

Taxes, Subsidies, and Knowledge: A Reply to Professor Oei

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INTRODUCTION

In *The Knowledge Tax*, I argued that federal taxes and subsidies in aggregate likely disadvantage investments in higher education relative to other investments.¹ When it comes to investments in higher education, the tax rates are higher and the tax base is larger.²

The purpose of *The Knowledge Tax* is not to assert that the *only* explanation for underinvestment in higher education is differences in tax treatment and subsidies. Rather, *The Knowledge Tax* highlights that a simple neoclassical model can explain much of the observed data, and that a simple and underexplored explanation is credibly at least *one* important driver.³ An economic model can remove higher education policy from the realm of anecdotes and narrow interest group politics, and situate higher education in broader conversations about efficiency (relative to alternatives), investment, and economic growth.⁴

As Professor Shu-Yi Oei's response highlights, even demonstrating that higher education is at a disadvantage relative to other investments would be a substantial contribution to the scholarly literature.⁵ Demonstrating such a disadvantage would shift the policy question from *whether* we should subsidize higher education to *how* we should counter anti-education policies embedded in the tax system. Particular taxes and subsidies can best be understood within a broader context.

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¹ See generally Michael Simkovic, *The Knowledge Tax*, 82 U Chi L Rev 1981 (2015).

² Id at 2018.

³ See id at 2035.

⁴ See id at 1984–85.

⁵ See Shu-Yi Oei, Response, *Supply, Demand, and the Taxation of Knowledge*, 82 U Chi L Rev Dialogue 268, 271–75 (2015).

Neoclassical models are useful not because they fully capture reality, but because they simplify it. Simplification makes analysis and prediction inexpensive while explaining enough of reality to be relevant. To be useful, a model sometimes need only make predictions that are likely to be directionally correct. Thus, even if some students do not respond to financial incentives, or respond imperfectly, the model will make useful predictions as long as some students do respond in the direction economic theory predicts and few students respond in the opposite direction. An economic model will make useful predictions even if factors besides finances are important to educational decisions, as long as financial considerations are not completely irrelevant to all students. More complex models can be useful if the costs of greater complexity are outweighed by the benefits of greater predictive accuracy. Neoclassical models remain the foundational baseline upon which behavioral models seek to build and improve.

Oei questions the extent to which decisions about investment in higher education respond to economic incentives rather than psychological or behavioral factors, and she echoes my own call for additional research on behavioral responses to specific policy levers.⁶ These are important issues, and I welcome the opportunity to expand on the discussion that appears in *The Knowledge Tax*.

I. SUBSTITUTES FOR HIGHER EDUCATION

The Knowledge Tax suggests that tax disadvantages to higher education could lead to substitution away from investments in higher education and toward other investments.⁷ Assuming no negative externalities of higher education, this substitution would be an inefficient distortion. At a given level of investment, an inefficient allocation between human, physical, and financial capital would lead to suboptimal economic growth.⁸

Professor Oei questions whether it is appropriate to compare tax rates on higher education with tax rates on investments that are taxed more favorably, and whether it is appropriate to assume substitution effects between higher education and tax-favored investments.⁹ One apparent basis of this critique is that many stu-

⁶ Compare *id.* at 275–80, 283 with Simkovic, 82 U Chi L Rev at 2034 (cited in note 1).

⁷ Simkovic, 82 U Chi L Rev at 1983–84 (cited in note 1).

⁸ See *id.* at 1984.

⁹ Oei, 82 U Chi L Rev Dialogue at 278–80 (cited in note 5).

dents who have the option of borrowing to attend college or graduate school may not have the simultaneous option of making other investments that require a large amount of capital.¹⁰

Investments do not have to be direct substitutes for the taxation of one to affect the level of investment in the other. An individual student may not have a realistic choice between attending college and investing in a hedge fund, investing in a private equity fund, or starting a small business. However, that student's parents and grandparents probably have access to a variety of investment options such as housing¹¹ and securities.¹² Parents and grandparents can decide how much financial support to provide during college or graduate school, versus how much to invest in other assets and leave to their descendants as an inheritance.¹³

¹⁰ See *id.* ("It seems less likely that most students . . . are choosing to invest in stocks or real estate instead of going to school.")

¹¹ Fair Housing Administration (FHA) mortgages are available with a minimum down payment of 3.5 percent. Thus, an individual with only \$7,000 could purchase a \$200,000 house. See *Let FHA Loans Help You* (US Department of Housing and Urban Development), archived at <http://perma.cc/XYF3-DTFB>.

