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THE EFFECT OF COLLEGE FINANCIAL AID RULES ON THE ALLOCATION OF SAVINGS

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Abstract

The college financial aid system imposes an implicit asset tax that is prevalent and substantial. Facing this tax, rational families should reduce their total assets and shelter assets in protected categories. I find that the tax induces a 7% reduction in total assets, a result in line with the literature. Furthermore, I find evidence that families reallocate assets into sheltered retirement accounts. The paper provides further evidence that the financial aid tax reduces asset accumulation and prompts a reconsideration of the simple "higher tax, lower assets" story. It provides the first evidence that families may be engaging in a rational reallocation of their asset portfolio.

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I. Introduction

Families save for many reasons, but there are two reasons that stand out above all others: higher education and retirement. The lifecycle model of savings describes how optimizing individuals will plan their work and savings throughout their life to smooth consumption and prepare for retirement. The traditional model pays no particular attention to college costs. In reality, many families may perceive retirement and college as the two main reasons to save. In addition, there are important ways in which policy may alter savings incentives: families may save less for retirement or for college if they expect other funds to be available to them for those purposes (e.g. Social Security or financial aid). It is not surprising that by providing families with substitutes for saving, policy may reduce their optimal saving. However, there is an additional important factor relating to financial aid for college: because the financial aid system assesses need based on income and assets, it creates a perverse incentive to not save for college, and in fact to resist accumulating assets. By keeping assets low, families can "look poor" and thereby qualify for more college financial aid. Furthermore, since retirement assets are sheltered from the financial aid tax, families may have an incentive to increase their retirement savings.

Thus, by awarding more aid to those with lower assets, the financial aid system creates an implicit financial aid tax on assets. For a family with two children spaced two years apart, the implicit financial aid tax could be as high 29% of assets. This tax could certainly present a substantial deterrent to saving or incentive to reallocate assets. This paper investigates whether the tax affects asset accumulation and allocation in a manner consistent with rational optimizing behavior on the part of families.

The literature on the actual impact of these taxes on asset accumulation is mixed: some

papers find large reductions in assets, others find only small or insignificant reductions.[1] This paper contributes to this literature with several innovations. First, I calculate the financial aid tax carefully, including all of the features of the Federal Methodology as well as detailed family-specific information about permanent income (available from the panel data), tax credits, tuition expectations, and the value of aid. As part of this, I am able to test the sensitivity of the results to alternate assumptions in this calculation. Second, I propose and test a more detailed rational behavior model of a family's optimization of their asset bundle. The financial aid tax does not affect all asset categories equally, and I make and test predictions about the allocation of assets into specific protected and non-protected assets. Retirement savings are not subject to the financial aid tax, so a rational family with full information should shift into retirement savings to the extent possible. Third, I propose and test for rational behavior from another perspective, by incorporating a family's expectations of college attendance, costs, and aid. Families with greater or more certain knowledge and expectations of college attendance, college costs, and financial aid should be more likely to respond to the financial aid tax. Those families may also be more likely to save for college (before families worry about losing financial aid they probably worry about saving for college), and the model takes that effect into account as well.[2]

The paper finds evidence, consistent with the literature, that families reduce their assets substantially in response to the financial aid tax on assets. A typical family with two young children saves about 7% less than they would in the absence of the financial aid tax. Investigation of rational behavior produces mixed results. Asset allocation suggests rational

[1] Feldstein (1995) and Kim (1999) find significant effects of this tax on asset accumulation: they estimate close to a 50% reduction in assets due to this levy. Dick, Edlin, and Emch (2003) employ a more detailed simulation model and find a significant, but smaller effect of a 29% reduction in assets for those who attend college with certainty. Lastly, Long (2004), Kane (1998), and Monks (2004) find smaller and less robust effects and detail a number of reasons why the effect should theoretically be weaker.

[2] Many of the factors that make families fear losing aid are also factors that make them save for college in the first place. While much of the literature does not explicitly account for such effects, the model herein does so.

behavior: families appear to be reducing assets in categories subject to the financial aid tax, and there is some indication of sheltering assets in protected retirement accounts. This suggests that the financial aid system may serve to ameliorate rather than exacerbate the problem of sub-optimal retirement savings for some families. A more detailed behavioral model does not, however, yield clear results that a family's knowledge and expectations of college attendance, cost, and aid mediate the effect of the tax on assets.[3]

The paper proceeds as follows. Section II discusses the financial aid system and the implicit asset taxes. Section III develops the theory of how the aid tax should affect asset allocation, and summarizes the literature on this issue. Section IV outlines the data, Section V shows the calculated tax rates, and Section VI shows results for the effect of the tax on the asset accumulation and allocation. Section VII discusses the significance of results, outlines avenues for further research, and concludes.

