Online Postsecondary Education and the Higher Education Tax Benefits:
An Analysis with Implications for Tax Administration
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Abstract

Online postsecondary education is growing rapidly and increasingly dominates the use of the tax benefits for higher education: the American Opportunity Tax Credit, the Lifelong Learning Credit, and the Deduction for Tuition and Fees. Because online education does not closely resemble "brick-and-mortar" residential college education aimed at 18 to 23 year olds, it presents new challenges and opportunities for administering the tax benefits for higher education. In this paper, I combine tax data with administrative data from the U.S. Department of Education for cross-validation, to study compliance, and to gain understanding of how online schools and students use tax benefits for higher education. I also analyze take-up of the tax benefits and how they affect earnings. The findings suggest several practical implications for the administration of the tax benefits, including form revisions, federal data coordination, and novel uses of earnings data to target compliance reviews.

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I. Online Postsecondary Education and the Higher Education Tax Benefits

In 2014, online schools' students were important beneficiaries of the higher education tax benefits. For instance, if one ranks postsecondary schools by their students' total receipts from the American Opportunity Tax Credit (AOTC), about a third of the top fifteen schools were exclusively- or mainly-online.[2] For the Lifetime Learning Credit (LLC), about half of the top fifteen schools were exclusively- or mainly-online. And, for the Tax Deduction for Tuition and Fees (DTF), about two-thirds of the top fifteen schools were exclusively- or mainly-online. (The tax benefits are described below.) Exclusively- and mainly-online schools are now growing so rapidly, moreover, that if one were to project the growth in their students' use of the tax benefits to 2017 (using straight-line projections from 2009 onwards when the AOTC was enacted), their prominence would be even greater. For instance, instead of online schools making up about third of the top fifteen (2014) for the AOTC, they would make about half in 2017.

The importance of online institutions to the higher education tax benefits is a fairly new phenomenon. Back in 2005, for instance, the institutions whose students dominated the use of the tax benefits were statewide university and college systems that included multiple physical campuses. They made large use of the benefits because they are comprehensive *systems* that include two-year undergraduate institutions, four-year undergraduate institutions, and professional and graduate research programs.

Online institutions and their students pose somewhat different tax compliance issues than large, publicly controlled postsecondary systems or traditional residential colleges that policy makers may have had in mind when devising the instructions for the high education tax benefits. We shall see that online students are older than traditional-age (18 to 23 year-old) college students, are more likely to be working

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[2] I define "exclusively-online" and "mainly-online" with precision below. However, "exclusively-online" means that the postsecondary school offers 100 percent of its courses through an online or other distance platform. "Mainly-online" means that at least 50 percent of all of the school's courses are taken online. As discussed in more detail below, these definitions deliberately exclude certain types of online education such as massive open online courses (MOOCs) offered by brick-and-mortar universities, often free-of-charge and rarely for degree credit. These definitions also exclude online programs that are a small share of a university's total enrollment. For instance, Georgia Tech offers an online masters degree in computer science that has received much attention. However, enrollment in that degree program makes up only about 16 percent of Georgia Tech's total enrollment so it would be "buried" by in-person enrollment for the purposes of analysis.

continuously while enrolled, and are nearly always filing their own taxes (as opposed to being a dependent). As a result, they may interact differently with the tax system. In addition, while they do not do it now, online schools have the potential to improve the information available to the Internal Revenue Service with little administrative burden to themselves.   For instance, since a student's interactions with the school are exclusively or mainly electronic, a school could automate accurate reporting of credit hours on the information return (Form 1098-T) intended to help the student and the IRS assess eligibility for the tax benefits. Indeed, in the future, online schools could potentially monitor a student's activity—clicks, views of materials, completion of assignments—with an exactitude that would be difficult for a brick-and-mortar campus.

However, since online students have few if any in-person interactions with their school's financial administrators, they may be less aware of the tax benefits for tuition and fees so that they are less likely to take them up when eligible or more likely to take them when ineligible. Also, we shall see that —probably because online platforms are inherently less costly to join than are physical campuses— online students are more likely to enroll for very brief spells, pay tuition and subsequently withdraw, and "churn" among multiple schools in the same year. These phenomena may complicate the determination of eligibility for the tax credits and deductions.   Finally, in federal undercover investigations and audits, online postsecondary institutions have been disproportionately found to be associated with deceptive marketing, fraud, academic dishonesty, low course grading standards, and violations of U.S. Department of Education ("ED") regulations. Fraud rings at some institutions borrowed persons' identities and used them to enroll in courses and thus receive federal grants. Such activities are probably made easier by online platforms in which a person's actual identity is not verified in person. While there is no evidence in this paper that the tax benefits are used fraudulently (indeed, I argue below that they are far *less* conducive to fraud than other forms of financial aid), the previous investigations and audits suggest that the activity of online students may be hard, rather than easy, to assess.[3]

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[3] United States General Accountability Office (2010 and 2011). See also United States Department of Education, Office of Inspector General (2011). Because the fraud rings investigated in the latter report depended upon tuition and fees being entirely covered by federal grants, the fraud rings are unlikely to affect tax compliance. In other words, students were making no payments upon which tax benefits could be based. However, the reports cited in this footnote suggest wider problems of lax enforcement of federal financial aid rules and online use of other persons' identities.

If online platforms are much of the future of American higher education, we need a better understanding of how they and their students interact with the tax system. Are they compliant with tax rules? Are they taking up the tax benefits for which they are eligible? Do online students fulfil the activity standards and enrollment standards written into tax law? For instance, the AOTC requires that a student attend college at least half-time. Are AOTC takers spending a minimum of 18 hours per week (if exactly half-time) and 36 to 45 hours per week (if full-time) engaged in educational activities?[4] Are they enrolled in a degree program or, in the case of the LLC, improving their job skills? For these and other reasons that will become clearer as we examine how online students differ from the notional, traditional college student, this paper analyzes how online postsecondary education interacts with the tax system.

Scholarly evaluations of online postsecondary education, which are not numerous, tend to fit into two groups. First, there are studies of student course-taking and learning at particular online schools (case-studies). From De Vlieger, Jacob, and Stange (forthcoming), we learn that the most commonly taken courses at the mainly-online school they study are entry-level undergraduate courses such as algebra. Bettinger, Loeb, Fox, and Taylor (forthcoming) show that, at the (different) mainly-online school they study, students learn about one-third to one-quarter of a standard deviation less when they take a class online, as opposed to in a conventional classroom. The second group of studies examines how online schools fit into the broader market for higher education. Examples include Cowen and Tabarrok (2014), Hoxby (2014), Deming, Goldin, Katz, and Yuchtman (2015), McPherson and Bacow (2015), and Deming, Lovenheim, and Patterson (forthcoming).[5] Interestingly, there is—to the best of my

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[4] If a student is taking one credit hour, his education work should occupy a minimum of three hours per week—usually one hour of lecture and two hours of homework. However, the three hours can be allocated differently, especially in laboratory or project-based courses. A student who is enrolled full time must be taking a minimum of 12 credit hours, which correspond to 36 hours of educational work. However, at in-person four-year colleges, the majority of full time students take 15 or more credit hours, corresponding to at least 45 hours per week (author's calculations based on U.S. Department of Education, Education Longitudinal Study (2015). Thus, a student who is enrolled at least half time must be taking a minimum of 6 credit hours, corresponding to 18 hours of educational work each week. To be comparable to most in-person students, an at-least-half-time student would be taking a minimum of 7.5 credit hours, corresponding to 22.5 hours per week.

[5] There is another, larger group of studies that examines the performance of students who take some courses online while enrolled in a largely brick-and-mortar program. These studies are less relevant to the analysis at hand because the institutions involved would not be classified as mainly- or exclusively-online.

knowledge—very little research on how much students themselves pay for online education, how much that education costs, what tax benefits and grants they use, and how their earnings change with online education. Thus, this paper's evidence is novel.

The plan of the remainder of the paper is as follows. In Section II, I review the tax benefits for higher education and their eligibility criteria. In Section III, I explain what is reported on Forms 1098-T, 1040, 8863 (used for claiming the tax credits), and 8917 (used for claiming the tax deduction). I also explain how the data garnered from these forms should match up with administrative data that are collected—through a wholly independent process—by ED. In Section IV, I assess the growing enrollment in online schools. I also examine the characteristics of online students and their enrollment. Section V assesses whether the tax-based enrollment data coincide with the ED-based enrollment data. In Section VI, I perform a similar assessment for tax-based versus ED-based data on tuition and scholarships. In section VII, I briefly examine whether tax-based educational hours conform to those reported to ED. In section VIII, I compare online students' eligibility for and take-up of the tax benefits for higher education. Section IX assesses whether earnings data contain information that could be useful for assessing students' compliance with the requirements of the tax benefits. Are they engaged in educational activities? Are they acquiring or improving their job skills? In this section, I also show how earnings and cost data could be used to assess the fiscal consequences of the tax benefits. Finally, in Section X, I discuss the key findings and implications for administering the tax benefits for higher education.

II. The Tax Credits and Deduction for Higher Education Tuition and Fees

Table 1 summarizes the federal tax credits and tax deduction for tuition and fees. Especially important for this paper are the eligibility criteria. A student can take only one of the AOTC, LLC, and DTF in a year. Which one is most beneficial depends on his circumstances.

The AOTC is equal to 100 percent of the student's first $2,000 plus 25 percent of the next $2,000 spent on tuition, fees, and course materials. A tax filer may claim the benefit for himself as a student, a spouse who is a student, or dependents who are students. A filer may take the AOTC for *each* eligible student. The student must be a U.S. citizen or Resident Alien, must not have already completed four years of postsecondary education, and must not have claimed the AOTC or Hope Credit (the comparable

credit in use before 2009) in any four previous years.[6] The student must be pursuing a degree and must

be enrolled at least half-time in one academic period that began in the tax year. $1,000 of the AOTC is a

refundable credit—that is, the filer need not have tax liability. The AOTC phases out between $160,000

and $180,000 of Modified Adjusted Gross Income (MAGI) for joint filers and between $80,000 and

$90,000 of MAGI for single filers.

To compute his AOTC (if any), a tax filer must fill out Form 8863, provide the student's name,

social security number, and educational institution(s). He must also say whether the student received

Form(s) 1098-T from his institution(s), report the institution's federal identification number, indicate

which boxes were checked on that form, and answer a series of questions designed to check the student's

eligibility (prior use of tax credits, at least half-time enrollment, prior postsecondary education, and so

on).

Form 8863 is also used to compute the LLC which gives a credit equal to 20 percent of tuition

and fees paid, up to a maximum credit of $2,000 per year. The maximum is per filer, not per student. If

a student is eligible for the AOTC, then the LLC is always less generous. However, its eligibility criteria

are less restrictive. While the student still must be a U.S. citizen or Resident Alien, he can have any

previous amount of postsecondary education. Also, he need not be enrolled in a degree program so long

as the courses he is taking improve his job skills. There is no requirement that enrollment be at least

half-time: payments for a single course could qualify. The LLC phases out between $111,000 and

$131,000 of MAGI for joint filers and between $55,000 and $65,000 of MAGI for single filers. The LLC

is non-refundable.

The DTF is an above-the-line deduction, meaning that the households need not itemize

deductions to take it. Joint filers with MAGI less than or equal to $130,000 and single filers with MAGI

less than or equal to $65,000 are eligible for a $4,000 deduction. Joint filers with MAGI greater than

$130,000 but less than or equal to $160,000 and single filers with MAGI greater than $65,000 but less

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[6] None of the AOTC, LLC, or DTF may be taken for a student who self-reports having been convicted of a felony for possession or distribution of a controlled substance. I do not discuss compliance with this eligibility criterion because it is unclear whether the IRS or ED attempts to verify whether a student's self-report is true. On the other hand, there are estimates that two-thirds of colleges conduct criminal background checks on their applicants. See Vallas et al (2015) and United States Government Accountability Office (2005).

than or equal to $80,000 are eligible for a $2,000 deduction. These limits are per household, not per student, and they are sharp: the DTF does not phase out. The amount by which the DTF changes a household's tax liability—that is, the DTF's value— depends on the household's marginal tax rate. For instance, if a married filing joint household spent $4,000 on tuition and fees, its income were below $130,000, and its marginal tax rate were 25 percent, the DTF would reduce its taxes by $1,000 (=0.25 × 4000). To compute the DTF, a household fills out Form 8917 which asks for the student's name, social security number, and expenses for tuition and fees. Form 8917 does not, however, ask for information on the school that the student attended.

If a student is eligible for the AOTC, the DTF is always less generous, but the DTF's non-financial eligibility criteria are essentially the same as those of the LLC: any amount of previous postsecondary education, enrollment in a single course is sufficient, and so on. Whether the DTF or the LLC is more generous depends on several things. The DTF is obviously more generous in the income range where it exists but the LLC has already phased-out. Also, the higher is a taxpayer's marginal tax rate, the more valuable is the DTF (and *vice versa*). Thus, in the example above, the DTF was at its maximum value (at $1,000) because the household had a marginal tax rate of 25 percent.[7] In contrast, the LLC is always 20 percent of spending (up to $10,000) so its maximum value can be $2,000. However, the LLC is nonrefundable so it interacts with other tax credits in a way that the DTF does not. In short, it is best in practice to compute the DTF and LLC for each household, taking account of all its circumstances, and then compare the value of the two benefits side-by-side.

III. Data on the Higher Education Tax Benefits and Administrative Data from ED

A. Sources of Data

To study the interaction between postsecondary institutions and the tax system, especially take-up and compliance with the requirements of tax benefits, it is important to compare data reported to the IRS by students and their households, data reported to the IRS by institutions, and data reported to ED by institutions. These three sources of data can be used for cross-validation.

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[7] Some households who are eligible for the DTF have marginal tax rate of 28 percent, but they can deduct only to up $2,000, not $4,000.

Data reported to the IRS by students and their households come from Forms 1040, 8863, and 8917, all of which are completed by tax filers. This study employs deidentified data from an IRS database that includes certain elements from these forms. From the database, I derive several variables, the most notable of which are:

(i) the filer's refundable AOTC;[8]

(ii) the filer's nonrefundable AOTC and LLC;[9]

(iii) the filer's DTF;[10]

(iv) adjusted qualified education expenses;[11]

(v) MAGI as relevant to the credit or deduction in question.[12]

Data reported to the IRS by postsecondary institutions come from Form 1098-T which is filed regardless of whether the student takes up a higher education tax benefit. From the deidentified database, I derive important variables such as:

(vi) payments received and/or amounts billed for qualified tuition and fees;

(vii) adjustments in the above made for a prior year;

(viii) scholarships or grants;

(ix) adjustments to scholarships or grants for a prior year;

(x) an indicator for whether the qualified tuition and fees include amounts for an academic period that begins in January through March of the calendar year *subsequent* to the tax year in question;

(xi) an indicator that the student is enrolled at least half-time;

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[8] This is entered on line 16 of the 2016 Form 8863. It is also entered on line 68 of the 2016 Form 1040 or line 44 of Form 1040A.

[9] This is entered on line 19 of the 2016 Form 8863. It is also entered on line 50 of the 2016 Form 1040 or line 33 of Form 1040A.

[10] This is entered on line 6 of the 2016 Form 8917 and transferred to line 34 of the 2016 Form 1040 or line 19 of the 2016 Form 1040A.

[11] On the 2016 Form 8863, adjusted qualified educational expenses are entered on line 27 and/or line 31. On the 2016 Form 8917, adjusted qualified educational expenses are entered on line 2.

[12] On the 2016 Form 8863, this is line 3 and/or line 14, amounts transferred from line 68 of Form 1040 or line 44 of Form 1040A. On the 2016 Form 8917, this is line 5—also transferred from amounts on Form 1040 or 1040A.

(xii) an indicator that the student is a graduate student.