¹² A margin account can be opened with as little as \$2,000. See *4210. Margin Requirements* *11 (Financial Industry Regulatory Authority, 2010), archived at <http://perma.cc/XF6G-DCGD>. Diversified mutual funds and exchange-traded funds are available with similarly minimal upfront investments. See Steffen Andersen and Kasper Meisner Nielsen, *Participation Constraints in the Stock Market: Evidence from Unexpected Inheritance Due to Sudden Death*, 24 *Rev Fin Stud* 1667, 1690–92 (2011) (finding evidence that inadequate wealth is rarely a reason for not participating in the stock market).

¹³ Two leading economic theories that seek to explain parental decisions regarding bequests and inter vivos transfers include the altruism theory and the strategic bequest theory. Under altruism theory, parents view children as an extension of themselves and seek to maximize aggregate utility of the family. Under strategic bequest theory, parents use their wealth to influence their children's decisions to be more in line with parental preferences. See Robert A. Pollak, *Tied Transfers and Paternalistic Preferences*, 78 *Am Econ Assoc Papers & Proceedings* 240, 241 (1988) (proposing a "paternalistic preferences" model in which children's consumption as adults factors into parental utility); B. Douglas Bernheim, Andrei Shleifer, and Lawrence H. Summers, *The Strategic Bequest Motive*, 93 *J Polit Econ* 1045, 1058–68 (1985) (finding empirical support for their theory that parents use bequests "to influence the behavior of" their children). But see Joseph G. Altonji, Fumio Hayashi, and Laurence J. Kotlikoff, *Parental Altruism and Inter Vivos Transfers: Theory and Evidence*, 105 *J Polit Econ* 1121, 1156–58 (1997) (finding further evidence that appears inconsistent with the altruism theory); Joseph G. Altonji, Fumio Hayashi, and Laurence J. Kotlikoff, *Is the Extended Family Altruistically Linked? Direct Tests Using Micro Data*, 82 *Am Econ Rev* 1177, 1188–92 (1992) (raising doubts about the altruism theory).

Economists have long recognized a relationship between parental resources and college attendance, and have also considered more broadly how parents can influence students' decisions about the students' levels of educational investment. See Mariacristina De Nardi, *Wealth Inequality and Intergenerational Links*, 71 *Rev Econ Stud* 743, 743–44, 747–51 (2004) (modeling how intergenerational bequests of physical and human capital lead to wealth concentrations). See also, for example, Mark R. Rosenzweig and Kenneth I. Wolpin, *Intergenerational Support and the Life-Cycle Incomes of Young Men and Their Parents: Human Capital Investments, Coresidence, and Intergenerational Financial*

Family support will likely affect students' enrollment decisions—not only the choice of whether to attend college, but also the quality and cost of the institution the student chooses to attend.¹⁴

Even parents and grandparents may not have the option of investing in a hedge fund or private equity fund or small business—at least not directly. But hedge funds, private equity funds, small business owners, and their investors typically have the option of purchasing publicly traded securities or residential housing as well as purchasing illiquid investments to which most households do not have access. When households choose between higher education, securities, and housing, they affect the prices of and returns to securities and housing for all investors. The price and return impact of a single household's choice is likely to be negligible, but in aggregate, those choices can have a very large impact. Changes in the returns to housing and securities will affect decisions by other investors—those whose investment options overlap with the typical household but also include options to which typical households do not have access. And indeed, there is empirical evidence of spillovers between returns to household real estate investments and college-enrollment decisions.¹⁵ Thus, through a chain of indirect connections, incentives and decisions at one point in the capital market can affect returns and investment levels at another seemingly unconnected point. In other words, an assumption of an efficient capital market is often useful shorthand for describing the aggregate effects of policies, even if it is not necessarily literally true at a more granular level.

Moreover, if higher education and other investments really were separate and unconnected markets with a large segment of the population having only the option of investing in higher education—for example, because student loans were more readily

Transfers, 11 J Labor Econ 84, 109–11 (1993) (finding that parents provide financial assistance to their sons while they are in college so as to offset their sons' consumption losses).

Empirical evidence suggests that parental financial assistance can increase the likelihood of college completion. See Michael P. Keane and Kenneth I. Wolpin, *The Effect of Parental Transfers and Borrowing Constraints on Educational Attainment*, 42 Intl Econ Rev 1051, 1087–93 (2001) (finding that “college attendance contingent” parental financial assistance “create[s] important incentives for schooling attainment”); Laura T. Hamilton, *More Is More or More Is Less? Parental Financial Investments during College*, 78 Am Sociological Rev 70, 90–91 (2013) (“Parental funds may encourage . . . staying in school.”).