II. The Financial Aid System and Implicit Tax Rates

The U.S. financial aid system began with the Higher Education Act of 1965 and has experienced several important modifications in the intervening years. Federal funds, including both grants and loans, are distributed according to the Federal Methodology (FM). A family's ability to pay is primarily determined by their income and assets (home equity and retirement assets are excluded). Families file a Free Application for Federal Student Aid (FAFSA) form to apply for aid and determine their eligibility. Institutional funds can be distributed according institution-specific rules (Institutional Methodology or IM), which can differ substantially across institutions. The primary difference between the FM and the IM is that FM excludes both home

[3] This absence of significance may be the result of using insufficiently detailed measures for knowledge and expectations, a deficiency which will be addressed in further work.

equity and retirement assets when calculating assets, whereas IM usually includes home equity (while still excluding retirement assets.)

Thus, the financial aid system uses a complex set of rules to decide how much a family with certain income and assets can be expected to pay for college, given their financial circumstances. Once the expected family contribution (EFC) is determined, financial aid is awarded to cover the gap between the family contribution and the required tuition. Financial aid thereby, in theory, enables families to send their children to any college or university they want.

Because a family's ability to pay (reflected in their EFC) is a function of their income and assets, higher income or higher assets mean the family is expected to pay more (and aid will contribute less). So, any extra dollar of income or assets could result in less financial aid being awarded. This is the essence of the "financial aid tax" on assets: if a family saves more, they receive less financial aid.[4]

The FM proceeds as follows.[5] First, the family's *Available Income* is calculated as taxable income minus allowances for taxes, income necessary to support the family, and other minor deductions.[6] Second, the family's *Available Assets* are calculated as twelve percent of assets above a certain asset protection allowance. The family's *Adjusted Available Income* (AAI) is equal to the *Available Income* plus the *Available Assets*. Third, the expected family contribution (EFC) is calculated as an increasing function of AAI with a progressive structure, reaching a high of a 47% marginal contribution rate on AAI above $30,000.[7] Financial aid is then set to cover the gap between the EFC and the family's expected college costs.

[4] Another aspect of the implicit financial aid tax deserves mention. Families could also look poor by reducing their income during the college years. We generally assume that families will not do this. We assume the elasticity of income with respect to the aid tax to be negligible, and do not concern ourselves with a financial aid tax on income.
[5] The financial aid calculation is described in detail in Appendix A.
[6] This income protection allowance depends on the size of the family and the number of students enrolled. It varies from $10,950 to $40,730.
[7] EFC actually includes a student contribution in addition to the parental contribution, but I assume the student contribution is negligible.

The implicit financial aid tax results when a dollar of assets displaces some financial aid. Consequently, the maximum financial aid tax on assets in a single year of college attendance is 5.6% per year (12% of assets into AAI times 47% of AAI into EFC). This single-year tax needs to be compounded over the number of years college attendance to arrive at the total tax. For a family with two children spaced two years apart, the maximum tax is 29%. As discussed above, very low and very high income families will have no aid at risk of displacement and therefore have marginal tax rates of zero. In addition, families with income below $50,000 and no substantial assets (determined by their eligibility to file a 1040-A or 1040-EZ tax return) are not expected to make any contribution out of assets. This is called the *Simplified Needs Test*, and families that pass it will face a zero tax.

III. Theory: Effects of College Costs and Aid on Asset Accumulation and Allocation

We might reasonably expect that families may alter their assets in response to the implicit financial aid tax on assets. We therefore investigate the effect of the tax on asset accumulation. The financial aid tax on assets affects a family's lifecycle savings and optimal asset allocation. Specifically, the financial aid tax reduces the return to saving for assets that will either be consumed during college or after college, perhaps in retirement. Any assets the family has just prior to or during college will create a financial liability (in terms of lost financial aid). The tax therefore reduces the incentive to save for college or beyond.