Postsecondary institutions do not have to file Form 1098-T for courses for which no academic credit is offered, nonresident alien students, students whose expenses are entirely waived or paid entirely with scholarships, and students whose expenses are covered by a formal billing arrangement between an institution and the student's employer or a government entity, such as the Department of Veterans Affairs or the Department of Defense.[13] The lack of 1098-Ts for students whose costs are entirely covered by third parties actually has one fortunate by-product for this paper. It means that the analysis of the educational activities and learning benefits of online education must necessarily focus on students who actually pay something, even if only a small amount, in tuition and fees. This excludes "students" whose identities were used by fraud rings but who did not actually participate in online learning. Such fraud rings focused on online programs that were so inexpensive that federal grants *more* than covered tuition and fees, allowing for kickbacks.[14]

In the last section of this paper, I use wage and salary earnings derived from Form W-2, sent to the IRS regardless of whether a person files an income tax return. I also use self-employment earnings from Schedule C.

For administrative data reported to ED, I rely on the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS).[15] Postsecondary institutions whose students are eligible for higher education tax benefits or federal financial aid are mandated to report to IPEDS. From it, I derive numerous institution-level variables such:

(xii) revenue from tuition and fee payments;

(xiii) scholarships and grants;

(xiii) enrollment, disaggregated by the student's undergraduate/graduate status, Resident Alien status, and degree-granting program status;

(ix) credit hours, the basic measure of academic activity.

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[13] Further detail may be found in the Instructions for Forms 1098-E and 1098-T.

[14] See United States Department of Education, Office of Inspector General (2011).

[15] All IPEDS data are online and were downloaded from the official website. They are the final release data as of March 2017. See United States Department of Education, National Center for Education Statistics (2017).

B. Defining Exclusively and Mainly-online Postsecondary Institutions

IPEDS is also the source of the variable that I use to classify postsecondary schools as exclusively or mainly-online. Institutions are asked the following:[16]

(1) Are all programs at your institution offered exclusively via distance education?

(2) How many degree/certificate-seeking undergraduates are (a) enrolled exclusively in distance education courses, (b) enrolled in some but not all distance education courses, (c) not enrolled in any distance education course?

(3) Repeat question (2) for non-degree/certificate-seeking undergraduates and for graduate students.

An institution's program (degree-seeking undergraduate, non-degree-seeking undergraduate, graduate) is classified as "exclusively-online" if the answer to question (1) is "yes" or if the probability that the relevant students are enrolled in distance education is 100 percent based on the answers to questions (2) and (3). For instance, if a student were enrolled in graduate coursework, and all graduate students were enrolled exclusively in online courses (possibility (2)(a)), then the student would be classified as exclusively-online. Note that degree-seeking undergraduate, non-degree-seeking undergraduate, and graduate programs at the same institution could be classified differently.

A student's coursework is classified as "mainly-online" if the probability that his or her courses are online is greater than 50 percent where the probability assigned to option (2)(a) is 100 percent, option (2)(b) is 50 percent, and option (2)(c) is 0 percent.

Assigning 50 percent to option (2)(b) is not arbitrary and probably understates the likelihood that a student's courses are online. This is because, up through 2005, many institutions with a substantial online presence were tightly bound by ED's "50 Percent Rule" that required them to have one in-person enrollment for every online enrollment if their students were to remain eligible for federal tax expenditures and financial aid.[17] Owing to the 50 Percent Rule, schools like the University of Phoenix

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[16] United States Department of Education, National Center for Education Statistics (2014).

[17] A limited number of institutions were granted experimental waivers from the 50 Percent Rule between 1999 and 2005. These included several exclusively or mainly-online institutions that are now very large: American InterContinental University, Kaplan University, Walden University, University of Phoenix, Capella University, Western Governors University. See U.S. Department of Education, Office of Postsecondary Education, Office of Policy, Planning and Innovation (2005). For more on the 50

and Kaplan University were constrained to lease physical classroom space in a way that was almost

certainly unprofitable—if one did not take into account how the physical space relaxed the constraint on

online enrollment (which was relatively profitable). After the termination of the Rule, the schools that

had been constrained by it typically expanded their relatively profitable online programs and did not

expand or even significantly reduced their physical classroom space. This had the result that they went

from being 50 percent online to more than 50 percent online. See Deming and Lovenheim (forthcoming)

for evidence on this point. In short, the mainly-online category has become, if anything, more online in

recent years. Unfortunately, it is not possible to classify mainly-online experiences more precisely than

by using the IPEDS questions. Keep in mind that, even within a single mainly-online school, students

vary in the degree to which their educational activities are purely online.

     It is important to note what is excluded from exclusively- and mainly-online schools, defined as

above. They exclude MOOCs—massive open courses. While some MOOCs charge nominal fees for

graded items or evidence of course completion, they are usually free and do not lead to a degree. Also

excluded are "blended" or "hybrid" courses in which students learn partly in-person and partly through

online forums and coursework. Also excluded are online programs embedded in and that represent a

small share of enrollment in brick-and-mortar universities. For instance, Georgia Tech's online master's

degree in computer science is excluded because its enrollment accounts for only 16 percent of the

institution's enrollment and Georgia Tech has elected not to give its online division a separate identity.

(Some postsecondary institutions' online divisions have separate identification numbers for tax purposes

and IPEDS purposes. These online divisions *are* included in the analysis.)

     There are three reasons I exclude such activities from analysis in this paper. First, they simply

do not appear to be where online postsecondary education is heading. Exclusively- and mainly-online

institutions account for most of the growth in online enrollment. Second, these types of learning either

pose no issues for the tax system (because they are free) or only pose issues similar to those of brick-and-

mortar schools. For instance, students in hybrid courses can meet in-person with financial aid staff.

Third, these activities are either unobserved or buried in both tax and ED data. There are no 1098-Ts

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Percent Rule, see Avila (2016). It is also helpful to compare, over the years, the coverage of the 50
Percent Rule in the handbooks that Federal Student Aid issues annually for financial aid professionals.
These may be found online at ifap.ed.gov (search on "distance" in the archived handbooks).

issued by MOOCS, and they are not required to report to ED either. Hybrid coursework is not separately identified in tax or ED data and would be hard to define cleanly anyway. The students in online programs like Georgia Tech's are buried in the much larger number of in-person students at that university.

It is worth noting that nearly all exclusively- and mainly-online institutions are non-selective. That is, they typically enroll any student who is able to pay if he has a high school diploma or GED (for undergraduate coursework) or a baccalaureate degree (for graduate coursework).

C. Tax Years, School Years, and Fiscal Years

The AOTC, LLC, and DTF are for expenses paid in the tax year (calendar year). This complicates certain comparisons to ED enrollment data which are based on school years and ED financial data that are based on schools' fiscal years. 67 percent of exclusively or mainly-online schools have fiscal years that end in the summer so that their fiscal and school years are aligned, approximately if not exactly. However, 33 percent of online institutions have January to December fiscal years, fully aligned with the calendar year.

Consider a typical student whose institution has a fiscal year aligned with the school year. Suppose she enrolled for the 2012-13 and 2013-14 school years. If she paid for autumn terms in September and spring terms in January, she would have three years of IRS data—most notably 1098-Ts for 2012, 2013, and 2014. Her payments for her two years would end up in ED's data associated with fiscal years 2013 and 2014. Her IRS and ED payments should add up to the same total, but the IRS 2012 amount would be greater than the ED fiscal year 2012 amount (when she was not yet enrolled); the IRS 2013 amount would be between the ED amounts for fiscal years 2013 and 2014; and the IRS 2014 amount would be below the ED fiscal year 2014 amount (since it would include payments made in 2013).

Of course, a school does not have a single student but many students whose periods of enrollment overlap. If we replicated our typical student many times and made the replicates' enrollment periods begin in various years, what we would find is that the amount for tax year N would be between the amounts for fiscal years N and N+1 in the ED data. This conclusion also holds for enrollment variables although the illustration above focuses on financial variables.

This discussion could become much more elaborate because there are many special cases. The bottom line, however, is that, throughout the analysis in this paper, I take account of the way in which

IRS data and ED should be aligned, using the exact dates of each institution's fiscal and school years. I am also forgiving about differences between tax and ED data that may arise because of the differences in how years are defined. Importantly, if data on an institution that are derived from 1098-Ts *could* be reconciled with the ED data on the same institution—allowing for plausible allocations of enrollment within the school year and across calendar years—I consider the institution's data reconciled.

D. Total Enrollment versus Each-Person-Counted-Only-Once Enrollment

There should be one 1098-T for each postsecondary school to which a person pays tuition and fees. Thus, a student who attends two or three schools in the same calendar year should have two or three 1098-Ts. Each school will count that same person in its total enrollment but, of course, the person will not be two or three separate people.[18] The tax data allow one to see each person's total pattern of enrollment within a calendar year, but same pattern is not visible to the schools themselves which record only the person's enrollment with their programs.

This matters for enrollment counts because online students, it will turn out, are more likely to enroll in multiple institutions in the same calendar year than in-person students. This is probably because there are fewer fixed costs involved in switching online schools than in switching physical campuses. (A person could fairly easily take some courses at online school 1 and others at online school 2. If he were to do the same thing at two brick-and-mortar schools, he would need to physically commute between the campuses.)

When comparing tax and ED data, I treat each 1098-T as a separate enrollment and compare the total to ED's total enrollment. These should match once I restrict the ED enrollment to students for whom a 1098-T should be filed. *However*, when explaining how many students are enrolled online in the U.S., I do not allow a single student to double or triple count. Instead, I assign his enrollment to the institution where he was enrolled at least half-time. If this criterion leaves ambiguity, I assign his enrollment to the institution to which the highest tuition and fees were paid on his behalf. (From now on, I call this institution the "primary" school for that person in that year.) This method of counting tends to

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[18] Rather confusingly, an institution's total enrollment is termed "Total Unduplicated Headcount" enrollment in IPEDS. The word "unduplicated" refers to the institution's having ensured that a particular person is not double-counted within the same school year, even if he enrolls in multiple programs or enrolls in multiple terms in some manner that might create multiple records.

be generous towards the online student counts because the online schools usually cost more than public

community colleges, which are their main competitors for students.

E. Schools' Tax Identification Numbers Versus Their ED Identification Numbers

Schools are identified in ED data by their IPEDS identification numbers ("IPEDS id," also called

"unitid"). A school with multiple campuses or divisions often has multiple IPEDS ids that can be linked

by their "parent" id.

Schools are identified in the tax data by tax identification or Employer Identification Numbers

(EINs). Exclusively online schools never, to the best of my knowledge, have more than one EIN at a

time. Mainly-online schools sometimes have different EINs for different campuses but often have a

single EIN. The University of Phoenix, for instance, initially had a different EIN for each state in which

it operated. It has now put all of its campuses under a single EIN. Similar moves have been made by

other mainly-online schools, perhaps reflecting their increasing shift away from physical classrooms and

toward online learning.[19]

In any case, I exerted a great deal of effort to establish the correct EIN to IPEDS id crosswalk for

exclusively- and mainly-online schools, for each year since 2002. The exercise was complicated by the

fact that there have been mergers among schools and closures of schools. The typical reader of this paper

need take away only two things. First, the crosswalk is as reliable as I could make it, given all the tax

data, ED data, and data collected directly from the institutions themselves. Second, certain ED data are

more disaggregated (by campus or division) than the tax data so comparisons between tax-based and ED-

based variables are made at the level of the EIN, aggregating up data across IPEDS ids within the EIN.

IV. Enrollment in Online Postsecondary Schools

At the outset of this paper, I argued that online schools were important for tax administration

because they have begun to dominate the use of tax benefits for higher education. I also argued that that

dominance is likely to increase, if current enrollment trends continue. Finally, I argued that online

schools and students might be sufficiently different from traditional, brick-and-mortar schools and

students that their circumstances might affect how the tax benefits play out. In this section, I provide

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[19] State regulation also appears to play a role here.

evidence for these arguments.

A. Growing Enrollment and the Probable Importance of Withdrawals

Figures 1 and 2 show the growth in enrollment in, respectively, mainly- and exclusively-online postsecondary institutions from 2002 to 2015. One line on each chart shows ED's 12-month headcount, including all undergraduate and graduate students who enroll in a school year, regardless of whether they are full- or part-time. This number should correspond closely to enrollment figures based on the 1098-Ts if we allow each student to count multiple times if he is enrolled at multiple institutions. This is the next line on each chart. The final line on each line chart shows 1098-T-based enrollment in which each student is counted only once and is associated with the institution where he is at least half-time and, if this leaves ambiguity, to which the highest tuition is paid on his behalf.

Figure 1 shows that headcount data reported to ED suggest that enrollment at mainly-online schools rose from about 700,000 in 2002 to about 1,700,000 in 2012 through 2015. Note the especially rapid rise in the period from 2007 to 2011 when the 50 Percent Rule no longer constrained institutions and the Great Recession almost certainly boosted enrollment. (Historically, enrollment rises cyclically during recessions, owing to the decrease in the opportunity costs of schooling.) Enrollment based on Form 1098-Ts is consistently greater than ED's headcount. This difference peaked in 2010 when tax records suggest about 750,000 more mainly-online students enrolled than the headcount data do. In the same year (2010), the 1098-Ts indicate a difference that is only about half as great when we force students to be associated with a single institution. This suggests that the recession triggered substantial short-term or "churning" enrollment in which a student paid tuition to multiple schools in the same calendar year. Since the schools did not report some of these students to ED, they may have paid tuition but withdrawn. (See below for more on this). From 2013 onwards, the ED and tax data have aligned more closely.

Figure 2 shows that ED- and tax-based enrollment at exclusively-online schools rose from under 100,000 in 2002 to about 600,000 in 2013 and after. Although the base of 100,000 is much smaller than that of mainly-online schools, the rate of growth of exclusively-online schooling is much higher: 6-fold as opposed to less than 3-fold. In the earlier years, the tax-based counts of exclusively-online schools exceed the counts based on ED data. In the most recent years, this pattern is reversed. The counts differ by as much 100,000, which is non-negligible relative to the base. In the middle years (2007 to 2010

approximately), the ED and tax-based counts tend to align.

Figures 3 and 4 show undergraduate enrollment for, respectively, mainly and exclusively-online schools. These tell a similar story to the previous figures. At mainly-online schools, 1098-T-based enrollment consistently exceeded headcounts reported to ED for much of the period, with the difference peaking in 2010 and disappearing recently. At exclusively-online schools, the tax-based counts exceed ED-based counts in early years, align from 2007 to 2010, and are inferior in recent years.

What does all this mean for administering the tax benefits for tuition and fees? First, online enrollment is growing very fast and is therefore of increasing importance, as emphasized above. Second, online schools are almost certainly confronted—disproportionately—with students who pay tuition and who then withdraw, not early enough to receive a refund for the tuition they paid. Though registrars' distinctions about "enrolling", "dropping", "withdrawing," and "completing" courses may seem finicky, they may in fact be important to online schools. To clarify, if a student initially enrolls in a course but then drops it before a certain date (the "drop date"), the student is usually entitled to a refund of tuition and the course does not appear at all on his transcript. The drop date may occur early in the course, even before real activity occurs. In contrast, if a student withdraws from a course after the drop date, tuition is not refunded and some mark (such as a "W") may appear on his transcript. Withdrawals can be passive: a student who never participates (or never participates after initial sessions) may be recorded as withdrawn so that he does not receive a failing grade.

Given the current 1098-T instructions, schools are likely to report tuition payments to the IRS for withdrawn students but not to report them as enrolled to ED. Thus, the current instructions leave it to withdrawn students to "self-police" and determine whether they have in fact fulfilled the conditions for the tax benefits. Is a student "enrolled or attending" (as required for taking the tax benefits) if he pays tuition for a course but withdraws with little or no actual activity? In the days in which residential colleges dominated the postsecondary scene, such situations may have arisen only rarely. As online schools grow, clarifying such matters is likely to be increasingly important.