¹⁴ See Simkovic, 82 U Chi L Rev at 1994–95 (cited in note 1).

¹⁵ Michael F. Lovenheim, *The Effect of Liquid Housing Wealth on College Enrollment*, 29 J Labor Econ 741, 765–66 (2011). The article focuses on wealth effects, but it is a small move from finding wealth effects to assuming substitution effects.

available than other forms of credit—the flood of captive investments into higher education would make the pretax, risk-adjusted marginal returns to higher education *lower* than the returns to other investments without captive investors, all else being equal. But in fact, the pretax returns to education are unusually high.¹⁶

Another version of the nonsubstitution critique would be that higher education and other investments are not substitutes because it is possible to borrow the full cost of higher education and simultaneously borrow against higher expected future income to make other investments.¹⁷ In theory, this argument seems powerful—and indeed, in the long run, highly educated individuals are more likely to have higher incomes and consequently much higher levels of savings and investment. However, in the short run, many students behave as if their borrowing capacity is more limited.¹⁸

II. SUPPLY-SIDE SUBSIDIES AND THE MARGIN OF INVESTMENT

The Knowledge Tax considered higher education tax expenditures as well as federal subsidies such as Pell Grants.¹⁹ In aggregate, even after taking these subsidies into account, the tax treatment of higher education appears to be disadvantageous compared to many other investments.

Professor Oei raises an important question: whether comprehensively integrating all subsidies as well as taxes into the analysis changes the conclusion that investments in higher education are disadvantaged.²⁰ Oei questions whether higher education really is at a tax-and-subsidy disadvantage compared to other investments. She focuses on supply-side subsidies to higher education and the exclusion of forgone earnings from taxation.²¹

Subsidies are most important to the analysis if they operate on the *margin* where investment decisions are made²²—that is, if the dollar value of the subsidy changes with a dollar increase or decrease in investment in higher education at the current level of

¹⁶ Simkovic, 82 U Chi L Rev at 1996–2002 (cited in note 1).

¹⁷ See Ian Ayres and Barry Nalebuff, *Diversification across Time*, 39 J Portfolio Mgmt 73, 73–75 (Winter 2013).

¹⁸ Reluctance to borrow even when credit is available and borrowing seems sensible is sometimes called “debt aversion.” Catherine C. Eckel, et al, *Debt Aversion and the Demand for Loans for Postsecondary Education*, 35 Pub Fin Rev 233, 258 (2007).

¹⁹ Simkovic, 82 U Chi L Rev at 2018–26 (cited in note 1).

²⁰ Oei, 82 U Chi L Rev Dialogue at 270 (cited in note 5).

²¹ Id at 271–75.

²² See Susan Dynarski, *The Behavioral and Distributional Implications of Aid for College*, 92 Am Econ Assoc Papers & Proceedings 279, 283–84 (2002).

investment. Much of US public spending on higher education comes from state governments supporting state institutions.²³ These subsidies probably do not scale proportionately with increased marginal demand for higher education. For example, public universities might have appropriations that do not directly increase with enrollments or costs. This leaves public universities facing increased demand with the following options:²⁴ (1) increase prices (if the state legislature will allow it) and privatize more of the costs,²⁵ (2) cap enrollments in popular and expensive classes, or (3) sacrifice quality to keep costs down.²⁶

Many students find resource rationing at public universities unacceptable, and therefore voluntarily sacrifice the state-school subsidy to opt for more accessible or higher-quality private universities. Similarly, many federal demand-side subsidies such as Pell Grants or the American Opportunity Credit will only scale along the margin of additional students wishing to attend college, but not along the margin of student desire for higher-quality and more expensive college education or advanced degrees. Means testing and income phase outs reduce the extent to which subsidies scale along the margin because income typically increases with greater investment in higher education.

²³ Fiscal Federalism Initiative, *Federal and State Funding of Higher Education: A Changing Landscape* (Pew Charitable Trusts, June 11, 2015), archived at <http://perma.cc/ED7K-TFNW>. One specific example of a supply-side subsidy that Oei mentions—the deduction for charitable contributions to educational institutions—is explicitly addressed in *The Knowledge Tax* and is modest. See, Oei, 82 U Chi L Rev Dialogue at 272 (cited in note 5); Simkovic, 82 U Chi L Rev at 2024–25 (cited in 1). If averaged across all students, tax expenditures for the charitable contribution deduction would equal roughly \$225 per student per year, although in practice most of the benefits are concentrated at a few elite, exclusive institutions. Simkovic, 82 U Chi L Rev at 2025, 2038 (cited in note 1). These subsidies probably do not scale along the margin of investment for most students, who can only gain admission to institutions that depend primarily on tuition. Even at elite institutions, subsidies from charitable donations grow with the amount donated and the tax revenue forgone, not with growth in the number of students or the quality of education.

