federal student loans, and providing insurance that mitigates downside risk.

If elasticities were known, these transfer programs could target the groups of prospective students who are most likely to respond to subsidies and who have the highest rates of return on investment. For example, it is possible that groups toward the bottom of the income distribution respond the most to subsidies because they are on the margin with respect to college attendance. This assumption is sometimes presented as a justification for means testing Pell Grants and excluding middle-class college students and graduate students from eligibility.[260]

However, the empirical evidence for higher elasticities of investment in education for lower-income groups is mixed at best.[261] Half of the studies suggest that higher socioeconomic groups may respond more to incentives to invest in higher education than lower-income groups.[262] This intuitively makes sense, considering differences in the availability of attractive alternative investments such as family-owned businesses.

The marginal dollar is not necessarily invested by the marginal student. Elasticity of investment should be considered with respect to the *quality* of education as well as the *quantity*. Higher quality typically comes at higher cost, at least among nonprofit institutions.[263] The rates of return on degrees disproportionately funded by Pell Grants—such as associate's degrees and vocational programs from for-profit institutions[264]—may be lower than the rates of return to higher-quality programs that are financed primarily through other government sources,[265]

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[260] See Sigal Alon, *Who Benefits Most from Financial Aid? The Heterogeneous Effect of Need-Based Grants on Students' College Persistence*, 92 Soc Sci Q 807, 822–23 (2011). 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 benefits from and supports public investment programs. Means testing may be attractive to some liberals because it favors low-income groups over middle-income groups. See id at 808 ("Means-tested financial aid is designed to promote the attainment of bachelor's degrees by low-income students by increasing their likelihood of enrollment and lessening their chances of dropping out of school for lack of funds.").

[261] Susan Dynarski, *The Behavioral and Distributional Implications of Aid for College*, 92 Am Econ Rev 279, 284 (2002).

[262] Id.

[263] See Dale and Krueger, 177 Q J Econ at 1522 (cited in note 36).

[264] See *For-Profit Colleges Capitalize on Pell Grant Revenue* (The Chronicle of Higher Education, Jan 4, 2010), archived at http://perma.cc/2V7T-CPFJ.

[265] 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. *Postsecondary Education:*

especially when differences in completion rates are taken into account.[266] 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 as well as reduce the aggregate level and efficacy of public investment in education.

Because the labor-economics literature has focused on liquidity constraints and risk aversion as likely causes of underinvestment in higher education,[267] it may be sensible, as a first approximation, to augment and expand existing programs that provide liquidity, such as federal student loans,[268] as well as programs that provide insurance or risk spreading, such as income-based repayment programs with debt forgiveness.[269] (Modified grant programs that are simpler and more closely tied to rates of return also merit consideration.)

Low borrowing limits on certain federal student-loan programs and high interest rates, especially for graduate students,[270]

Student Outcomes Vary at For-Profit, Nonprofit, and Public Schools *5–8 (GAO, Dec 2011), archived at http://perma.cc/KW4R-SJED. See also David W. Breneman and Fred J. Galloway, *Rethinking the Allocation of Pell Grants* *6 (Education Resources Information Center, Feb 1996), archived at http://perma.cc/K54L-TFB6 (discussing the benefits from "excluding proprietary school students from Pell Grants"); Kane and Rouse, 85 Am Econ Rev at 600 (cited in note 18) (discussing skepticism among economists regarding the value of attending community college).

[266] See Mariana Alfonso, Thomas R. Bailey, and Marc Scott, *The Educational Outcomes of Occupational Sub-baccalaureate Students: Evidence from the 1990s*, 24 Econ Educ Rev 197, 209–10 (2005) (discussing differences in completion rates between occupational and academic students).

[267] See, for example, Weixiang Pan and Ben Ost, *The Impact of Parental Layoff on Higher Education Investment*, 42 Econ Educ Rev 53, 62 (2014); Lance Lochner and Alexander Monge-Naranjo, *Credit Constraints in Education*, 4 Ann Rev Econ 225, 230–32 (2012); Lance J. Lochner and Alexander Monge-Naranjo, *The Nature of Credit Constraints and Human Capital*, 101 Am Econ Rev 2487, 2489 (2011); Catherine C. Eckel, et al, *Debt Aversion and the Demand for Loans for Postsecondary Education*, 35 Pub Fin Rev 233, 258 (2007) ("Debt aversion . . . is statistically significant.") (emphasis omitted); Heckman, Lochner, and Todd, *Earnings Functions* at 338 (cited in note 9); Claire Callender and Jonathan Jackson, *Does the Fear of Debt Deter Students from Higher Education?*, 34 J Soc Pol 509, 529 (2005) (finding that debt is a deterrent to higher education among lower-income British students).