The structure and effect of the aid tax is more complex, however. There is an asset protection allowance (refer to Appendix A) which is increasing in parental age and protects $44,000 of assets for a two-parent family with a 50-year-old elder parent. Only assets in excess of this asset protection allowance are subject to the tax, and we might expect to see families'

assets bunch up just below the asset protection allowance. In addition, the tax is structured in such a way as to induce specific *reallocations* of assets. Not all types of assets are taxed: some assets are not included on the FAFSA or PROFILE forms, and so do not affect aid awards and consequently do not entail a liability. In particular, retirement assets are sheltered from the financial aid tax, both in the Federal Methodology (FAFSA) and the Institutional Methodology (PROFILE). Home equity is sheltered from the financial aid tax under the Federal Methodology, but is taxed in the Institutional Methodology. A rational family would shift assets into protected forms of savings, particularly retirement assets since they are protected to the greatest degree. To the extent that the available protected assets substitute for non-protected assets, the financial aid tax would merely induce a reallocation of the family's portfolio rather than a change in its total value. To the extent that such substitution is costly or unavailable, the family would reduce its assets across the board, with possibly larger reductions in the taxed assets. Thus, beyond a simple prediction of reduced assets, we have the following predictions: 1) assets may cluster below the asset protection allowance; 2) assets may be shifted into protected assets; 3) total assets may be reduced, both unprotected and protected.

There is additional behavioral complexity that results from the heterogeneity of families' situations. While the central prediction is simple – an optimizing family will respond to the increased tax on assets by reducing their assets or reallocating their portfolio – this is a simplified characterization of the behavior of diverse individual families. Different families have different budget constraints, utility functions, and knowledge, and consequently will likely respond differently to this change in their intertemporal budget constraint and the relative returns to various asset categories.

In particular, some families may not care about the financial aid tax for a number of sound reasons – they may not expect their children to go to college, they may not expect college to be expensive, or they may not know about the financial aid tax. Such families may show little or no response to the tax. On the other hand, families who have more at stake and know it – those with higher or more certain expectations of college attendance, with higher expectations of college costs, or with better knowledge of the financial aid system – may have a larger behavioral response to the tax. Thus, we have predictions that the following families will respond more to the tax: 1) families who think college attendance is more likely; 2) families who think college will be more expensive; 3) families who know more about college finance and therefore are more aware of the tax.

Thus, the primary innovation of this paper is to test a structural model of the family's response to the financial aid tax. I ask the following two-part question: are families reducing their assets in response to this tax, and if so are they doing so in a rational manner? The existing literature addresses primarily the first question, and provides mixed results. Feldstein (1995) and Kim (1999) find significant effects of the financial aid tax on asset accumulation: they estimate close to a 50% reduction in assets due to this levy. Dick, Edlin, and Emch (2003) employ a more detailed information model and find a significant but smaller effect of a 29% reduction in assets for those who attend college with certainty. Lastly, Long (2004), Kane (1998), and Monks (2004) find smaller and less robust effects and detail a number of reasons why the effect should theoretically be weaker. By asking the second question about rational behavior and using substantially more detail about assets and family situation to study family savings behavior, the current paper aims to reconcile some of the disparate results from the literature.

IV. Data

The primary data is the Panel Study of Income Dynamics (PSID) for the years 1999, 2001, and 2003. Four main components of the PSID – the Family Files, the Individual Files, the Income Plus Supplement and the Wealth Supplement – were combined to produce complete cross-year files for each family. From the approximately 4,000 families with children in the PSID, I selected a sub-sample of approximately 1,100 families. The sample includes families with less than five children, taxable income less than $300,000, parents between ages 35 and 55, and no children of college age.[8]

One advantage of the PSID is that the panel nature of the data allows one to follow families over time. A second and more important advantage is the availability of detailed income and wealth data for these years. The wealth supplement contains extremely detailed wealth information for the years 1999, 2001 and 2003, including separate values for checking and savings accounts, stocks and mutual funds, home equity, retirement accounts, debts, real estate, and businesses. This level of detail permits examination of specific asset categories and asset allocation, including separate investigation of taxable and non-taxable assets. The presence of a variable for the value of any IRA or similar retirement accounts is particularly important for investigating sheltering of assets in asset categories protected from the tax. A summary of the data is shown in Table 1.

The PSID has been supplemented with data from several other sources. The Integrated Public Use Microdata Sample of the 2000 U.S. Census was used to calculate the college attendance of peers (by race and state) and the share of the population that is stable (has not migrated in the last 5 years, by state). The National Center for Education Statistics provides data

[8] Because the PSID includes only the age of the youngest child, not the ages of all children, the selection of families with no children of college age is based on the assumption of 2-year spacing of children.

on college costs (tuition and fees) as well as the number of college students going to different types of institutions of higher education. The National Education Longitudinal Study (NELS) data was used to calculate the composition of aid between grants and loans.