²⁴ The following list assumes no low-hanging fruit of greater efficiencies, which universities facing stiff competition for student enrollments and limited budgets presumably attempt to implement regardless of tax-and-subsidy levels.

²⁵ At public colleges, tuition recently surpassed state subsidies as a source of revenue. *Higher Education: State Funding Trends and Policies on Affordability* *9 (GAO, Dec 2014), archived at <http://perma.cc/P72J-N657>.

²⁶ Completion rates are lower at public universities than at private, nonprofit universities after controlling for race. See 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/836X-ZS2R>. While this may partly reflect differences in student populations, it likely also reflects superior resources at more expensive institutions free of publicly imposed rationing and price controls.

Subsidized student loans arguably scale along the margin of investment up to a point—especially for undergraduates—but annual subsidized loan limits are below the cost of education at many institutions of higher learning and therefore do not scale on the true margin.²⁷ When students exhaust these subsidized loans, they can turn to either higher-cost private loans or higher-cost federal PLUS loans.²⁸ For many graduate students, PLUS loans charge *higher* interest rates than private loans and are therefore not a subsidy.²⁹

The federal program closest to a real-world example of a subsidy that can operate along the margin without a cap is probably income-based student loan repayment with debt forgiveness (IBR). IBR acts like insurance for those with high debt and unusually low income, capping their payments at a percentage of their income and forgiving the balance after a number of years.³⁰ All else being equal, those who invest more in education may be more likely to enroll in IBR initially, but are probably less likely to last the full twenty years required for debt forgiveness because

²⁷ See Michael S. McPherson, Morton Owen Schapiro, and Gordon C. Winston, *Recent Trends in U.S. Higher Education Costs and Prices: The Role of Government Funding*, 79 Am Econ Assoc Papers & Proceedings 253, 255 (1989) (positing that slowdowns in federal funding of universities lead to increases in tuition); 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, 43 (2011). See also *Average Estimated Undergraduate Budgets, 2015-16* (College Board, 2016), archived at <http://perma.cc/G66T-DDSY>.

²⁸ Kerri Anne Renzulli, *Avoid the Parent Trap: Why a PLUS Loan Isn't the Best Way to Pay for College* (Time, June 19, 2014), archived at <http://perma.cc/7GY2-HFWY>.

²⁹ For at least a few very high-risk students, however, PLUS loans probably are a subsidy. See Michael Simkovic, *Risk-Based Student Loans*, 70 Wash & Lee L Rev 527, 590 & n 154 (2013); David Kamin, *Risky Returns: Accounting for Risk in the Federal Budget*, 88 Ind L J 723, 752–53 (2013); Glater, 14 NYU J Legis & Pub Pol at 57 (cited in note 27).

³⁰ See Simkovic, 70 Wash & Lee L Rev at 617–18 (cited in note 29). See also John R. Brooks, *Income-Driven Repayment and the Public Financing of Higher Education*, 104 Georgetown L J 229, 251–52 (2016); Jonathan D. Glater, *Student Debt and Higher Education Risk*, 103 Cal L Rev 1561, 1604–05 (2015); Philip G. Schrag and Charles W. Pruett, *Coordinating Loan Repayment Assistance Programs with New Federal Legislation*, 60 J Legal Educ 583, 590–93 (2011).

There is a separate program that offers student debt forgiveness after ten years working in public service. See Brooks, 104 Georgetown L J at 253 & n 141 (cited in note 30). This is not so much an education subsidy program as an indirect approach for increasing early career salaries for skilled workers in the public sector. Compensation for skilled workers is typically substantially less in the public sector than the private sector, and probably remains so even after debt forgiveness is taken into account. See Heather Rastorfer Vlieger, Daniel J. Brown, and Thomas Pryor, *Doing More with Less: How the Loan Repayment Assistance Program of Minnesota Augments Federal Loan Repayment Assistance to Expand Legal Aid*, 39 Wm Mitchell L Rev 70, 78 (2012).

their long-term incomes are typically going to be too high.³¹ However, in the event that they do require IBR over the long term, those who have invested more in education are likely to benefit more from the insurance or subsidy because they may have higher loan balances.³²