[268] See generally Jonathan D. Glater, *The Other Big Test: Why Congress Should Allow College Students to Borrow More through Federal Aid Programs*, 14 NYU J Legis & Pub Pol 11 (2011).

[269] See Simkovic, 70 Wash & Lee L Rev at 617–19 (cited in note 39); Philip G. Schrag and Charles W. Pruett, *Coordinating Loan Repayment Assistance Programs with New Federal Legislation*, 60 J Legal Educ 583, 590–97 (2011).

[270] 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,

increase the costs of financing a degree.[271] Unlike increases in tuition, which can fund improvements in the quality of education that students receive, increases in interest rates and other financing costs are unlikely to provide any benefits to students.

Income-based repayment programs currently cap debt repayments and provide forgiveness.[272] Some of these programs are explicitly designed to subsidize work that may be undercompensated by the market. Other programs are intended as insurance against low income for work that does not necessarily produce positive externalities.[273] In theory, this may have the unintended consequence of disproportionately benefiting fields of study that both are expensive and lead to relatively low earnings. A better approach may be to insure only against downward deviations from expected income in light of an individual's field of study, ex ante characteristics, and institutional characteristics.[274] This may roughly correspond to current income-based repayment programs, since more-expensive programs will generally be associated with higher earnings and higher debt levels.[275]

If risk aversion reduces educational investment, insurance programs may provide a large benefit at a minimal cost. Insurance can reassure far more students than will actually need to use the insurance.[276]

Ultimately, the specific reforms that should be undertaken to correct extant distortions should be determined through empirical studies of student responsiveness, elasticities, and rates of return.[277]

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business, engineering, and computer science. See, for example, *Refinance Your Student Loans* (Darien Rowayton Bank, 2015), archived at http://perma.cc/R26J-E42H.

271 Lochner and Monge-Naranjo, 101 Am Econ Rev at 2520–21 (cited in note 267).

272 See Simkovic, 70 Wash & Lee L Rev at 617–18 (cited in note 39).

273 See John R. Brooks II, *Income-Based Repayment and the Public Financing of Higher Education*, 104 Georgetown L J *38 (forthcoming 2015), archived at http://perma.cc/Y5F6-PYAG.

274 Thus, for example, a graduate in Field A, for which the average expected income is $100,000 per year and the twenty-fifth percentile income is $60,000 per year, would receive debt forgiveness to the extent that his or her long-term income fell below $60,000 per year. In contrast, a graduate in Field B, for which the average expected income is $50,000 per year and the twenty-fifth percentile income is $30,000 per year, would receive debt forgiveness only to the extent that his or her long-term income fell below $30,000 per year.

275 See Brooks, 104 Georgetown L J at *55 (cited in note 273).

276 See Robert J. Shiller, *The New Financial Order: Risk in the 21st Century* 130–50 (Princeton 2003); Felicia Ionescu, *The Federal Student Loan Program: Quantitative Implications for College Enrollment and Default Rates*, 12 Rev Econ Dynamics 205, 206–07 (2009).

277 Readers who are skeptical about optimal taxation and economic theories of efficiency might consider horizontal equity, which in this case appears to suggest fairly

CONCLUSION

This Article contributes to the optimal-tax and consumption tax literature by considering higher education as a discretionary form of investment. If knowledge is a choice rather than an immutable characteristic, optimal-tax and subsidy policies are at odds with those recommended by much of the extant literature.

This Article also contributes to the literature on education investment. Labor economists have struggled to explain why the pretax rates of return to higher education have remained much higher than the rates of return to other investments. Explanations offered by other scholars have included the psychic costs of schooling, risk aversion, liquidity constraints, and information failures. However, these explanations alone seem insufficient to explain the magnitude and persistence of the observed difference in returns.