B. Enrollment at Online Schools: Where, Who, How, and Costs

In this sub-section, I briefly describe the characteristics of enrollment at mainly or exclusively-online schools. I focus on variables needed later in the analysis of the tax benefits for tuition and fees. Furthermore, I focus on enrollment that occurred in "episodes" that began between 2007 and 2012

because (i) these years are all after the end of the 50 Percent Rule so that exclusively-online enrollment is widely available and (ii) these episodes potentially end early enough for us to observe post-enrollment earnings.

I define an enrollment "episode" as a period of enrollment that begins in a tax year that was preceded by at least two tax years with no enrollment and that is succeeded by at least two tax years with no enrollment. (Switching from two to three pre- and post- years makes little difference.) It is important to define episodes in some such way because a student might easily be un-enrolled for a single calendar year during a course of study that is perceived both by him and his institution to be continuing. Note that enrollment of three years could thus take a person four years to achieve, and so on. (The "gap" year is allowed but not included in enrollment length.) When I refer to episode length, it is number of years of *enrollment*.

I associate each student with the online institution that was primary at the beginning of his enrollment episode. Recall that the primary institution is the one he attended at least half-time (if any). If this criterion leaves ambiguity, the student's primary institution is the one to which the highest tuition was paid on his behalf.[20] If a student switches institutions in the course of an episode, he continues to be categorized under the type of online institution where he began the episode. This is because such switches are endogenous and, in any case, not common enough to affect the results. Note, however, that whenever it matters in this paper (such as assessing eligibility for and take-up of the tax benefits), I account for *all* the institutions in which a person is enrolled in each year.

Because it is important for this exercise that I be able to recognize an enrollment episode and the primary institution, the enrollment characterized in this section is for people with 1098-Ts. I do not claim, therefore, that all enrollment in online institutions is perfectly represented here. We have seen and shall see that there are differences between 1098-T-based enrollment and ED-based enrollment. Nevertheless, it is useful to describe online students in a general way.

Table 2 shows that for-profit mainly-online schools account for the majority of enrollment episodes: 56%. Next most common are enrollment episodes at non-profit mainly-online schools (20%) and for-profit exclusively-online schools (14%). Public mainly-online schools account for only 7%, and

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[20] It makes almost no difference if I resolve this ambiguity by assigning each student to the institution where he paid the highest percentage of full-time tuition and fees.

non-profit and public exclusively-online schools account for only 3%. (Non-profit exclusively-online and public exclusively-online schools are combined throughout this paper because they account for such a small share of enrollment.)

The next part of Table 2 demonstrates that many online students have short enrollment episodes. The average is between 2.1 and 2.8 calendar years (about 1.1 to 1.8 school years). In every category of online institution, the modal episode length is 1 calendar year which corresponds, usually, to half a school year (a semester). Next most common are episodes of 2 calendar years (usually, 1 school year). Later, I pay particular attention to episodes of 3 calendar years (2 school years) because they are at least somewhat prevalent, accounting for 15 to 17 percent of episodes, but they are also long enough for a student plausibly to have attained an associates' degree, completed a baccalaureate degree that was already partially completed at the time of enrollment, or attained a master's degree. Episodes of 5 calendar years (usually, 4 school years) or more are comparatively rare.[21]

The subsequent rows of Table 2 show two characteristics that are crucial in determining whether a student is eligible for the AOTC: whether a student is reported, on his 1098-T, to be enrolled at least half-time and as an undergraduate. Most online episodes are reported to be at least half-time. For instance, 88 to 89 percent of students are enrolled at least half-time in for-profit schools, which make up 70 percent of episodes. The vast majority of students are enrolled in undergraduate coursework: 90 percent of for-profit mainly-online episodes and 77 percent of non-profit mainly-online episodes.

Later, when examining eligibility for the AOTC, I examine students' previous use of the AOTC and HOPE credits and their previous postsecondary enrollment. Table 2, focused on new enrollment episodes, is not ideal for considering these issues. However, I note here—based on that eligibility analysis—that 8 percent of online students who are recorded as undergraduates on their 1098-Ts already have 5 tax years (4 school years) of at-least-half-time postsecondary enrollment. 5 percent have 6 tax years; 3 percent have 7 tax years; 2 percent have 8 tax years, and 2 percent have 9 or more tax years. In other words, a sizable share of reported undergraduates would have probably already obtained a

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[21] Although episodes of short length are also common in non-selective (open enrollment) community colleges and four-year colleges, their mean enrollment episode is more than a calendar year longer than the mean enrollment episode of mainly- and exclusively-online schools. Author's calculations based on deidentified tax data.

baccalaureate degree had their time-to-degree been what ED defines as "normal."

Table 2 shows that students in the three most usual categories of online schools have an average age of 34 to 35. The remaining online students' average is not much younger: around 30. Their fairly mature ages, for students, makes it unsurprising that the vast majority of them have significant earnings prior to their enrollment episode. Ten percent or fewer of them have zero wage earnings in each of the two years before the episode begins. Their average wage earnings (conditional on having any) in the year prior to the episode are mainly in the $26,000 to $36,000 range.

Later, when examining eligibility for the tax benefits, I take great care to relate students to the correct tax filer and correct adjusted gross income, taxable income, and so on. Table 2 is not ideal for considering these issues, but—based on that later analysis—I can state that 93 percent of online students are the filer or filer's spouse. Only 7 percent are dependent children or other dependents. 43 percent are married joint filers. Another 31 percent are single filers, and 24 percent file as unmarried heads of household. Even among those who are married joint filers, the student's own earnings make up, on average, 61 percent of adjusted gross income. 44 percent of online students are in the 10 percent tax bracket; 37 percent in the 15 percent bracket; 16 percent in the 25 percent bracket; and the remaining 3 percent in a higher tax bracket.

The final rows of Table 2 show the cost of online students' education, both to themselves and to society. Students themselves pay in the range of $3,500 to $4,100 in tuition except for the comparatively rare students at public online schools, who pay about $1,700. If we include tuition paid by scholarships and grants, including taxpayer-funded grants such as the Pell Grant, tuition payments to the student's school of primary enrollment are around $6,000 at for-profit mainly-online schools and about $1,000 less at non-profit mainly-online and for-profit exclusively-online schools. Recall that these schools account for 90 percent of episodes. I use the phrase "social cost" to refer to what a school expends to educate a student: instructional spending plus academic support plus student services plus institutional services. Social costs are often substantially higher than tuition paid at public and non-profit institutions, with the difference made up by taxpayers (government appropriations) and philanthropists. This is obvious in the final line of Table 2 which shows that social costs are around $9,500 at public mainly-online schools, around $13,750 at non-profit mainly-online schools, and around $12,500 at public and non-profit exclusively-online schools. In contrast, social costs are very close to tuition paid at for-profit online

schools.

V. Does Enrollment from Tax Data Coincide with Enrollment in ED Data?

Having provided some context regarding online enrollment, we can proceed to examining the differences between enrollment based on tax data and that based on ED data. This is shown in Tables 3 through 8. Non-resident alien students have been removed from the ED headcounts because schools are not required to issue 1098-Ts for them. Moreover, because the tax data are based on calendar years while ED's headcount data are based on school years, I created a version of the ED data that averages the headcounts in the two school years that are in a calendar year. Thus, 2013's tax-based enrollment is compared to the average of the ED headcount in 2012-13 and 2013-14. In short, I make the data as comparable as possible. Since schools' enrollment can fluctuate over the course of a year, however, I consider differences of up to 10 percent of enrollment as ignorable. Put another way, I regard the tax and ED range as coinciding in this plus or minus 10 percent range. Outside of that range, there should be an explanation for the enrollment differences, some of which are wholly legitimate. Other sizable differences may indicate non-compliance with either tax or ED reporting requirements.

For instance, consider Tables 3 and 4, which show all (undergraduate and graduate) enrollment based on 1098-Ts and ED's headcounts. Table 3 weights each online school equally; Table 4 weights each school by its total ED enrollment.

Tax-based and ED enrollment are within 10 percent of one another about 25 to 35 percent of the time (school-weighted) or about 30 to 50 percent of the time (enrollment-weighted). The fact that the data coincide more when enrollment-weighted suggests that the larger online institutions may be more consistent in their reporting or may simply have enrollment that fluctuates less (in percentage terms) from year to year. However, the coincidence between tax and ED enrollment differs somewhat by type of institution. For instance, the tax and ED enrollment are within 10 percent of each other 52 percent of the time at non-profit and public exclusively-online schools but only 29 percent of the time at public mainly-online schools (enrollment-weighted).

What might account for 1098-T based enrollment that is substantially lower than ED enrollment? Also, what might account for schools with positive ED enrollment but no 1098-T enrollment at all? First, schools are not required to issue 1098-Ts for students whose tuition is paid entirely by an employer

or government entity with a master billing arrangement. If this is the cause, tax-based enrollment will appear low and we should also find (below) that tax-based tuition payments appear low. Second, schools are not required to issue 1098-Ts for students whose tuition is paid entirely by scholarships and grants. If this is the cause, tax-based enrollment will appear low and we should also find (below) that tax-based scholarship amounts appear low. Third, schools may be filing their 1098-Ts under one or more tax identification numbers that are different than the one(s) they report to ED. I have done everything I could to eliminate this as a possibility—examining every school merger and reorganization, hand-checking each number for errors, contacting schools to resolve missing data or ambiguities. However, this possibility cannot be ruled-out entirely. The problem is not that the tax identification numbers reported to ED do not exist in the tax data. They do exist. They are simply not associated with any 1098-Ts. Fourth, some schools may be failing to comply with tax-reporting requirements although they report their headcounts to ED. This last possibility seems most likely for schools that depend greatly on Pell Grants or federal student loans for tuition payments. To stay eligible for federal financial aid, they would need to comply with ED reporting requirements. They might be less compliant with tax-reporting requirements. This possibility should evince itself in tax-based enrollment, tuition paid, and grants being below ED-based amounts especially at schools that depend disproportionately on federal student aid.

What might account for 1098-T-based enrollment that is substantially higher than ED enrollment? These may be students who pay tuition and are then withdraw—too late to get a refund but nevertheless excluded from the enrollment reported to ED. As discussed above, this phenomenon may occur disproportionately at online schools. Recall that the modal enrollment episode is one calendar year, usually corresponding to half a school year or a single term. That is, online schools are probably disproportionately exposed to transient enrollment, perhaps because certain fixed costs associated with a student's being physically present are low.

There are other possible explanations for 1098-T based enrollment being higher than ED enrollment, but they all seem unlikely. For instance, an online school might have a greater incentive to comply with tax-reporting requirements than with ED-reporting requirements. This could occur if the school's typical student was eligible for the tax benefits but had exhausted his eligibility for the Pell Grant and other subsidized federal student aid. As a logical matter, though, this scenario seems unlikely: Once a school had gone to the trouble of generating 1098-Ts, completing the IPEDS report would be

fairly painless. Fraud-based explanations for 1098-T enrollment greater than ED enrollment would be an even more remote possibility. This is because the tax benefits for tuition and fees do not lend themselves to such activities. For instance, suppose a school (or a rogue administrator) were to invent tuition payments that were never truly made so that "students" could receive tax credits. To get a kickback from such a scheme, the organizer would need to collect from each tax filer involved since it would be the filers—not the school

parties (except family members and loan proceeds). Grants and scholarships are to be included regardless of whether the source is a government entity or a non-profit entity. Thus, the scholarships and grants reported on Form 1098-T correspond to what ED calls "total student grants."[23]

Tables 9 and 10 show the comparison of tax- and ED-based tuition paid. The amounts approximately coincide between 30 and 53 percent of the time when schools are not enrollment-weighted. They approximately coincide between 35 and 70 percent of the time when enrollment-weighted. There is substantial variation among types of schools in the degree of coincidence. For instance, the 35 percent coincidence is associated with for-profit mainly-online schools (the category that accounts for the modal enrollment episode) but the 70 percent coincidence is associated with non-profit mainly-online schools (the second most prevalent category).

Overall, the degree of coincidence is higher in tuition paid than in enrollment (Tables 3 and 4). Also, tax-based tuition paid being higher than ED-based tuition paid is less common than tax-based enrollment being higher than ED-based enrollment. This suggests that schools may always report a tuition payment for a student who withdraws whereas whether to report him as enrolled is somewhat up their registrar. The patterns of tax-based tuition payments that are less than ED-based ones (including a complete lack of tax-based payments) are probably explained by the same phenomena discussed above. Namely, there are two wholly legitimate reasons for such differences: schools not being required to file 1098-Ts on behalf of students whose tuition is paid entirely by (i) scholarships or (ii) entities with a formal billing arrangement. Also possible are two reasons that are more problematic, especially for cross-checking tax and ED amounts. They are (i) lack of compliance with tax-reporting requirements by schools that comply with ED reporting requirements (which are simpler) and (ii) the use of different tax identification numbers for 1098-T and ED reporting.

Table 11 shows coincidence for scholarships and grants that ranges between 27 percent (non-profit and public exclusively-online schools) and 48 percent (public mainly-online schools). The degree of coincidence increases when the schools are enrollment-weighted in Table 12. The lowest degree of

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[23] Notice that scholarships and grants are to be reported so long as they are against the *cost of attendance* on both the 1098-T and the report to ED of total student grants. Thus, the scholarships and grants are typically applied first to tuition and fees, then to room and board in facilities that the school itself runs (called "auxiliary enterprises" by ED), and finally to costs that the student himself pays (such as rent on an apartment not owned by the school).

coincidence is 50 percent (public mainly-online schools) and the highest is 73 percent (for-profit mainly-online schools). Since coincidence is higher in scholarships than in enrollment, one is again led to the suggestion that schools have less discretion about whether to report a scholarship they processed for a student who withdraws than whether to report him as enrolled. The same four explanations listed in the paragraph above probably explain why the tax-based scholarship amounts are lower than ED-based amounts a non-trivial share of the time.

VII. Conformity between Tax-based Credit Hours and Credit Hours Reported to ED

In this section, I briefly consider the information contained in the at-least-half-time indicator reported on 1098-Ts. This indicator may allow for wide variations in credit hours compared to the fairly precise credit hours reported to ED. One can compute the minimum credit hours based on the tax data by supposing that every student enrolled at-least-half-time is enrolled exactly half-time (6 credit hours) and that every student enrolled less than half-time is enrolled for 3 credit hours (the only possibility, corresponding to a single course). One can compute the maximum plausible credit hours by supposing that every student with a 1098-T at-least-half-time indicator is enrolled exactly full-time (12 credit hours) while the remaining students must necessarily be recorded as 3 credit hours.

I made these minimum and maximum calculations. In Table 13, I show whether the credit hours reported to ED fall between the minimum and maximum. These ED-based hours should be accurate since they are based on clear-cut questions:

Undergraduate instructional activity... may be reported in units of contact hours or credit hours. Which instructional activity units will you use to report undergraduate instructional activity? Please note that any graduate level instructional activity must be reported in credit hours.

[What is] Undergraduate level: Contact hour activity[?]

[What is] Undergraduate level: Credit hour activity[?]

[What is] Graduate level: Credit hour activity[?][24]

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[24] United States Department of Education, National Center for Education Statistics (2012).

If schools are given equal weight, they fall between the minimum and maximum between 30 percent of the time (public mainly-online) and 63 percent of the time (non-profit and public exclusively-online). When the schools are enrollment-weighted, conformity falls except at for-profit exclusively-online schools where it remains in the 50 percent range. For other categories of online schools, it is between 13 and 26 percent.

Some of this lack of conformity may be due to tax-based and ED-based enrollment differences as reported in Tables 3 through 8. Yet, even if I restrict the set of schools to those where tax-based and ED-based enrollment approximately coincide, conformity of credit hours remains modest.