To the extent that the analysis in *The Knowledge Tax* focuses on investment decisions at the margin, real-world supply-side subsidies may not affect those decisions nearly as much as taxes or hypothetical subsidies that would scale on the margin. In other words, many of the subsidies to higher education are infra-marginal, and therefore not well situated to correct distortionary taxation at the margin of investment. Imagine if most businesses would typically spend \$10,000 per month on rent if rent were deductible, with virtually all businesses spending between \$5,000 and \$15,000. But instead of a deduction at a 25 percent tax rate, the benefit businesses received was a 50 percent credit up to \$5,000 in spending (for example, a \$2,500 maximum credit). A few businesses spending less than \$5,000 might spend more, but most businesses would face no marginal tax benefit to higher spending on rent (above \$5,000). We would therefore expect overall spending on rent to go down compared to the efficient level under a deductibility regime. Ironically, at the new, lower spending levels on rent, the public subsidies to rent would appear quite generous, because a substantial proportion of the total (lower) spending would be publicly funded. Taking into account supply- and demand-side subsidies, the Organisation for Economic Co-operation and Development estimates that tertiary education expenditures in the United States are around 35 percent public and around 65 percent private.³³

³¹ See Michael Simkovic and Frank McIntyre, Book Review, *Populist Outrage, Reckless Empirics: A Review of Failing Law Schools*, 108 Nw U L Rev Online 176, 180, 185 (2014) (discussing the mid-career salary increases of attorneys); Anthony P. Carnevale, Stephen J. Rose, and Ban Cheah, *The College Payoff: Education, Occupations, Lifetime Earnings* *4 (Georgetown University Center on Education and the Workforce), archived at <http://perma.cc/9JSF-Z5Y2> (noting the high lifetime earnings of lawyers). See generally Michael Simkovic and Frank McIntyre, *The Economic Value of a Law Degree*, 43 J Legal Stud 249 (2014).

³² It may be helpful to think of income-based debt forgiveness as a kind of insurance for which those who borrow from the federal government pay a premium in the form of higher interest rates, since private loans without debt forgiveness are often available at lower interest rates. However, if the insurance premium—the difference between the interest rate on government loans and a benchmark interest rate such as an equivalent private loan interest rate or a break-even interest rate—is low enough relative to the costs to the government, then the insurance will be priced at subsidized rates.

³³ See *Education at a Glance 2013: OECD Indicators* *207 (OECD, Sept 2013), archived at <http://perma.cc/HW2V-VSFB>.

Higher education remains a relatively small fraction of public expenditures. Aggregating both direct expenditures at the federal,³⁴ state, and local levels³⁵ and federal tax expenditures,³⁶ the public spent around \$7.7 trillion in total on education in 2013. Of this sum, approximately 3 percent (\$240 billion) was spent on higher education.³⁷

The public may subsidize investments that compete with higher education as much as, if not more than, it subsidizes higher education. Healthcare and the military are each a larger share of federal outlays than higher education.³⁸ Tax expenditures on housing dwarf those on higher education.³⁹ Viewing the gap between taxation of capital and taxation of labor as a subsidy to investment, the aggregate size of that investment subsidy is likely going to be much larger than subsidies specific to higher education. Notably, subsidies in many noneducation areas scale with the level of investment, and therefore influence decisionmaking on the margin.

III. NONTAXATION OF FORGONE EARNINGS

At least some students who enter university could instead have worked longer hours in a paid job and earned more money during what would otherwise be their school years. If they had

³⁴ In direct outlays, the federal government spent around \$3.5 trillion in 2013 and 2014, with only around 0.3 percent of this (around \$10 billion) going to subsidize higher education. See Office of Management and Budget, *Fiscal Year 2017: Historical Tables; Budget of the U.S. Government* *80–81, 83–84 (GPO, 2016), archived at <http://perma.cc/5AQQ-Z9YC> (noting a 2013 negative outlay of \$525 million and a 2014 positive outlay of about \$20 billion, which averages to an annual positive outlay of about \$10 billion). This estimate treats federal student loans as profitable because repayments of interest and principal are likely to exceed funding and administrative costs. In practice, the government often charges less than a private lender would, and this below-market price would be considered a subsidy under fair value accounting. Thus, under fair value accounting, federal expenditures on higher education could be higher. Fair value accounting would also increase estimates of subsidies through other programs, such as government mortgage and small business lending programs.

³⁵ In 2013, state and local governments spent approximately \$3.2 trillion in total. Approximately 5 percent to 6 percent of this (\$160 billion to \$190 billion) was spent subsidizing higher education. See *State and Local Government Finances by Level of Government and by State: 2013* *1–2 (US Census Bureau), archived at <http://perma.cc/549M-TCMW>. These figures were calculated by subtracting higher education revenues from higher education expenditures and (for the larger estimate) capital outlays.