This Article identifies an additional explanation for the high pretax returns on higher learning: taxation. Although rates of return on higher education are extremely high before taxes, after taxes these rates are closer to the returns that we observe on other investments. The net effective tax rate on higher education remains relatively high even after we take various subsidies into consideration. These tax policies may produce an economic distortion that leads to underinvestment in higher education. This analysis assumes no positive externalities of education and therefore provides a conservative estimate of underinvestment.

Distortions that lead to underinvestment in learning can be corrected through tax reform, additional subsidies to higher education, or both. The underlying economic theories that support much of current tax policy suggest that correcting these distortions would hasten economic growth and improve social welfare.

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similar policy changes. See David S. Davenport, *Education and Human Capital: Pursuing an Ideal Income Tax and a Sensible Tax Policy*, 42 Case W Res L Rev 793, 952–53 (1992).

TABLE 1. AVERAGE ANNUAL EARNINGS BY EDUCATION, PRIME-AGE MALES, 1970–2010

	High School or Less	Some College or Two-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 (%)				
1970		35	77	98
1980		21	56	70
1990		32	81	139
2000		35	101	172
2010		43	133	237

Note: These are cross tabulations. Earnings are calculated as the sum of wage, farm, and business incomes. Person-weights are used in all years, ages thirty to fifty-four. Data-quality flags are applied to filter out imputed data for components of earnings and for education levels. Data include employed and unemployed persons but exclude those not in the labor force. Earnings are inflation adjusted to 2012 dollars using the CPI and rounded to the nearest hundred dollars. Due to rounding, figures may not sum precisely.

Source: Minnesota Population Center, *Integrated Public Use Microdata Series* (cited in note 104).

TABLE 2. AVERAGE ANNUAL EARNINGS BY EDUCATION, PRIME-AGE FEMALES, 1970–2010

	High School or Less	Some College or Two-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 (%)				
1970		27	65	123
1980		23	45	90
1990		37	79	139
2000		34	87	150
2010		42	114	204

Note: These are cross tabulations. Earnings are calculated as the sum of wage, farm, and business incomes. Person-weights are used in all years, ages thirty to fifty-four. Data-quality flags are applied to filter out imputed data for components of earnings and for education levels. Data include employed and unemployed persons but exclude those not in the labor force. Earnings are inflation adjusted to 2012 dollars using the CPI and rounded to the nearest hundred dollars. Due to rounding, figures may not sum precisely.

Source: Minnesota Population Center, *Integrated Public Use Microdata Series* (cited in note 104).

TABLE 3. PER-STUDENT AND AGGREGATE HIGHER EDUCATION TAX EXPENDITURES, 2012

	Per Student Tax-Expenditure Estimates (2012 USD)			Aggregate Tax-Expenditure Estimates (2012 USD Millions)		
	OMB	JCT	Average	OMB	JCT	Average
Total:	1,704	1,996	1,852	34,560	40,500	37,580
Tuition Tax Credits	865	1,001	933	17,540	20,300	18,920
American Opportunity Tax Credit	704	N/A	704	14,290	N/A	14,290
Lifetime Learning Tax Credit	160	N/A	160	3,250	N/A	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	N/A	4	80	N/A	80
Exclusion of Interest on Savings Bonds Redeemed to Finance Educational Expenses	1	N/A	1	20	N/A	20
Parental Personal Exemption for Students Ages Nineteen and 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

Note: Per-student figures are calculated by dividing aggregate tax expenditures by the number of postsecondary students. The number of postsecondary students is the average (20.3 million) of estimates from the US Census Bureau's Current Population Survey (19.9 million) and the US Department of Education's Integrated Postsecondary Education Data System (20.6 million). Due to rounding, figures may not sum precisely.

Sources: NCES, *Table 303.10* (cited in note 197); US Census Bureau, *School Enrollment: CPS October 2012 - Detailed Tables* *table 5 (Department of Commerce, Sept 3, 2013), online at http://www.census.gov/hhes/school/data/cps/2012/tables.html (visited Oct 23, 2015) (Perma archive unavailable); Office of Management and Budget, *Fiscal Year 2013: Analytical Perspectives; Budget of the U.S. Government* *249–53 (GPO, 2012), archived at http://perma.cc/P2PR-GFSD; JCT, JCS-1-13 at *30–41 (cited in note 195).