What Table 13 suggests is that the at-least-half-time indicator on Form 1098-T may be fairly uninformative about whether online students satisfy the at-least-half-time requirement for the AOTC. Therefore, we might look to other indicators of whether the vast majority of them (recall Table 2) are really enrolled at least half-time. In particular, half-time enrollment entails a minimum of 18 hours of academic activity each week; three-quarters enrollment entails a minimum of 27 hours; full-time enrollment entails a minimum of 36 hours. Thus, we expect to see some reduction in earnings while a student is enrolled. The greater the reduction in earnings, the more likely it is that the person is withdrawing some hours from employment activity and reallocating them to academic activity.

VIII. Take-Up of Versus Eligibility For the Tax Benefits for Tuition and Fees

In this section, I examine take-up of the tax benefits for tuition and fees, comparing it to apparent eligibility based on the information reported on Form 1098-T. This section relies entirely on tax data (except for categorizing schools).

To construct the evidence for this section, I took each student for whom there was a 1098-T associated with an online school in 2011 or 2012.[25] Data from all their other 1098-Ts (from 1999 to 2014) were gathered as were data from all their Forms 8863 and 8917. All of the variables needed to compute their eligibility were gathered as well.

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[25] 2012 is the last year that is it desirable to use for this purpose because it will later prove useful to have some potential post-enrollment years of earnings. Adding data prior to 2011 did not seem likely to provide additional insight, especially as it is desirable to get the tax benefit parameters as close as possible to their current state.

Note that I cannot evaluate whether a tax benefit was taken on behalf of a student for whom no 1098-T existed. This is because deidentified 8863 data do not contain an identifier for the institution at which the student was enrolled. Form 8917 does not even ask for such information. Thus, the analysis that follows must necessarily focus on students whose online school enrollment appeared on a 1098-T. Were they eligible for a tax benefit? Did they take it up and did they take up the one most valuable to them? I cannot assess whether there some people took a tax benefit and claimed it was associated with an online school that did not, in fact, issue a 1098-T for them.

The principal challenge for determining eligibility is that the AOTC non-financial criteria cannot be gauged with entire accuracy based on tax data. I therefore set up a "generous" and a "strict" standard for AOTC eligibility. The difference between them is the following:

> generous standard: at least *one* 1098-T for the relevant year reports the student as an
> undergraduate, even if the online school itself reports him as a graduate student; the
> student's number of previous at-least-half-time years is less than or equal to 9
> (corresponding to 8 school years, the maximum number of years an exactly half-time
> student would take to get through 4 school years).
> strict standard: all 1098-Ts for the relevant year report the student as an undergraduate;
> the student's number of previous at-least-half-time years is less than or equal to 7
> (corresponding to 6 school years, 1.5 times the normal time-to-degree, a standard used by
> ED).

For both the generous and strict standard, a student is judged to be ineligible if his qualified expenses (the maximum of qualified tuition paid and amounts billed minus scholarships and grants) are zero or negative *over all schools* in that year.[26] He is also judged to be ineligible if he has already taken the AOTC or HOPE credits four or more times. (Violations of this restriction do occur, though rarely. Two percent of the students who took a refundable AOTC in 2011 or 2012 had already taken it four or more times.) In addition, he is judged to be ineligible if he is neither at-least-half-time at one school or less-

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[26] Negative numbers are possible because scholarships and grants may pay for room and board and so on. In practice, this is rarely an issue for online schools, perhaps because they are nonresidential.

than-part-time at two schools.[27] [28]

Having gathered all the necessary variables, I compute the refundable and nonrefundable AOTC for each student eligible under the generous and strict standards. Since the AOTC is always more valuable than the LLC or DTF, I then have the students who are potential candidates for one of those two tax benefits. I compute the LLC and DTF for each filer associated with these LLC/DTF candidates and determine whether the credit or deduction would be more valuable. Finally, I "assign" a student to the tax benefits that would be most valuable to him: the refundable AOTC, the nonrefundable AOTC (usually an addition to the refundable AOTC), the LCC, and/or the DTF.

Table 14 compares eligibility for and take-up of the refundable AOTC. Between 1,006,389 (strict standard) and 1,078,907 (generous standard) online students are apparently eligible for the credit per year, and 854,292 online students take it up.[29] The average credit for which a student is eligible is $811, whereas the average credit taken is $974 (very close to the maximum refundable credit of $1,000). The discrepancy between the average credit taken and the average credit of eligibles seems due to the credit being taken-up by the eligibles for whom it is more valuable (author's calculations). Hereafter, I call this phenomenon "selection-on-value." It can apply only to schools in which take-up is less than full.

Although online students, overall, appear to take up the refundable AOTC less than they could, this conclusion varies substantially by the school's category. Students at public mainly-online schools appear to take the refundable AOTC more often than they are eligible, and their average credit taken is larger than the average credit for which students are apparently eligible. Non-profit mainly-online

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[27] Since the minimum number of credits for a less-than-half-time is 3, any student with 3 credits at *two* schools has a reasonable chance of being half-time overall (6 credits).

[28] A final issue is the checkbox meant to identify students who are under age 24 and financially dependent on another person, even if that person does not file taxes himself. On this point, the Form 8863 is somewhat problematic because the amount in question when a filer comes to this line is the amount for *all* students eligible for the AOTC up to this point. Yet, the wording related to the checkbox appears to assume that there is only one possible AOTC student. It is only the student(s) who become ineligible at this line who should be "bumped" into the nonrefundable credit. If a household with multiple potentially AOTC-eligible students foresees the checkbox, it might end up with different total tax benefits then if it does not foresee the checkbox and simply follows the instructions line-by-line. Fortunately, the differences in potential tax benefits here are limited to a very small number of online students.

[29] This is an average of the 2011 and 2012, to obtain a per year number.

students and non-profit and public exclusively-online students appear to take the refundable AOTC whenever they are eligible or slightly more often than when they are eligible (generous standard). Their average credit is larger than the average credit for which they are apparently eligible. Among for-profit mainly-online students, take-up is about 70 to 75 percent of apparent eligibility and, among for-profit exclusively-online students, it is 78 to 83 percent of apparent eligibility. For both these categories, the average credit taken is larger than the average credit for an eligible student but this seems due to selection-on-value (author's calculations.)

One might wonder how students can have take-up rates that exceed 100 percent of eligibility and credits larger than the credits for which they are eligible. One likely explanation is that students are taking the AOTC when, in fact, they are ineligible because they have too much prior postsecondary education or are not enrolled at least half-time. They may be reporting their qualified educational expenses accurately, but they should be taking the LLC or DTF. This explanation is somewhat supported by the data since, as we shall see, AOTC take-up rates are higher than LLC or DTF take-up rates. Another likely explanation is that students are overstating the qualified educational expenses for which they paid. For instance, they might claim expenses covered by a grant or non-required fees. Neither are qualified expenses. Or, students who withdrew from online courses quickly enough to receive refunds might remember their tuition payments when filing taxes but forget their tuition refunds. A final explanation is that students are filing correctly but their online school is underreporting their payments—probably due to accounting errors rather than deliberate deception. However, this explanation seems most likely with small online schools whose financial systems might be more primitive. The data do not, in fact, suggest that small schools account for the excess take-up or credits.

Table 15 compares eligibility for and take-up of the nonrefundable credits. This is a more complex array of results because I can calculate eligibility for the nonrefundable AOTC separately from eligibility for the nonrefundable LLC. However, we have take-up data only for the *combined* nonrefundable credits.

Over all categories of schools, online students appear to be eligible for about 690,000 to 745,000 nonrefundable AOTCs with an average value of around $980. Online students appear to be eligible for approximately 390,000 to 435,000 nonrefundable LLCs with an average value of about $940. Combining the nonrefundable credits, online students are eligible for around 1,200,000 with an average

(combined) value of about $980. Take-up of the nonrefundable credits is around 900,000, approximately 75 percent of eligibles. The average credit taken is $1,177, greater than the $980 average credit of eligibles. This discrepancy is largely explained by selection-on-value (author's calculations).

In every category of school, take-up of the nonrefundable credits is less than full. It is lowest among for-profit mainly-online and exclusively-online students. This is unsurprising because their take-up of the refundable AOTC was also lower than full, and once a taxpayer has failed to complete Part I of Form 8863 (the refundable AOTC), he would probably fail to complete the other parts associated with the nonrefundable credits. Once again, the average credit taken is always greater than the average credit among eligibles. This is mainly attributable to selection-on-value (author's calculations).

Table 16 shows that between about 240,000 and about 270,000 online students are eligible for and would be best off taking the DTF. This is smaller than the approximately 390,000 to 435,000 online students eligible for and best off taking the LLC. The mild dominance of the LLC among online students who are not eligible for the AOTC is not due to most students paying tuition close to $10,000 (at which the LLC is maximized) but—rather—due to many students having sufficiently modest incomes that they do not make it into the 25 percent tax bracket. (For students in the 25 percent bracket, the value of the LLC begins to exceed the value of the DTF when tuition payments top $5,000. Many students are paying $5,000 or more, but their marginal tax rate is below 20 percent—the parameter relevant to the LLC.)

The average *deduction* for which an online student is eligible is about $2,500 to $2,600, with an average *value* of $410.[30]

Among online students overall, take-up of the DTF is 64 to 72 percent. The average deduction taken up is about $2,600, very close to the average deduction among eligibles. The take-up rate is in the 60 to 80 percent range for all categories of online schools. For all categories except public mainly-online schools, the deduction taken is fairly close to the average deduction among the eligibles. At mainly-online schools, the average deduction taken is about $1,700 though the average deduction among eligibles is only about $1,400. This again seems to be due to selection-on-value (author's calculations).

It is worth noting that there is little evidence that online students are taking the wrong tax benefit, in the sense of taking one that is *less* generous than another for which they are eligible. This finding

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[30] One cannot interpret the ratio of the value to the deduction as a tax rate, owing to the fact that the maximum deduction drops from $4,000 to $2,000 at $130,000 ($65,000 for single filers).

contrasts with Turner (2012) whose analysis indicates that students and their families often choose the wrong higher education tax benefit. He also finds lower take-up rates among eligibles than shown here for online results. However, Turner considers all college students, not just online students, so his results are dominated by the behavior of students of traditional age who are dependents and who often do not file their own taxes. There may be less possibility of slippage or miscommunication when the student and the filer are the same person, as is often true for online education.

Summing up, about three-quarters of eligible online students take-up a tax benefit for tuition and fees, with the rate being highest for the refundable AOTC and lowest for the DTF. The evidence suggests pervasive selection-on-value. That is, students are more likely to take up the tax benefit for which they are eligible if that benefit is greater in dollars. Some categories of online students have refundable AOTC take-up rates that appear to be more than full, and this may be due to students overstating qualified expenses. More likely, students are taking the AOTC when they are really only eligible for the LLC or DTF. Although take-up is not full across the board, it is higher than one might expect given that the modal enrollment episode lasts only 1 tax year (half a school year). The true take-up rates may even be somewhat higher than computed when we recall the indications so far that a certain share of tuition payments to online schools are associated with students who withdraw too late for a refund but before participating enough to be "enrolled" by ED standards. Because the tax benefits require a student to be enrolled, such students should not be in the denominator for the take-up rates although they may appear to be eligible based on their 1098-Ts. (This is no fault of the schools. Students must currently police themselves on such matters.)

Given that most online enrollment episodes are very short, it is implausible that students would have time to learn about the tax benefits on a gradual basis from their fellow students or other word-of-mouth. Rather, it seems likely that the take-up rates are as high as they are because the typical online student is mature and thus accustomed to paying taxes—perhaps with the help of a tax preparer or tax software—and accustomed to credits and deductions. The typical online student is usually the filer himself or the filer's spouse. This may raise the salience of the tax benefits relative to the situation where the student is a dependent. The filer may also be more likely to have all the information, at his fingertips, that he needs to complete Forms 8863 and 8917.

IX. The Usefulness of Earnings Data for Assessing the Higher Education Tax Benefits

Section VII concluded with the suggestion that changes in earnings might provide useful information about whether online students were in fact enrolled at least half-time as required by the AOTC. They might also be somewhat informative on students who pay tuition but withdraw before being truly enrolled—such students would have little academic activity. The change in earnings from before to after enrollment might also indicate whether students are acquiring or improving job skills, per the requirements of the LLC. Finally, changes in earnings, together with the costs of education, could be used by the Treasury to assess the fiscal consequences of the tax benefits for tuition and fees. In this section, I attempt to show enough about changes in earnings to assess the usefulness of earnings for these four purposes. Fortunately, the demonstration can be carried out using simple figures. Exact calculations were made but are not shown in detail here.[31]

To generate the figures, I return to the set of enrollment episodes that began between 2007 and 2012 at an online postsecondary institution that was primary, in the sense defined in Section III (the institution where the student was enrolled half-time; if ambiguous, the institution to which the most tuition was paid on behalf of the student).

To construct each of Figures 5 through 12, I used the following procedure that results in a simple plot of online students' earnings relative to their pre-enrollment earnings.

(i) I normalized each student's wage and self-employment earnings (including zeros) so that they were relative to that student's earnings in the year before the enrollment episode began. Thus, if his episode begin in 2009 and his 2008 earnings were $25,000, his normalized earnings would be actual earnings minus $25,000 for all years.

(ii) I focused on students with at least two years of positive earnings prior to the episode and at least two years of potential earnings after the episode. This restriction can be altered to be three years with little change in the results.[32]

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[31] I performed many variants on the analysis shown below to demonstrate that the simple version I show here is very robust to plausible modifications of the procedure. These variants are described in detail in a related paper.

[32] Longer pre- and post- year requirements limit the data to less recent and less representative episodes. This is somewhat undesirable if one wants to focus on episodes that reflect today's online postsecondary learning environment.

(iii) I constructed indicators for time relative to the year of episode commencement. For instance, if a student commenced his enrollment episode in 2009, the indicator for time=-1 would turn on for 2008, the time for time=0 would turn on for 2009, the indicator for time=1 would turn on for 2010, and so on, extrapolating in both directions. Each person has five pre-enrollment years, the enrollment episode years, and up to seven post-enrollment years.[33]

(iv) I regressed normalized earnings on the relative time indicators, age, age squared, and calendar year indicators.[34]

(v) I plotted the estimated coefficients for each relative time indicator.

The figures bear a simple interpretation. They show how earnings change relative to the pre-enrollment earnings, accounting for age and calendar year.

It is important to note that episode length is *not* randomly assigned to people. A person who persists in online education for three years is likely to have a better fit with it, be learning more, be more motivated, or otherwise be different than a person who persists for only a single year (half a school year), Thus, every figure I show is for episodes that lasted a specific length: one year, two years, three years, etc. I do not claim to control for selection into episodes of different lengths.

Thus, readers should interpret each figure as indicating how people with a certain episode length are doing before, during, and after enrollment *relative to themselves*. Readers should not compare across figures with different episode lengths and give a causal interpretation to such comparisons. For instance, it would be wrong to think that people who enroll for only a single year would have earnings like that of people who enroll for four years if only we could somehow induce them to enroll for four years.

I focus first on enrollment episodes of three years in length because such episodes, though uncommon (about 16 percent of episodes), are not rare as are episodes of four or more years. Also, it seems more likely that three year (two school year) episodes would result in a degree or improvements in job skills than—say—a one year episode.

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[33] It is an unbalanced panel in the relative time and calendar year senses.

[34] I found that age and age squared were sufficient to absorb the predictable age-earnings profile over the period in question. A cubic or quartic in age added almost nothing. The year indicators pick up anything constant across people in the year in question: the price level, macroeconomic conditions, and so on.

Consider Figure 5 which shows earnings associated with three-year episodes at for-profit mainly-online schools. The line with the circle markers shows the plot of earnings relative to the beginning of the enrollment episode. People are gaining earnings steadily going into the episode, at a rate of about $2,000 per year. (The pre-enrollment rate of gain is plotted as a dashed line, for reference.) During the episode itself, earnings gains fall slightly so that people earn about $800 less than expected in the first calendar year of enrollment. Their earnings remain about $800 short in the second year of enrollment, and about $500 short in the third year. When the episode ends, their rate of earnings growth picks up temporarily for two years. Then their earnings return to the dashed line—that is, the earnings that would have been projected for them based on their pre-enrollment earnings, assuming they never enrolled.