³⁶ Federal tax expenditures in 2013 totaled around \$1 trillion. Of this, around \$35 billion, or 3.4 percent, was spent on higher education. See Office of Management and Budget, *Fiscal Year 2015: Analytical Perspectives; Budget of the U.S. Government* *205–09 (GPO, 2014), archived at <http://perma.cc/TA5Q-MPXL>.

³⁷ For figures, see notes 34–36.

³⁸ See OMB, *Fiscal Year 2017* at *82–83 (cited in note 34).

³⁹ See OMB, *Fiscal Year 2015* at *205–09 (cited in note 36).

worked, their additional earnings would have been taxed. The money they could have earned but did not—their forgone earnings—are one of the costs of higher education. This cost—the money they did not earn—is not taxed.

In *The Knowledge Tax*, I addressed the claim that higher education is tax advantaged because forgone earnings are not taxed.⁴⁰ This critique targets one of the two prongs of the argument in *The Knowledge Tax*—nondeductibility of costs and the larger tax base for higher education—but does not address the second prong of higher tax rates.

Investments in human capital are heterogeneous with respect to the relative importance of forgone earnings (in other words, time) and cash outlays for tuition and the like (in other words, money). Forgone earnings are the primary cost of apprenticeships, PhDs, and on-the-job-training, in which trainees accept low wages in return for valuable training.⁴¹ By contrast, non-deductible tuition fees and book purchases are the primary cost of high-end bachelor's degrees, professional degrees, and terminal master's degrees.⁴² Forgone earnings should not be calculated by assuming that attending college or graduate school means working zero hours while not attending school means working full-time. Most postsecondary students work a substantial number of hours in paid employment while in college, graduate, or professional school,⁴³ and many young, uneducated workers struggle to find full-time work. A back-of-the-envelope analysis suggests that among college students, forgone earnings may average between \$5,000 and \$10,000 per year, while among graduate and professional students, foregone earnings may average between \$10,000

⁴⁰ See Simkovic, 82 U Chi L Rev at 2010, 2042–43 (cited in note 1).

⁴¹ See Peter Cappelli, *Why Do Employers Pay for College?*, 121 J Econometrics 213, 216–17 (2004) (arguing that “employers have to recoup the investment in training through a gap between what workers produce and what they are paid” and describing theories for “how that happens”); John M. Barron, Mark C. Berger, and Dan A. Black, *Do Workers Pay for On-the-Job Training?*, 34 J Hum Res 235, 250 (1999) (describing both the traditional theory that on-the-job-training reduces starting wages, as well as challenges to that theory).

⁴² Many master's degrees are awarded to those who abort their PhD programs. Such master's degrees generally do not involve cash outlays for tuition.

⁴³ In 2011, 72 percent of students who were enrolled in college worked—20 percent full-time and 52 percent part-time, but generally for a substantial number of hours and a substantial portion of the year. See Jessica Davis, *School Enrollment and Work Status: 2011* *1–2 (US Census Bureau, Oct 2012), archived at <http://perma.cc/YM7S-TU35>.

and \$20,000 per year.⁴⁴ Tuition and related direct expenditures are typically higher than this.⁴⁵

I intentionally focused on formal, tuition-funded higher education in *The Knowledge Tax*—rather than human capital writ large—because formal higher education is the form of human capital investment for which the case for distortionary taxation is strongest, and which has well-documented unusually high returns. All else being equal, disadvantageous tax treatment of formal, tuition-funded higher education may not only cause substitution to physical or financial capital; it could also cause substitution to less efficient methods of investing in human capital such as apprenticeships and on-the-job-training. The

⁴⁴ I conducted this analysis using cross tabulations of 2013 American Community Survey data from the Integrated Public Use Microdata Series (IPUMS). See *Integrated Public Use Microdata Series: Census Microdata for Social and Economic Research* (Minnesota Population Center), archived at <http://perma.cc/4363-AA9G> (providing the searchable database). To estimate forgone earnings for college attendance, I restricted the sample to those age eighteen to twenty-four who had not had a child within the last year, who had at least a high school diploma but less than an associate's or bachelor's degree, and who were either attending college or not enrolled in school. I compared the average earnings of those enrolled in college to the average earnings of those who were not enrolled in school, within race and gender.

The approach to estimating forgone earnings of graduate and professional school attendance was similar, except that I restricted the sample to those age twenty-one to twenty-six who had not had a child within the last year, who had a bachelor's degree, and who were either attending graduate or professional school or not enrolled in school. I compared the average earnings of those enrolled in graduate or professional school to the average earnings of those who were not enrolled in school, within race, gender, and college major.