TABLE 4. PAYROLL AND CORPORATE TAXES AS A PERCENTAGE OF FEDERAL GOVERNMENT REVENUE, 1934–2013

Years	Social Security and Retirement Receipts (%)	Corporate Income Tax Receipts (%)
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: Five-year averages weight each year equally.

Source: OMB, *Fiscal Year 2015* at *33–35 (cited in note 241).

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 (2014 USD)	Payroll Tax Rates (%)		
		Total Payroll Tax Rate	Social Security Tax Rate (OASDI)	Medicare Tax Rate (HI)
1938	50,600	2.00	2.00	N/A
1943	41,200	2.00	2.00	N/A
1948	29,600	2.00	2.00	N/A
1953	32,000	3.00	3.00	N/A
1958	34,600	4.50	4.50	N/A
1963	37,300	7.25	7.25	N/A
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 CPI and rounded to the nearest hundred dollars.

Source: *Social Security and Medicare Tax Rates* (cited in note 244).

APPENDIX. TIMING ISSUES

Early economic analyses 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 forgone wages are not taxed, education is tax advantaged.[278]

Today, these assumptions are much less likely to hold true for important categories of higher education: high-end bachelor's, 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.[279] In contrast, real earnings for those with bachelor's degrees and above have increased, especially for those with both higher education and subsequent work experience.[280]

Less of the cost of higher education is in the form of untaxed forgone earnings and more is in the form of after-tax direct expenditures. Students finish their degrees sooner and spend more. The rate at which students complete college has increased,[281] shortening the time spent obtaining a given level of education. At the same time, tuition and fees have increased[282] while per-student public funding for state universities has not

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[278] See generally Trostel, 101 J Polit Econ 327 (cited in note 128); Stephan, 70 Va L Rev 1357 (cited in note 128).

[279] See Thomas Lemieux, *Postsecondary Education and Increasing Wage Inequality*, 96 Am Econ Rev 195, 195 (2006); Abel and Deitz, 20 Current Issues Econ & Fin at 2 (cited in note 93).

[280] See Lemieux, 96 Am Econ Rev at 196 (cited in note 279); Simkovic, 70 Wash & Lee L Rev at 537 (cited in note 39).

[281] See NCES, *Percentage of First-Time Full-Time Bachelor's Degree-Seeking Students at 4-Year Institutions Who Completed a Bachelor's Degree* (cited in note 44). Law school–completion rates have also increased. See Section of Legal Education and Admissions to the Bar, *Enrollment and Degrees Awarded 1963 - 2012 Academic Years* (ABA), archived at http://perma.cc/B35T-HT35.

[282] See National Center for Education Statistics, *Table 330.10: 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* (Department of Education, Mar 2014), archived at http://perma.cc/5SZB-UNDH. See also National Center for Education Statistics, *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* (Department of Education, Dec 2013), archived at http://perma.cc/U4CB-2465.

kept pace.[283] The tax disadvantages of investments in higher education have increased relative to the tax advantages (that is, direct expenditures have increased relative to opportunity costs).

The present value of a tax benefit also depends on its timing and the discount rate. Because the tax benefit of the exclusion of forgone 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.[284]

However, over the last thirty years, prevailing interest rates have dramatically declined, reducing discount rates. As a result, timing matters less for present value today than it did thirty years ago. In other words, early tax benefits associated with investments in higher education are worth relatively less, while later-life penalties are worth more, and the data now more strongly suggest 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.[285] 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 in effective individual income tax rates.[286] Payroll taxes, whose incidence is on labor, have dramatically increased.[287]

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[283] State grants per student grew faster than the CPI from the early 1990s through the mid-2000s, but college costs increased faster and, as a result, state funding now provides a lower percentage of total funding than it once did. *Trends in Student Aid 2013* at *10–16, 28–29 (cited in note 192).

[284] See Stephan, 70 Va L Rev at 1384 (cited in note 128); Simkovic and McIntyre, 43 J Legal Stud at 281–82 (cited in note 18).

[285] See Mankiw, Weinzierl, and Yagan, 23 J Econ Persp at 147–48 (cited in note 2).

[286] See generally Piketty and Saez, 21 J Econ Persp 3 (cited in note 244). Top statutory marginal income tax rates have declined dramatically, but effective tax rates have not declined as much. See id at 12–13.

[287] Id at 12–13; *Social Security and Medicare Tax Rates* (cited in note 244).