Now examine Figure 5 in light of the questions we hoped to answer with it. 88 percent of students in these for-profit mainly-online schools were enrolled at least half-time. This entails academic activity of at least 18 hours per week. If they were enrolled full-time, academic activity should occupy 36 hours per week. Their average earnings in the year prior to enrollment was $26,407 ($13.20 per hour if they worked full-time or $26.40 per hour if they worked half-time). Given that their earnings fell by only $800 relative to expectations, one might surmise that they drew down their employment hours by 61 hours (800/13.20) over the course of the whole year if they were previously working full-time. This is a reduction of 1.2 hours of employment per week. If they were previously working half-time, one might think that they drew down their employment by 30 hours (800/26.40) over the course of the whole year. This is a reduction of 36 minutes in employment per week. These reductions in employment are small relative to the academic activity required to fulfil the at-least-half-time standard. Of course, people can cut back on leisure, family time, or personal care time to engage in 18 to 36 hours of academic activity while reducing employment time by only 36 minutes to 1.2 hours. However, such cuts would presumably be hard to maintain.

Figure 5 therefore suggests that the AOTC requirement of at-least-half-time enrollment might not actually be met by some students who are apparently eligible for it based on their 1098-Ts. Since there is also a lack of conformity between tax-based and ED-based credit hours (section VII), one might view the evidence as suggesting that more information about actual hours of academic activity would be useful for judging compliance with the AOTC.

Another use for Figure 5 is judging whether students are acquiring or improving job skills. They

may be: earnings are about $700 and $1,700 above the pre-enrollment trend in, respectively, the first and second years after enrollment. After that, earnings settle onto the pre-enrollment trend, a phenomenon that is hard to reconcile with skill improvements unless the skills depreciate rapidly.

Yet another use for Figure 5 is assessing the consequences of the enrollment episode in a return-on-investment sense. Here, the contest is between the gains in earnings (already noted), the losses in earnings during enrollment (already noted), and the direct costs of enrollment. These direct costs are shown in bars in the years in which enrollment took place. Since tuition paid and social cost are very similar at for-profit mainly-online schools, I show only tuition paid but the bars would look nearly identical for social costs. What is noteworthy is that the height of the bars dwarfs the gains and losses in earnings. Put another way, it might take many years of earnings gains to generate a positive return on the education.

If one projected earnings forward using the pre-enrollment trend and the post-enrollment trend, one could make a formal calculation of the return on investment (ROI).[35] Its numerator would be the projected gain in lifetime earnings, discounted to the current day using a conventional discount rate. The gain would be composed of two terms. The first term would be the discounted sum of actual earnings while enrolled and projected earnings based on post-enrollment trends. The second term, which would be subtracted from the first, would be projected earnings based on pre-enrollment trends. The denominator of the ROI would be the discounted sum of the costs of schooling. The student himself might be interested solely in his private ROI, where the costs would include only the tuition he himself pays. Tax payers, philanthropists, and policy makers might be interested in the social ROI, where the costs would include those paid by federal grants, donors, state appropriations, and other sources.[36]

Having assessed Figure 5 with care, we can now move more quickly through Figures 6 through 9, which are exactly parallel except that they show earnings and costs for online schools in other categories. Figure 6, for instance, displays data based on non-profit mainly-online schools, the second most prevalent type of enrollment episode. It looks much like Figure 5 and suggests similar lessons. Note, however, that the vertical scale in Figure 6 accommodates a higher pre-enrollment trend in earnings and higher

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[35] I show the results of varying the method of projecting earnings in a related paper.

[36] An exact equation is shown in a related paper.

costs.[37] Social costs and tuition paid are distinct in Figure 6 because they differ substantially in non-profit schools. Even at a glance, Figure 6 indicates that the social ROI would be considerably less than the private ROI. This is because the numerator would be the same (discounted earnings gains) but the denominator would be larger owing to use of social costs rather than tuition paid.

Figure 7 shows data for the third most common category: for-profit exclusively-online schools. The earnings differences look a lot those in Figure 6, but the costs are lower (and there is no reason to distinguish between tuition paid and social costs). Nevertheless, the lessons are similar. Figure 8 is for the public mainly-online schools, which represent just 7 percent of episodes. Figure 8 shows the largest and most persistent post-enrollment earnings gains seen thusfar. It suggests that ROI calculations for public mainly-online schools would look favorable. Note, however, that we cannot give a causal interpretation to difference in effects between public mainly-online schools and other online schools. The students who select into public mainly-online schools are observably different from those at other online schools. See Table 2. They are younger and earn less prior to enrollment. They may also differ in unobservable ways such as preparation or motivation. Thus, we cannot say that students at other online schools would attain greater or more persistent earnings gains if only they enrolled in public mainly-online schools.

Figure 9 is for non-profit and public exclusively-online schools, which account for only 3 percent of episodes. Earnings would hard to project well for these schools, simply there are fewer students in the data. In any case, the lessons one would draw from Figure 9 are approximately the same as those one would draw from Figures 6 and 7.

Figures 10, 11 and 12 are parallel figures except that they show enrollment episodes of, respectively, length one, two, and four. They combine all categories of online schools. The vertical scale is the same as in Figures 6 through 9. The overall impression from Figure 10 is that one year (half school year) episodes trigger only very small earnings losses during enrollment and may have little or even negative effects on post-enrollment earnings. The overall impression from Figure 11 is much like that from Figures 5, 6, and 7: earning losses during enrollment are small; earnings gains post-enrollment are small if any; costs dwarf the earnings differences and could take many years of earnings gains to

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[37] I continue to use this scale for Figures 7 to 9 to facilitate comparisons. I did not use this scale Figure 5 in order to allow the reader to better judge the earnings differences, visually.

recover, if at all. (It is not surprising that Figure 11 looks much like Figures 5, 6, and 7 because the three categories of students they represent account for 90 percent of the students in Figure 11.) Figure 12 shows that four-year episodes are associated with modest but persistent earnings gains. Based on the figure alone, one could not say whether these gains would be sufficient to generate favorable social or private ROIs. The gains, direct costs of schooling, and the earnings losses while enrolled would need to be discounted and put in the computation described above. It is crucial to remember that four-year episodes are comparatively rare and that we cannot give a causal interpretation to episode length. That is, it would be wrong to infer that students whose episodes are shorter would experience gains more like those shown in Figure 12 if only we could induce them to enroll for four years. The four-year enrollees are likely to differ because selecting into a four-year episode is so unusual.

X. Key Findings and Their Implications for Administering the Tax Benefits

In this section, I discuss findings that have potential implications for the administration of the tax benefits for tuition and fees.

Online postsecondary education *is* growing rapidly and its students *are* different than the notional student who may have inspired the education credits: a traditional-age student who attends a brick-and-mortar, probably residential, college full-time. The notional student persists in college fairly continuously or at least has strong adherence. In light of the growing importance of online education, it may be helpful to revise forms and instructions to accommodate the reality of online students' and schools' circumstances. I would highlight several differences between online students and the notional student.

(1) Online students' enrollment episodes are often brief—half a year (one term) is the mode.

(2) Online students are probably more likely to pay tuition and then withdraw, not in time to get their payment refunded but in time to be not-enrolled from an academic point of view.

(3) Online students are likely to combine enrollment with continuous employment, setting up issues for the determination of whether they fulfil the time requirements of the AOTC.

(4) Online students are older and more likely to themselves be tax filers or the tax filer's spouse. Perhaps as a result, their take-up of the tax benefits is fairly high despite their brief enrollment and lack of in-person exposure to fellow students and financial aid staff.

(5) Online students typically have several years of pre-enrollment earnings and continue to have positive earnings while enrolled and post-enrollment.

Some practical implications of these differences are as follows.

(1) It might be helpful for the 1098-T to include a box in which a school could indicate that a student paid tuition but was considered "withdrawn" before the end of the relevant coursework. Currently, there is no way to determine whether such students were enrolled as required by the tax benefits.

(2) More clarity is needed regarding hours of academic activity. Credit hours are reported to ED and are the underlying unit of transcripts in any case. Reporting them on the 1098-T would not seem to increase schools' administrative burden much. Indeed, schools are currently made to translate credit hours into the "at least half time" indicator, an indicator that they use for no purpose other than tax reporting.

(3) If hours of academic activity were reported in credit hours, it would be far easier to determine a student's at-least-half-time status and, eventually, his undergraduate status. The latter would cumulate over time.

(4) Because many online students have multiple years of earnings prior to enrollment, while enrolled, and after enrollment, earnings data may be informative about several aspects of compliance with the requirements of the tax benefits. Use of earnings data may allow more efficient targeting of audits. In contrast, earnings would not generate much if any information for students of traditional college-going age whose pre-enrollment earnings are non-existent or do not resemble adult earnings.

(5) There has been much concern in recent years about advertising the tax benefits for tuition and fees. There is a concern that students do not know that they exist and, thus, fail to take them up or take them into account when making college choices. These concerns are possibly less relevant for online students who are older and usually file for themselves. Thus, advertising campaigns might be directed disproportionately to students who are still likely to be dependents.

The exercise of comparing tax-based and ED data yields numerous interesting findings. Among them, I would highlight the following.

(1) There is great potential for the use of ED data to cross-validate compliance with 1098-T reporting requirements and filers' compliance with the rules for the higher education tax benefits.

(2) Many of the definitions used by the IRS and ED already correspond, even if they are not written in identical language. For instance, 1098-T-based tuition paid and scholarships and grants have

corresponding ED variables.

(3) It would be helpful if ED required schools to report the totals of their 1098-T variables on an annual basis. This would not be an important increase in schools' administrative burden but greatly facilitate cross-validation.

(4) It seems likely that more coordination is needed with ED regarding schools' identifiers. The simplest change would be a requirement that the school reports to ED the tax identification number that it uses on its 1098-Ts. If, for some reason, this is not the same tax identification number that it ordinarily reports to ED, it ought to report both to ED. More complex schemes could be devised, such as schools reporting their ED identification numbers on Form 1098-T. However, such schemes would be more burdensome.

Finally, more attention might be directed to the opportunities created by the technology that makes online postsecondary education possible. This technology creates some issues for reporting—for instance, by probably allowing greater amounts of very brief enrollment. However, it could also be used to automate reporting in a manner that might be hard for brick-and-mortar schools to replicate without undue burden.

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Figure 1
Enrollment in Mainly-Online Postsecondary Schools
(undergraduate & graduate, full- & part-time)
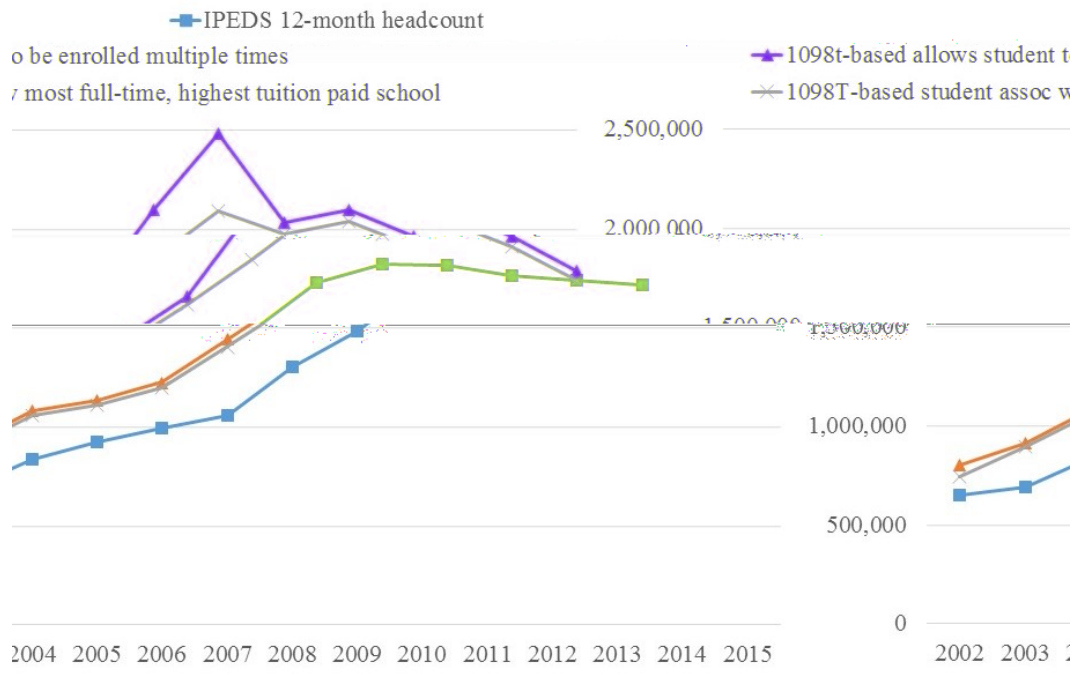
Figure 2
Enrollment in Exclusively-Online Postsecondary Schools
(undergraduate & graduate, full- & part-time)
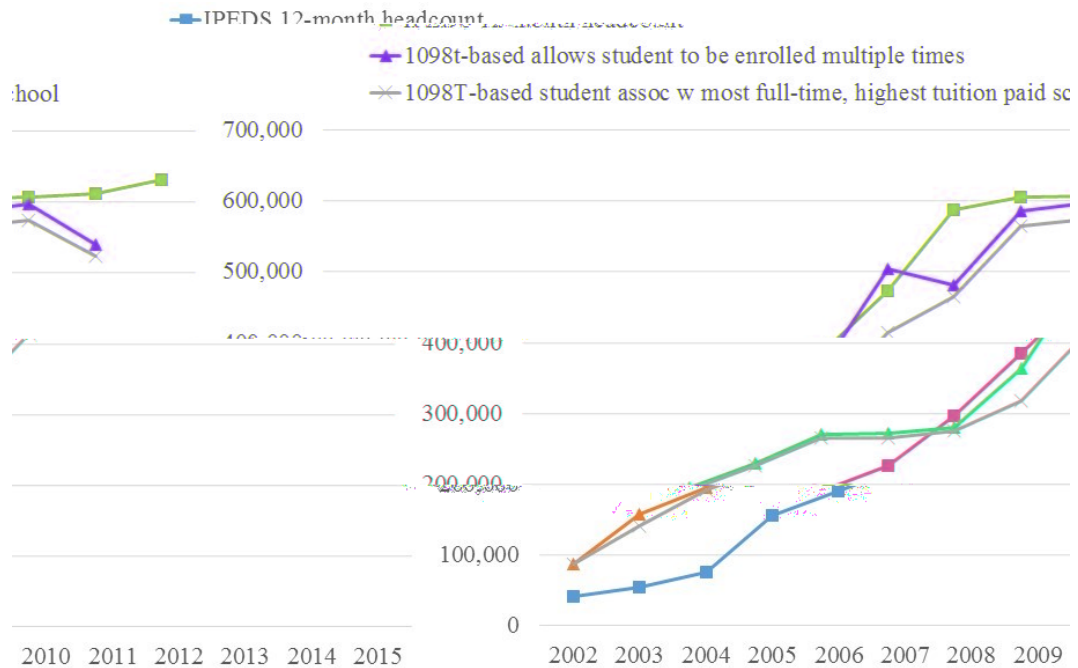
Figure 3
Undergraduate Enrollment in Mainly-Online Postsecondary Schools