An obvious shortcoming of this analysis is that it does not adequately account for selection into additional education, which could suggest greater earning ability even at a lower level of education, higher returns to education, or, at least for some students, fewer employment prospects with a lower level of education. More sophisticated analyses would be helpful. However, this crude cross-tabulation represents an improvement over analyses that assume full-time employment for those not enrolled in school and no employment for those enrolled.

⁴⁵ 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/FLN8-HX2B>; 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/H6DF-9BZH>; *Average Net Price over Time for Full-Time Students, by Sector* (College Board, 2016), archived at <http://perma.cc/32XD-J2RV>; Michael Simkovic and Frank McIntyre, *The Economic Value of a Law Degree*, 43 *J Legal Stud* 249, 281 (2014).

pretax returns to these forms of investment are generally estimated to be much lower than the returns to formal education.⁴⁶ Therefore, the evidence of underinvestment in formal higher education is not necessarily generalizable to other forms of human capital.

With respect to high-end, tuition-funded higher education, the benefits of nontaxation of forgone earnings appear to be relatively small compared to various tax disadvantages. Economic analyses from thirty or forty years ago suggesting otherwise are based on a time when tuition was much lower,⁴⁷ unskilled labor was relatively more valuable,⁴⁸ education took longer to complete,⁴⁹ and discount rates were higher.⁵⁰ In sum, such dated analyses do not reflect present realities.

Moreover, the nontaxation of forgone earnings is broadly available for many substitute investments. For example, an individual who works fewer hours in the formal labor market and spends more time improving the value of property he or his family owns⁵¹—without compensation for his labor—will not pay taxes

⁴⁶ For a skeptical view of the returns to job training, see Dominique Goux and Eric Maurin, *Returns to Firm-Provided Training: Evidence from French Worker-Firm Matched Data*, 7 *Labour Econ* 1, 16–17 (2000); James J. Heckman, *Policies to Foster Human Capital*, 54 *Resrch in Econ* 3, 38–42 (2000). While such investments do not entail much in the way of tuition expenditures, they do involve substantial costs in terms of time and do not appear to produce benefits that are as large, portable, or widely applicable across occupations as higher education. Thus it is unlikely that the lower returns to such investments are offset by lower riskiness.

⁴⁷ *Tuition and Fees and Room and Board over Time, 1975–76 to 2015–16, Selected Years* (College Board, 2016) archived at <http://perma.cc/PTY5-9TZS>.

⁴⁸ Simkovic, 82 *U Chi L Rev* at 2036 (cited in note 1) (showing the decline in real earnings for men with a high school diploma or less and the increase in real earnings for those with a bachelor's degree or more since 1980).

⁴⁹ Within race and institution type, four-year, five-year, and six-year completion rates have increased. See *Table 376: Percentage of First-Time Full-Time Bachelor's Degree-Seeking Students at 4-Year Institutions Who Completed a Bachelor's Degree* (cited in note 26). See also *Enrollment and Degrees Awarded 1963-2012 Academic Years* (American Bar Association), archived at <http://perma.cc/NXR2-NVDL>.

⁵⁰ See *10-Year Treasury Constant Maturity Rate* (Federal Reserve Bank of St. Louis), archived at <http://perma.cc/AJS8-HYFY> (showing the decline in the maturity rate since the 1980s).

Because the tax benefits of nontaxation of foregone earnings are front-loaded, while the disadvantages of nondeductibility of interest, nonrecovery of tuition expenditures, and higher tax rates are back-loaded, higher discount rates make the advantages relatively more valuable and the disadvantages relatively less important.

⁵¹ In 2013, among those age eighteen to twenty-four with at least a high school diploma but no associate's or bachelor's degree, and who were not currently enrolled in school, approximately 43 percent lived in homes that were owned either by themselves or a family member. However, only around 4 percent lived in a home owned by themselves or their spouse. Among those age twenty-one to twenty-six with a terminal bachelor's degree who were not enrolled in graduate school, a similar proportion lived in a family-owned

on his forgone earnings, just like a student. However, unlike a student, the individual or family that invests time in boosting the value of physical property will also benefit from advantageous tax rates on gains. Similarly, tax benefits are available to those who work at startups for low wages, but receive a share of equity or options.⁵²

IV. SUBSIDY INCIDENCES

Professor Oei suggests that some noneducation subsidies or tax benefits may be complementary rather than competitive with higher education.⁵³ In other words, the incidence of some noneducation subsidies may benefit investments in higher education.