- IPEDS 12-month headcount
- 1098t-based allows student to be enrolled multiple times
- 1098T-based student assoc w most full-time, highest tuition paid school
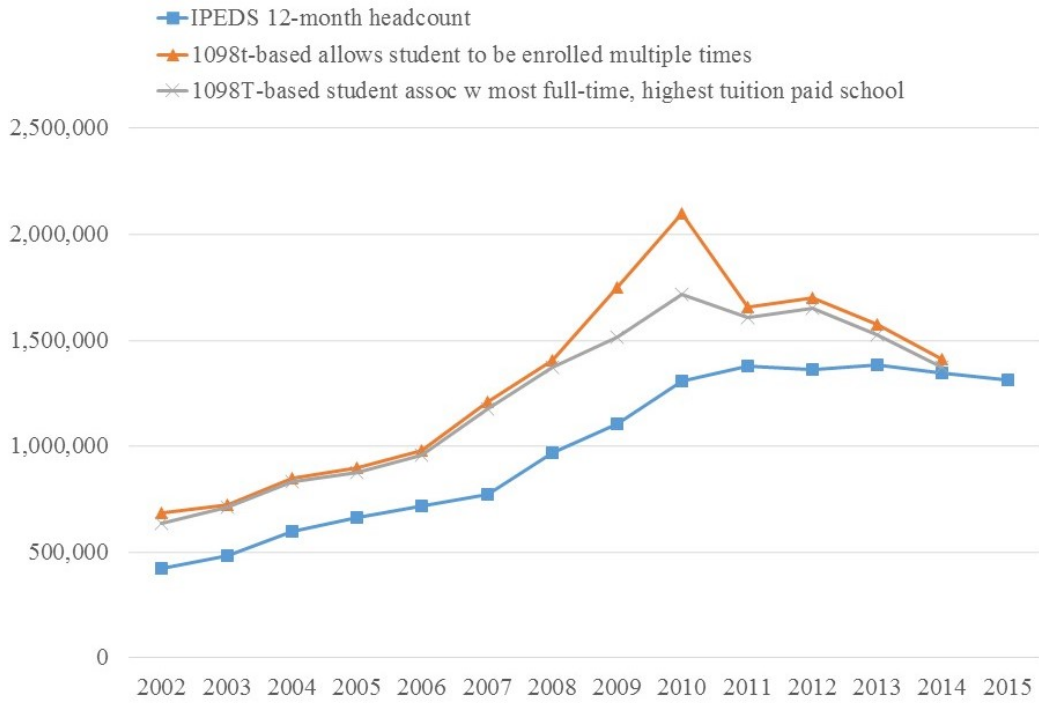
Figure 4
Undergraduate Enrollment in Exclusively-Online Postsecondary Schools

- IPEDS 12-month headcount
- 1098t-based allows student to be enrolled multiple times
- 1098T-based student assoc w most full-time, highest tuition paid school

Figure 5
Earnings and Costs Associated with 3-Year Enrollment Episodes
at For-Profit Mainly-Online Schools
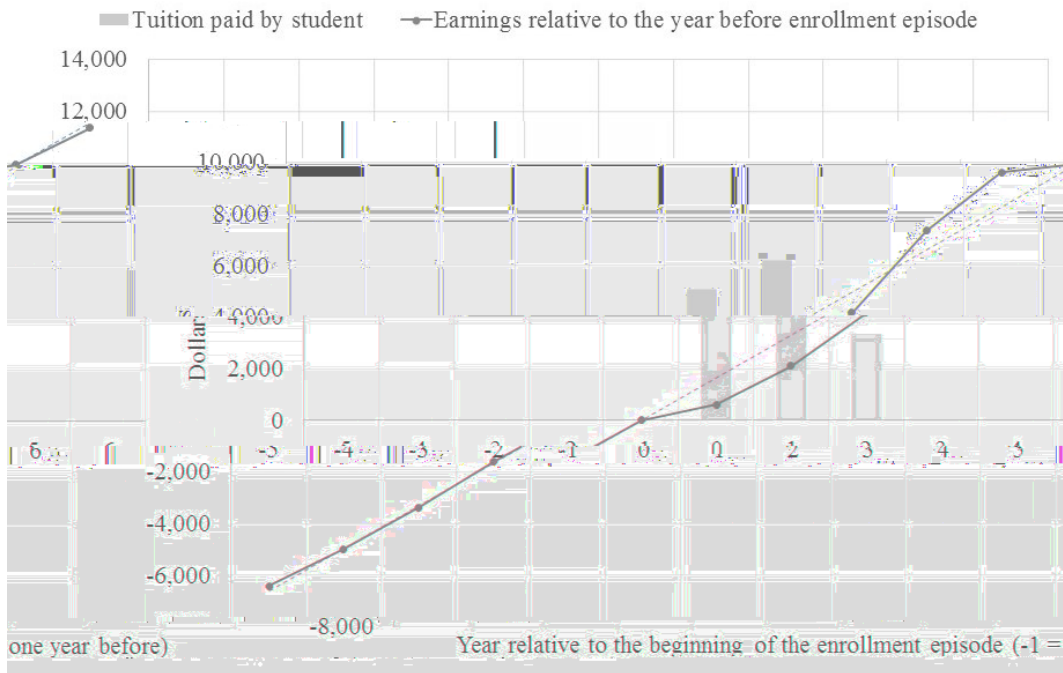
Figure 6
Earnings and Costs Associated with 3-Year Enrollment Episodes
at Non-Profit Mainly-Online Schools
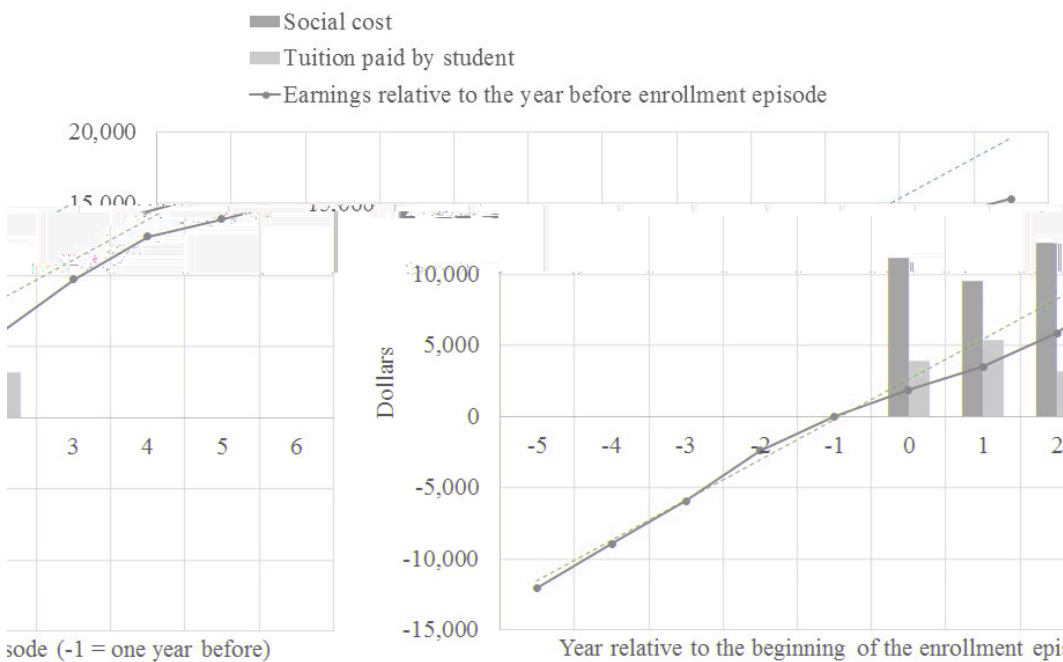
Figure 7
Earnings and Costs Associated with 3-Year Enrollment Episodes
at For-Profit Exclusively-Online Schools
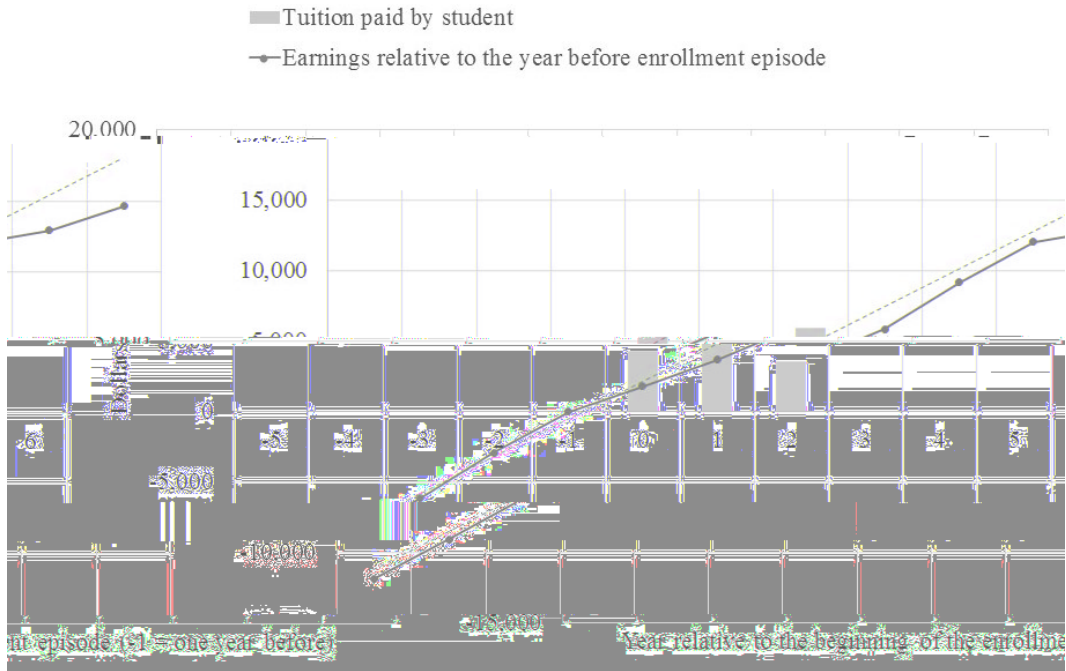
Figure 8
Earnings and Costs Associated with 3-Year Enrollment Episodes
at Public Mainly-Online Schools
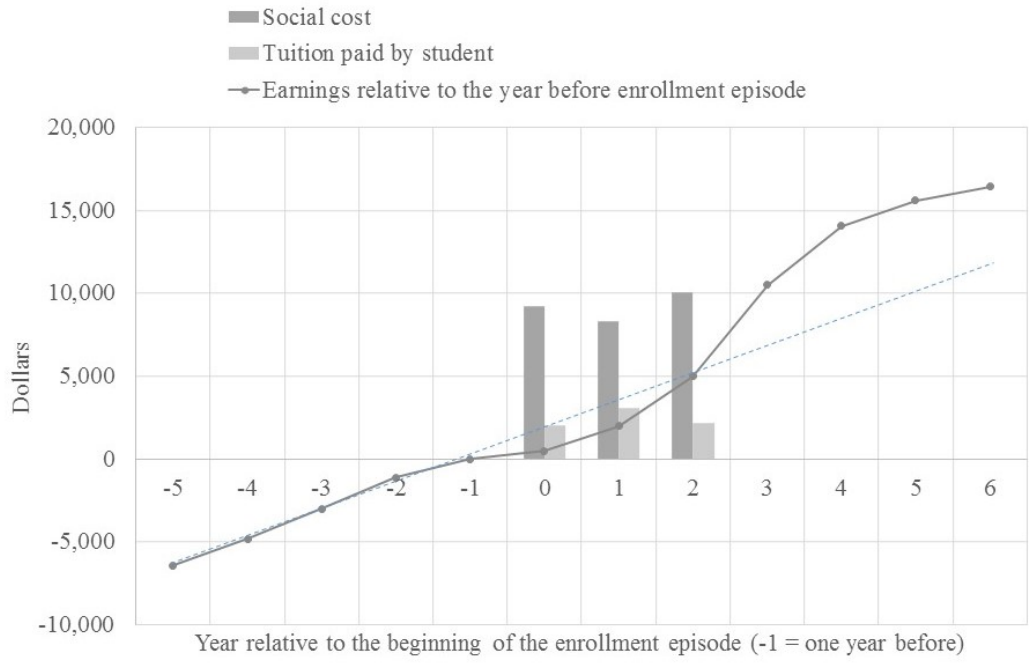
Figure 9
Earnings and Costs Associated with 3-Year Enrollment Episodes
at Non-Profit or Public Exclusively-Online Schools
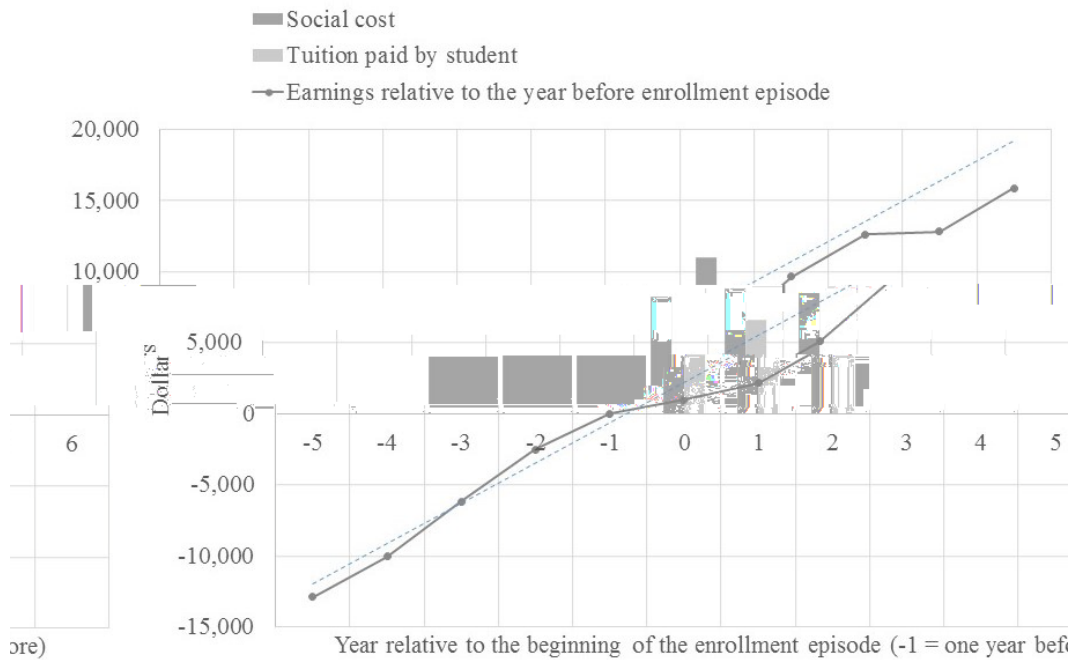
Figure 10
Earnings and Costs Associated with 1-Year Enrollment Episodes
at All Mainly- or Exclusively-Online Schools
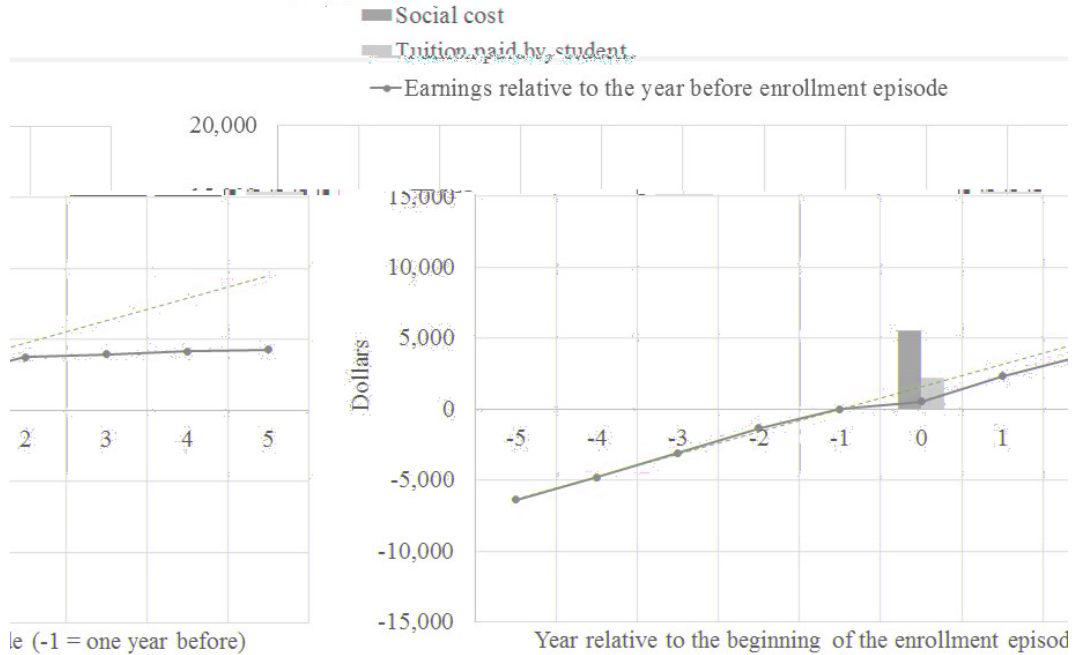
Figure 11
Earnings and Costs Associated with 2-Year Enrollment Episodes
at All Mainly- and Exclusively-Online Schools
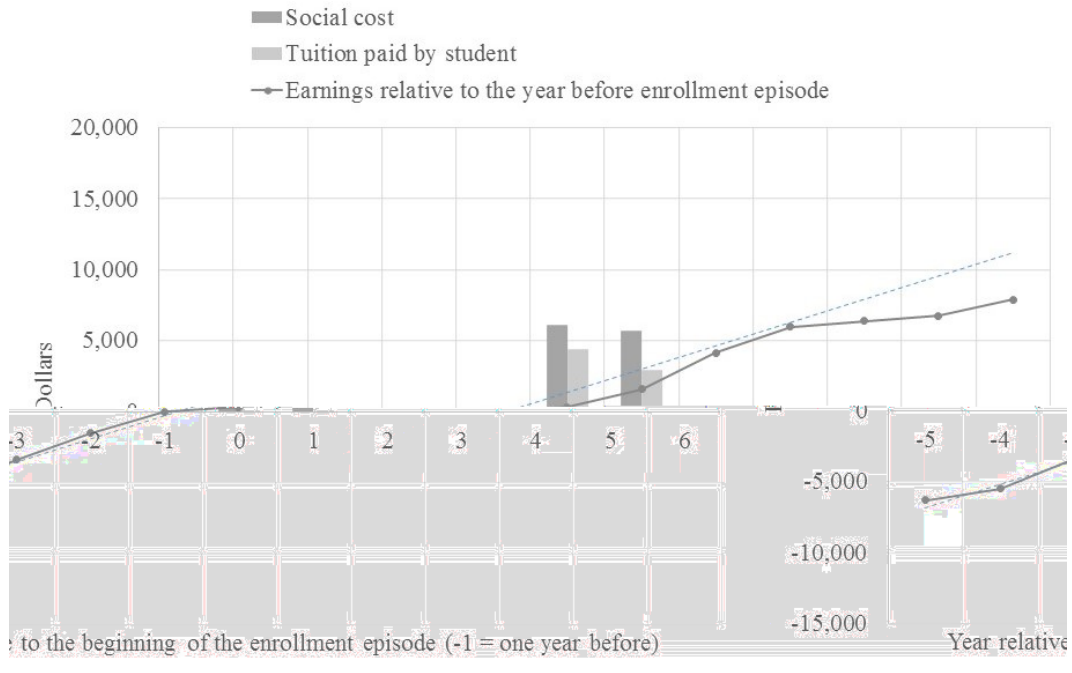
Figure 12
Earnings and Costs Associated with 4-Year Enrollment Episodes
at All Mainly- and Exclusively-Online Schools
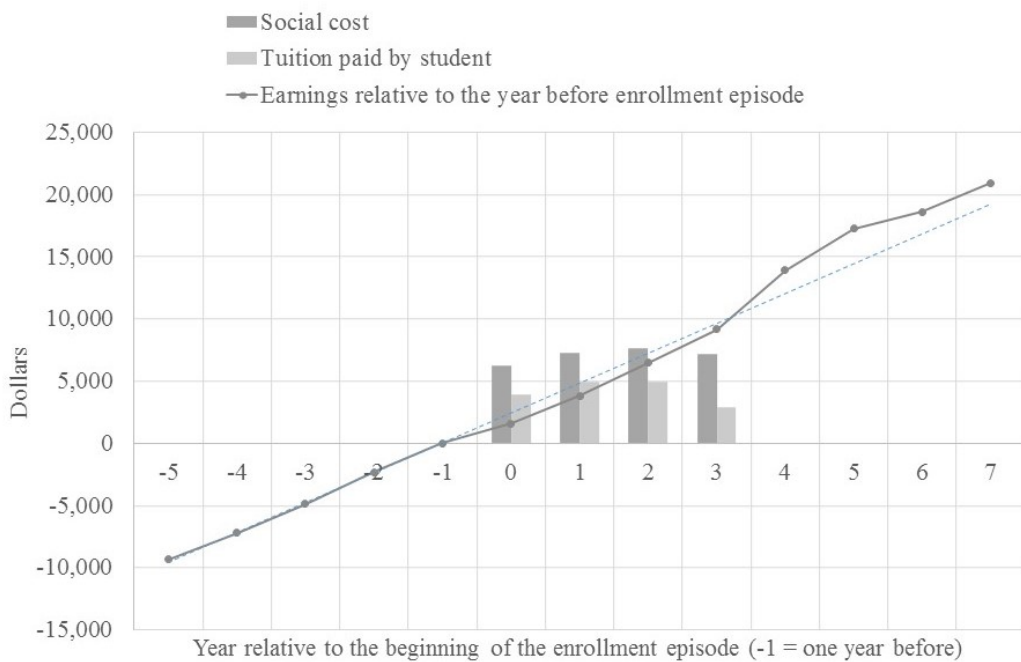
Table 1
Key Parameters of the Tax Benefits for Tuition and Fees (2016)

	American Opportunity Tax Credit	Lifelong Learning Credit	Tax Deduction for Tuition & Fees
Formula	100% of the first $2,000 plus 25% of the next $2,000	20% of the first $10,000	marginal tax rate times 100% of the first $4,000 if below the first limit or 100% of the first $2,000 if below the second limit
Qualified expenses	tuition, required fees and course materials	tuition and required fees	tuition and required fees
Maximum benefit	$2,500	$2,000	$4,000 times filer's marginal tax rate
Refundability	40% of the credit for which otherwise qualified	nonrefundable	does not apply
Income (MAGI) limits	$180,000 married filing jointly; $90,000 single	$131,000 married filing jointly; $65,000 single	$130,000/160,000 married filing jointly; $65,000/$80,000 single
Benefit is limited per student or per filer	per student	per filer	per filer
Phase-out or sharp income cut-off	phase-out	phase-out	sharp cut-off
Applies to which years of education	first 4 years of undergraduate education	all years of postsecondary education	all years of postsecondary education
Benefit available for how many years	4 tax years *per student* including years in which Hope Credit claimed	unlimited	unlimited
Required percentage of time enrolled	at least half time	1+ courses	1+ courses
Program/type of courses required	degree program or equivalent	courses to acquire or improve job skills	any course at an eligible institution
Who must pay the qualified expenses	filer on whom student depends; spouse or dependent of same filer	filer on whom student depends; spouse or dependent of same filer	filer on whom student depends; spouse of same filer; student himself
Timing of payments that qualify	payments made in tax year for academic terms that begin in tax year or first 3 months of next tax year	payments made in tax year for academic terms that begin in tax year or first 3 months of next tax year	payments made in tax year for academic terms that begin in tax year or first 3 months of next tax year

Notes: The source is https://www.irs.gov/newsroom/tax-benefits-for-education-information-center.

Table 2
Characteristics of Enrollment Episodes that Began at an Online School between 2007 and 2012
(Each Student Given Equal Weight)

	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online
Percent of online enrollment episodes	7%	20%	56%	3%	14%
Average episode length in calendar years (school years = calendar years - 1)	2.3	2.3	2.4	2.8	2.1
Percent of episodes with calendar year length=1 (≈1/2 school years)	42%	39%	34%	28%	41%
Percent of episodes with calendar year length=2 (≈1 school years)	23%	25%	29%	23%	28%
Percent of episodes with calendar year length=3 (≈2 school years)	15%	16%	17%	17%	16%
Percent of episodes with calendar year length=4 (≈3 school years)	9%	9%	10%	11%	8%
Percent of episodes with calendar year length=5 (≈4 school years)	6%	7%	6%	13%	4%
Percent enrolled at least half-time in the first year of episode	60%	68%	88%	91%	87%
Percent enrolled as undergraduates in the first year of episode	95%	77%	90%	75%	70%
Student's age in the first year of episode	29	34	34	31	35
Student's earnings in the year before the first year of episode (no zeros)	$21,489	$35,903	$26,407	$36,356	$34,715
Percent of students with zero or missing earnings in both of the two years before episode	9%	8%	10%	6%	9%
Tuition paid by student himself to primary institution in the first year of episode	$1,637				
Tuition paid to primary institution in the first year of episode	$1,637	$5,251	$6,124	$3,516	$4,733
Tuition paid to all postsecondary institutions in the first year of episode	$1,670	$5,332	$6,518	$3,516	$5,071
Social cost of student's education in the first year of episode	$9,491	$13,775	$6,700	$12,380	$5,408

Notes: Source is author's calculations based on deidentified tax data and IPEDS data. Students are assigned to an online school category based on the "primary institution" at which he is enrolled at the beginning of his enrollment episode. The primary institution is that at which he is enrolled at least half-time. If this categorization is ambiguous, he is assigned based on the school to which the highest tuition was paid. This same note applies to the remaining tables.

Table 3
Enrollment Based on 1098Ts versus Enrollment Reported to U.S. Department of Education
Online Schools by Type (Each School Given Equal Weight)

Each cell shows percent of schools within that type (column) that exhibit difference in enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	5.6	1.1	4.2	2.6	4.9	3.0
1098T enroll 40-50% lower than IPEDS	4.2	0.9	0.7	0.0	2.9	1.4
1098T enroll 30-40% lower than IPEDS	2.8	1.7	2.8	5.3	0.0	2.1
1098T enroll 20-30% lower than IPEDS	1.4	2.5	7.6	7.9	3.9	4.1
1098T enroll 10-20% lower than IPEDS	9.8	3.8	8.0	13.2	2.0	5.9
1098T enroll 0-10% lower than IPEDS	9.1	18.6	11.4	13.2	19.6	15.2
1098T enroll 0-10% greater than IPEDS	15.4	21.8	15.2	10.5	16.7	18.2
1098T enroll 10-20% greater than IPEDS	12.6	17.3	7.3	5.3	8.8	12.6
1098T enroll 20-30% greater than IPEDS	10.5	7.6	5.5	2.6	2.9	6.8
1098T enroll 30-40% greater than IPEDS	2.1	1.7	3.5	0.0	0.0	2.0
1098T enroll 40-50% greater than IPEDS	4.2	0.6	2.1	2.6	0.0	1.5
1098T enroll 50+% greater than IPEDS	7.0	4.9	3.1	10.5	7.8	5.2
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	15.4	17.6	28.7	26.3	30.4	21.9
	100.0	100.0	100.0	100.0	100.0	100.0

Table 4
Enrollment Based on 1098Ts versus Enrollment Reported to U.S. Department of Education
Online Schools by Type (Each School Weighted by Its Total Enrollment)

Each cell shows percent of schools within that type (column) that exhibit difference in enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	1.9	0.1	1.7	0.1	3.1	1.7
1098T enroll 40-50% lower than IPEDS	3.8	2.0	0.0	0.0	3.6	1.2
1098T enroll 30-40% lower than IPEDS	3.6	0.2	13.9	0.8	0.0	8.0
1098T enroll 20-30% lower than IPEDS	3.0	1.8	12.2	0.1	0.2	7.3
1098T enroll 10-20% lower than IPEDS	17.2	5.6	0.7	0.6	0.0	2.3
1098T enroll 0-10% lower than IPEDS	13.6	24.4	15.7	36.1	14.6	17.6
1098T enroll 0-10% greater than IPEDS	15.6	20.8	19.7	15.5	30.4	21.5
1098T enroll 10-20% greater than IPEDS	14.0	16.6	2.7	1.4	18.3	8.5
1098T enroll 20-30% greater than IPEDS	8.9	11.3	15.6	0.8	3.3	11.8
1098T enroll 30-40% greater than IPEDS	0.8	9.5	13.1	0.0	0.0	9.0
1098T enroll 40-50% greater than IPEDS	1.6	0.1	0.6	0.0	0.0	0.4
1098T enroll 50+% greater than IPEDS	6.9	1.8	1.6	0.8	3.8	2.3
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	9.3	6.0	2.5	44.0	22.7	8.5
	100.0	100.0	100.0	100.0	100.0	100.0

Table 5
Undergraduate Enrollment Based on 1098Ts versus Undergraduate Enrollment Reported to ED
Online Schools by Type (Each School Given Equal Weight)

Each cell shows percent of schools within that type (column) that exhibit difference in undergraduate enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	6.4	2.1	5.4	3.3	8.4	4.4
1098T enroll 40-50% lower than IPEDS	3.6	1.3	0.4	0.0	1.1	1.3
1098T enroll 30-40% lower than IPEDS	2.9	1.0	2.5	0.0	0.0	1.6
1098T enroll 20-30% lower than IPEDS	1.4	0.8	9.1	10.0	2.1	3.8
1098T enroll 10-20% lower than IPEDS	8.6	6.3	6.5	10.0	2.1	6.4
1098T enroll 0-10% lower than IPEDS	9.3	14.6	9.8	23.3	13.7	12.6
1098T enroll 0-10% greater than IPEDS	12.9	21.2	15.6	16.7	12.6	17.2
1098T enroll 10-20% greater than IPEDS	14.3	14.6	6.9	0.0	14.7	11.8
1098T enroll 20-30% greater than IPEDS	12.9	10.7	4.0	0.0	2.1	7.8
1098T enroll 30-40% greater than IPEDS	2.9	5.7	5.1	0.0	1.1	4.4
1098T enroll 40-50% greater than IPEDS	3.6	2.1	1.5	0.0	1.1	2.0
1098T enroll 50+% greater than IPEDS	7.9	4.4	5.1	13.3	8.4	5.8
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	13.6	15.1	28.3	23.3	32.6	20.9
	100.0	100.0	100.0	100.0	100.0	100.0

Table 6
Undergraduate Enrollment Based on 1098Ts versus Undergraduate Enrollment Reported to ED
Online Schools by Type (Each School Weighted by Its Total Enrollment)

Each cell shows percent of schools within that type (column) that exhibit difference in undergraduate enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	1.9	1.4	2.0	0.1	6.8	2.7
1098T enroll 40-50% lower than IPEDS	3.8	2.1	0.0	0.0	0.0	0.6
1098T enroll 30-40% lower than IPEDS	3.6	2.3	0.5	0.0	0.0	0.8
1098T enroll 20-30% lower than IPEDS	3.0	0.0	35.8	0.1	0.2	20.0
1098T enroll 10-20% lower than IPEDS	12.9	9.0	0.6	0.1	0.0	2.6
1098T enroll 0-10% lower than IPEDS	13.6	17.6	13.5	37.9	12.6	14.9
1098T enroll 0-10% greater than IPEDS	11.9	16.8	20.4	16.1	11.9	17.6
1098T enroll 10-20% greater than IPEDS	18.3	13.6	2.6	0.0	33.4	11.0
1098T enroll 20-30% greater than IPEDS	11.6	11.5	2.3	0.0	4.5	4.7
1098T enroll 30-40% greater than IPEDS	1.7	8.7	4.9	0.0	0.6	4.4
1098T enroll 40-50% greater than IPEDS	1.3	5.6	10.6	0.0	0.8	7.0
1098T enroll 50+% greater than IPEDS	7.1	6.6	4.7	0.8	6.3	5.3
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	9.2	4.8	2.3	45.0	22.9	8.4
	100.0	100.0	100.0	100.0	100.0	100.0