While it is difficult to accurately estimate subsidy incidences, the equation in *The Knowledge Tax* demonstrates that, under reasonable assumptions about the levels of tax-and-subsidy disadvantages, tax disadvantages could explain a large portion of the difference in returns between higher education and other investments.⁵⁴ The explanation is simple and fits the data and economic theory reasonably well.

As a general matter, selective changes in taxation will produce both wealth effects and substitution effects for households.⁵⁵ For example, if the government reduced taxes on interest income, the substitution effect could cause households to substitute interest-bearing investments for other investments. However, the wealth effect could cause households to invest more in all investments, since they would have higher incomes after taxes.

Similarly, tax reductions that do not explicitly target higher education could increase investment in higher education, and tax increases could reduce investment in higher education.⁵⁶ However, it seems likely that taxes and subsidies that are more closely

home, and around 11 percent lived in a home they or their spouse owned. See *Integrated Public Use Microdata Series* (cited in note 44).

⁵² See Victor Fleischer, *Taxing Founders' Stock*, 59 *UCLA L Rev* 60, 70–74 (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 Gregg D. Polsky and Brant J. Hellwig, *Examining the Tax Advantage of Founders' Stock*, 97 *Iowa L Rev* 1085, 1088–89 (2012) (arguing that founders' stock is not a subsidy because of offsetting tax consequences for the company).

⁵³ See Oei, 82 *U Chi L Rev Dialogue* at 282 (cited in note 5). It is also possible that some higher education subsidies—for example, research grants—may have beneficial spillovers to industries and functions besides higher education.

⁵⁴ See Simkovic, 82 *U Chi L Rev* at 2003–06 (cited in note 1).

⁵⁵ This assumes no offsetting effects on public finances.

⁵⁶ Again, this assumes that revenues are not used to fund higher education or complementary public spending.

tied to higher education are likely to produce a larger change in higher education investment than changes in taxes and subsidies that may be somewhat complementary.⁵⁷

Thus, the model in *The Knowledge Tax* need not necessarily predict that an increase in taxes on investments other than higher education would lead to an increase in investment in higher education. Instead, the model predicts that such a policy change would not lead to as large a fall in education investment as in the investments that were taxed. I hope that future researchers will test these theoretical predictions empirically and build on the foundation laid out in *The Knowledge Tax*.

V. INFORMATION COSTS AS RISING MARGINAL COSTS

Some of Professor Oei's suggestions, which are presented as challenges to a neoclassical model, actually support it. The neoclassical model assumes rising marginal costs and declining marginal returns to investment. In the absence of taxation, investment should cease just before the point at which marginal costs exceed marginal returns. Taxation and subsidies can move the margin, because decisionmakers focus on private benefits and costs, not social benefits and costs.

Oei discusses information problems—some students lacking adequate information about the value of higher education.⁵⁸ These problems can be understood as raising marginal costs. Educational institutions have an incentive to inform potential students of the value of their offerings, just as any provider of a service or investment seeks to educate potential customers or investors.⁵⁹ Similarly, students have an incentive to seek the best information. However, providing and disseminating better information is costly. The leaders in marketing and outreach—some for-profit educational institutions—spend so much on sales and marketing that they seem to have limited resources to provide a

⁵⁷ For example, Oei points out that an individual could shield some of their higher education earnings premium from taxes by investing in a tax-advantaged retirement account. See Oei, 82 U Chi L Rev Dialogue at 274–75 (cited in note 5). However, money is fungible. A taxpayer or family need not necessarily invest in higher education to benefit later from tax-advantaged retirement accounts. A taxpayer or family could instead invest in assets that generate returns that will be taxed at a lower rate than labor income, while also working. Whatever income they generate by working would be pure labor income (not attributable to higher education) and could be shielded in a retirement account while the taxpayer or family lives on the returns from their physical and financial assets.

⁵⁸ Oei, 82 U Chi L Rev at 276–77 (cited in note 5).

⁵⁹ In some instances, there may be conflicts of interest that—in combination with information asymmetries—suggest a role for government intervention to improve efficiency. Simkovic, 70 Wash & Lee L Rev at 567–86 (cited in note 29).

quality education. We run into the classic problem of increasing marginal costs and decreasing marginal benefits.

Similarly, lower completion rates for nontraditional students could be understood as another instance of rising marginal costs—because costly interventions and improvements in educational quality can increase completion rates. Presumably if there were more resources available to institutions of higher education and their students, greater expenditures on outreach and retention efforts would be more feasible.

In sum, while nuance and complexity can be helpful, simplicity and theoretical elegance have their advantages. I look forward to research that builds on *The Knowledge Tax* in many of the directions that Oei suggests.