Table 7
Graduate Enrollment Based on 1098Ts versus Graduate Enrollment Reported to ED
Online Schools by Type (Each School Given Equal Weight)

Each cell shows percent of schools within that type (column) that exhibit difference in graduate enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	0.0	5.1	8.9	5.9	4.1	5.3
1098T enroll 40-50% lower than IPEDS	0.0	1.3	1.0	5.9	2.7	1.6
1098T enroll 30-40% lower than IPEDS	7.1	1.1	1.0	2.9	0.0	1.4
1098T enroll 20-30% lower than IPEDS	2.4	4.3	4.0	0.0	1.4	3.5
1098T enroll 10-20% lower than IPEDS	2.4	6.7	5.0	5.9	5.4	5.9
1098T enroll 0-10% lower than IPEDS	21.4	22.7	18.8	23.5	23.0	22.0
1098T enroll 0-10% greater than IPEDS	26.2	20.3	17.8	2.9	17.6	19.0
1098T enroll 10-20% greater than IPEDS	4.8	12.5	11.9	5.9	4.1	10.5
1098T enroll 20-30% greater than IPEDS	0.0	4.3	6.9	2.9	0.0	3.8
1098T enroll 30-40% greater than IPEDS	0.0	0.8	0.0	2.9	0.0	0.6
1098T enroll 40-50% greater than IPEDS	0.0	0.0	0.0	0.0	0.0	0.0
1098T enroll 50+% greater than IPEDS	9.5	3.5	2.0	11.8	6.8	4.5
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	26.2	17.6	22.8	29.4	35.1	21.7
	100.0	100.0	100.0	100.0	100.0	100.0

Table 8
Graduate Enrollment Based on 1098Ts versus Graduate Enrollment Reported to ED
Online Schools by Type (Each School Weighted by Its Total Enrollment)

Each cell shows percent of schools within that type (column) that exhibit difference in graduate enrollment that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T enroll 50+% lower than IPEDS	0.0	4.0	0.6	0.1	2.5	1.5
1098T enroll 40-50% lower than IPEDS	0.0	0.1	0.0	0.1	0.8	0.2
1098T enroll 30-40% lower than IPEDS	20.1	0.3	0.1	0.8	0.0	0.6
1098T enroll 20-30% lower than IPEDS	7.0	3.1	0.5	0.0	0.0	1.0
1098T enroll 10-20% lower than IPEDS	2.3	7.0	1.3	0.5	5.0	3.0
1098T enroll 0-10% lower than IPEDS	23.1	40.7	34.8	49.9	27.7	34.7
1098T enroll 0-10% greater than IPEDS	26.8	18.8	38.6	1.7	33.1	32.5
1098T enroll 10-20% greater than IPEDS	2.2	17.4	18.7	1.4	3.6	14.5
1098T enroll 20-30% greater than IPEDS	0.0	1.7	3.5	0.8	0.0	2.3
1098T enroll 30-40% greater than IPEDS	0.0	0.1	0.0	0.0	0.0	0.0
1098T enroll 40-50% greater than IPEDS	0.0	0.0	0.0	0.0	0.0	0.0
1098T enroll 50+% greater than IPEDS	9.3	1.9	1.5	0.8	3.6	2.1
IPEDS enroll>0 but no 1098T enroll even though EIN-IPEDSid linked	9.4	4.9	0.4	44.0	23.7	7.4
	100.0	100.0	100.0	100.0	100.0	100.0

Table 9
Tuition Based on 1098Ts versus Tuition Reported to U.S. Dept of Education
Online Schools by Type (Each School Given Equal Weight)

Each cell shows percent of schools within that type (column) that exhibit difference in tuition paid that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T tuit paid 50+% lower than IPEDS	9.1	3.5	3.9	10.0	5.3	4.7
1098T tuit paid 40-50% lower than IPEDS	1.4	2.4	1.8	3.3	0.0	1.9
1098T tuit paid 30-40% lower than IPEDS	2.1	2.2	1.8	13.3	2.1	2.4
1098T tuit paid 20-30% lower than IPEDS	5.6	3.5	3.2	6.7	2.1	3.6
1098T tuit paid 10-20% lower than IPEDS	18.2	9.1	7.3	3.3	5.3	9.4
1098T tuit paid 0-10% lower than IPEDS	30.1	35.9	17.8	10.0	17.0	27.5
1098T tuit paid 0-10% greater than IPEDS	11.9	16.9	16.1	26.7	12.8	15.9
1098T tuit paid 10-20% greater than IPEDS	1.4	4.3	5.6	0.0	6.4	4.3
1098T tuit paid 20-30% greater than IPEDS	0.7	3.0	3.9	0.0	2.1	2.8
1098T tuit paid 30-40% greater than IPEDS	0.7	0.9	0.7	0.0	2.1	0.9
1098T tuit paid 40-50% greater than IPEDS	0.7	0.7	1.8	0.0	0.0	0.9
1098T tuit paid 50+% greater than IPEDS	2.8	1.3	7.0	0.0	13.8	4.2
IPEDS tuit paid>0 but no 1098T tuit paid even though EIN-IPEDSid linked	15.4	16.6	29.4	26.7	30.9	21.7
	100.0	100.0	100.0	100.0	100.0	100.0

Table 10
Tuition Based on 1098Ts versus Tuition Reported to U.S. Dept of Education
Online Schools by Type (Each School Weighted by Its Total Enrollment)

Each cell shows percent of schools within that type (column) that exhibit difference in tuition paid that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T tuit paid 50+% lower than IPEDS	5.0	0.3	1.7	0.1	3.1	1.8
1098T tuit paid 40-50% lower than IPEDS	0.0	1.2	0.0	0.0	0.0	0.2
1098T tuit paid 30-40% lower than IPEDS	3.8	2.5	12.0	0.8	3.6	8.1
1098T tuit paid 20-30% lower than IPEDS	12.0	3.2	0.6	1.1	0.1	1.6
1098T tuit paid 10-20% lower than IPEDS	19.3	14.3	6.9	0.1	0.6	7.4
1098T tuit paid 0-10% lower than IPEDS	29.9	43.0	19.7	4.4	34.4	26.4
1098T tuit paid 0-10% greater than IPEDS	14.8	26.5	14.8	49.9	19.2	18.8
1098T tuit paid 10-20% greater than IPEDS	0.0	3.3	0.9	0.0	10.4	3.0
1098T tuit paid 20-30% greater than IPEDS	1.7	0.6	33.3	0.0	0.1	18.9
1098T tuit paid 30-40% greater than IPEDS	1.0	0.2	0.3	0.0	0.7	0.4
1098T tuit paid 40-50% greater than IPEDS	0.0	0.3	0.2	0.0	0.0	0.1
1098T tuit paid 50+% greater than IPEDS	3.1	0.2	7.0	0.0	4.9	5.0
IPEDS tuit paid>0 but no 1098T tuit paid even though EIN-IPEDSid linked	9.3	4.4	2.5	43.8	22.9	8.3
	100.0	100.0	100.0	100.0	100.0	100.0

Table 11
Scholarships/Grants Based on 1098Ts versus Scholarships/Grants Reported to ED
Online Schools by Type (Each School Given Equal Weight)

Each cell shows percent of schools within that type (column) that exhibit difference in scholarships and grants that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T schlshps 50+% lower than IPEDS	0.0	5.1	8.9	5.9	4.1	5.3
1098T schlshps 40-50% lower than IPEDS	0.0	1.3	1.0	5.9	2.7	1.6
1098T schlshps 30-40% lower than IPEDS	7.1	1.1	1.0	2.9	0.0	1.4
1098T schlshps 20-30% lower than IPEDS	2.4	4.3	4.0	0.0	1.4	3.5
1098T schlshps 10-20% lower than IPEDS	2.4	6.7	5.0	5.9	5.4	5.9
1098T schlshps 0-10% lower than IPEDS	21.4	22.7	18.8	23.5	23.0	22.0
1098T schlshps 0-10% greater than IPEDS	26.2	20.3	17.8	2.9	17.6	19.0
1098T schlshps 10-20% greater than IPEDS	4.8	12.5	11.9	5.9	4.1	10.5
1098T schlshps 20-30% greater than IPEDS	0.0	4.3	6.9	2.9	0.0	3.8
1098T schlshps 30-40% greater than IPEDS	0.0	0.8	0.0	2.9	0.0	0.6
1098T schlshps 40-50% greater than IPEDS	0.0	0.0	0.0	0.0	0.0	0.0
1098T schlshps 50+% greater than IPEDS	9.5	3.5	2.0	11.8	6.8	4.5
IPEDS schlshps>0 but no 1098T schlshps even though EIN-IPEDSid linked	26.2	17.6	22.8	29.4	35.1	21.7
	100.0	100.0	100.0	100.0	100.0	100.0

Table 12
Scholarships/Grants Based on 1098Ts versus Scholarships/Grants Reported to ED
Online Schools by Type (Each School Weighted by Its Total Enrollment)

Each cell shows percent of schools within that type (column) that exhibit difference in scholarships and grants that is described in the row	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
1098T schlshps 50+% lower than IPEDS	0.0	4.0	0.6	0.1	2.5	1.5
1098T schlshps 40-50% lower than IPEDS	0.0	0.1	0.0	0.1	0.8	0.2
1098T schlshps 30-40% lower than IPEDS	20.1	0.3	0.1	0.8	0.0	0.6
1098T schlshps 20-30% lower than IPEDS	7.0	3.1	0.5	0.0	0.0	1.0
1098T schlshps 10-20% lower than IPEDS	2.3	7.0	1.3	0.5	5.0	3.0
1098T schlshps 0-10% lower than IPEDS	23.1	40.7	34.8	49.9	27.7	34.7
1098T schlshps 0-10% greater than IPEDS	26.8	18.8	38.6	1.7	33.1	32.5
1098T schlshps 10-20% greater than IPEDS	2.2	17.4	18.7	1.4	3.6	14.5
1098T schlshps 20-30% greater than IPEDS	0.0	1.7	3.5	0.8	0.0	2.3
1098T schlshps 30-40% greater than IPEDS	0.0	0.1	0.0	0.0	0.0	0.0
1098T schlshps 40-50% greater than IPEDS	0.0	0.0	0.0	0.0	0.0	0.0
1098T schlshps 50+% greater than IPEDS	9.3	1.9	1.5	0.8	3.6	2.1
IPEDS schlshps>0 but no 1098T schlshps even though EIN-IPEDSid linked	9.4	4.9	0.4	44.0	23.7	7.4
	100.0	100.0	100.0	100.0	100.0	100.0

Table 13
Conformity between Credit Hours Based on 1098Ts and Credit Hours Based on Reports to ED
Online Schools by Type

Share of Schools whose IPEDS-based Credit Hours are Greater than 1098T-based Minimum and Less than 1098T-based Maximum	Each School Given Equal Weight	Each School Weighted by Its Total Enrollment
Public Mainly Online	0.30	0.26
Non-Profit Mainly Online	0.46	0.26
For-Profit Mainly Online	0.37	0.14
Non-Profit & Public Exclusively Online	0.63	0.13
For-Profit Exclusively Online	0.53	0.51
All Schools	0.43	0.24

Table 14
1098T-Based Eligibility for Versus Take-up of the Refundable AOTC

	Online Schools by Type					
	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
Number filers with 1+ students eligible (generous std) for refundable AOTC per yr	37,481	170,423	701,359	38,274	131,371	1,078,907
Number filers with 1+ students eligible (strict std) for refundable AOTC per yr	34,822	155,201	658,917	34,575	122,875	1,006,389
Avg refundable AOTC credit for which filer was eligible (generous std, no zeros)	$612	$796	$844	$724	$741	$811
Avg refundable AOTC credit for which filer was eligible (strict std, no zeros)	$604	$793	$845	$716	$735	$811
Number filers who took refundable AOTC for 1+ students per year	45,166	171,502	494,445	40,621	102,559	854,292
Avg refundable AOTC credit among filers who took it (no zeros)	$837	$975	$994	$932	$955	$974

Notes: Author's calculations based on de-identified tax data. Filers who have more than one student eligible or taking up the refundable AOTC are allocated to a category of online schools based on the school to which they paid the highest qualified tuition.

Table 15
1098T-Based Eligibility for vs. Take-up of the Nonrefundable AOTC & LLC Online Schools by Type
("generous" and "strict" always refer to standards for *AOTC* eligibility)

	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
Number filers with 1+ students eligible (generous) for nonrefundable AOTC per yr	26,966	122,706	475,175	28,618	91,353	744,816
Number filers with 1+ students eligible (strict) for nonrefundable AOTC per yr	24,849	110,461	441,279	25,723	84,604	686,916
Avg nonrefundable AOTC credit for which filer was eligible (generous, no zeros)	$800	$1,009	$995	$1,045	$916	$982
Avg nonrefundable AOTC credit for which filer was eligible (strict, no zeros)	$787	$1,001	$990	$1,041	$902	$976
Number filers with 1+ students eligible (generous) for LLC per yr	20,394	108,775	151,094	19,356	90,656	390,274
Number filers with 1+ students eligible (strict) for LLC per yr	22,055	118,176	176,565	21,647	95,542	433,985
Avg LLC credit for which filer was eligible (generous, no zeros)	$352	$808	$1,065	$863	$1,037	$939
Avg LLC credit for which filer was eligible (strict, no zeros)	$367	$814	$1,053	$856	$1,030	$938
Number filers with 1+ students eligible (generous) for some nonrefundable credit per yr	61,133	263,997	652,881	56,588	186,728	1,221,326
Number filers with 1+ students eligible (strict) for some nonrefundable credit per yr	60,649	260,991	644,318	55,727	184,854	1,206,539
Avg nonrefundable credit for which filer was eligible (generous, no zeros)	$769	$1,037	$1,037	$1,031	$989	$1,016
Avg nonrefundable credit for which filer was eligible (strict, no zeros)	$757	$1,029	$1,034	$1,016	$984	$1,010
Number filers who took some nonrefundable credit per year	50,547	210,021	460,628	49,944	134,697	905,836
Avg nonrefundable credit among filers who took it (no zeros)	$970	$1,190	$1,194	$1,205	$1,169	$1,177

Notes: Author's calculations based on de-identified tax data. Filers with more than one student eligible or taking up the credits are allocated to a category based on the school to which they paid the highest qualified tuition.

Table 16
1098T-Based Eligibility for Versus Take-up of the DTF

| | Online Schools by Type | | | | | |
	Public Mainly Online	Non-Profit Mainly Online	For-Profit Mainly Online	Non-Profit & Public Exclusively Online	For-Profit Exclusively Online	All Schools
Number filers with 1+ students eligible for DTF (generous AOTC std)	13,744	72,024	86,958	13,233	56,915	242,873
Number filers with 1+ students eligible for DTF (strict AOTC std)	14,750	77,869	103,427	14,969	60,377	271,391
Avg *value* of the DTF (reduction in taxes) for which filer was eligible (generous AOTC std, no zeros)	$220	$381	$426	$468	$457	$411
Avg *value* of the DTF (reduction in taxes) for which filer was eligible (strict AOTC std, no zeros)	$229	$384	$423	$464	$455	$410
Avg *deduction* for which filer was eligible (generous AOTC std, no zeros)	$1,302	$2,280	$2,784	$2,847	$2,712	$2,537
Avg *deduction* for which filer was eligible (strict AOTC std, no zeros)	$1,373	$2,324	$2,805	$2,850	$2,716	$2,572
Number filers who took DTF for 1+ students per year	9,896	47,724	68,646	10,411	38,913	175,589
Avg *deduction* among filers who took it (no zeros)	$1,715	$2,476	$2,853	$2,780	$2,729	$2,655

Notes: Author's calculations based on de-identified tax data. Filers who have more than one student eligible or taking up the DTF are allocated to a school category based on the school to which they paid the highest qualified tuition.