V. Results: The Financial Aid Tax

As discussed above, the implicit financial aid tax on assets varies significantly across families: very low and very high income families will have marginal tax rates of zero, whereas middle income families can face taxes as high as 30%. Using the PSID sample, Table 2a shows the share of families in different income and asset categories who face a non-zero marginal tax. Table 2b shows the average marginal tax rate for those who do face a non-zero marginal tax. As expected, families with income below $25,000 are very unlikely to face a tax, and those with income above $150,000 never face a tax. On the other hand, 90% of families with income between $25,000 and $100,000 face a tax that averages around 13 to 14% of assets, and families with incomes between $100,000 and $150,000 face a tax about half of the time and it averages around 7%.

I calculate the tax using the most detailed information available on asset protection allowances, state tax allowances, federal tax allowances, state-specific tuition measures, the share of aid in grants or loans, and the value of loans. While the calculation of the financial aid tax is largely formulaic, there are a number of assumptions that may alter the calculated tax. Financial aid consists of grants and loans, so the value of the aid award must be calculated as the dollar amount of grants plus the net present value of the loans: I use standard assumptions of the composition of loans and the various subsidies to calculate that a loan of $1.00 is equivalent to a grant of $0.60. The share of aid that is given in grants vs. loans is assigned from NELS data

based on income and college cost categories. A separate issue arises because not all demonstrated financial need is met, and this "gapping" means that assets that increase a family's EFC by a dollar may not reduce their aid by a full dollar: it may simply be one less dollar gapped. Because the extent of gapping is difficult to measure, I assume there is no gapping.[9] I assume two-year spacing of children (the PSID only provides the age of the youngest child, not the age of each child); one could assume three-year spacing, but it does not affect the tax rate in any substantial way.[10]

There are also important assumptions regarding the income and assets used to calculate the tax. Rather than simple annual income, I use a three-year average of annual income. This is an attempt to better measure a family's permanent lifetime income. I also use predicted assets (assets predicted by a quadratic in income, parental race, and a dummy for whether a parent graduated college) rather than actual assets. Because assets will be the independent variable in the primary regression, predicted assets are used to reduce any possible endogeneity of the tax rate. These two changes – using permanent income and predicted assets – do make a significant difference in the tax rate: the correlation with the basic tax rate is only 0.65.

There is also a question as to whether to include the Simplified Needs test.[11] This could potentially be important, though it is unclear if families are aware of this test. The correlation between a tax rate that uses permanent income and predicted assets and a tax rate that also includes the Simplified Needs test is 0.77. One last factor is the choice of the college cost measure: I use a weighted average of costs at public and private universities in that state, where

[9] This should not be too important, given that a family that has a high probability that their children will attend expensive colleges will likely face close to the full tax.
[10] The correlation between the two alternate tax rates, using two-year or three-year spacing, is 0.99.
[11] Families with income below $50,000 and no substantial assets (determined by their eligibility to file a 1040-A or 1040-EZ tax return) are not expected to make any contribution out of assets. This is called the Simplified Needs Test, and families that pass it face a zero tax.

the weights are the probability of attending each type of institution. Alternately, one could create an expected cost that is more specific for a family, or create two separate tax rates for 100% chance of public university and 100% chance of private university. This choice can make an important difference, and I will address its significance in the empirical analysis.

In sum, the tax rate is a complicated function of income and assets that does appear to be sensitive to some of the assumptions made in its calculation. Previous papers in the literature (Case and McPherson (1986), Edlin (1993), Dick and Edlin (1997)) calculate similar tax rates, and also emphasize that assumptions and specifics of the calculation can alter the relevant tax rates substantially (Kane (1998), Long (2004)). While some of the sensitivity results from the various assumptions discussed above, much of the sensitivity results from uncertainty in the likelihood of college attendance or the likelihood of different college costs. In calculating the tax rates, I choose to separate these two issues. I use the best data available to calculate the tax rate the family would face if a child attended college with certainty at a certain expected cost. This is the fundamental tax rate that the family faces. I then add expectations into the analysis primarily *after* calculating the family's fundamental tax rate, in order to see how expectations may alter the response to that fundamental tax rate.

VI. Results: Effects on Asset Accumulation and Allocation

1. Does the financial aid tax reduce assets?

The first question to answer is whether the financial aid tax induces families to reduce their assets. To investigate this question, I first run a basic specification in which assets are regressed on income, age of the parents, number of children in the household, the interaction between the financial aid tax and income, and year dummies:

$$Assets_{it} = \alpha_1 \ income_i + \alpha_2 \ age_{it} + \alpha_3 \ numkids_{it} + \alpha_4 \ mtr \times income_{it} + I_t + \varepsilon_{it} \quad (1)$$

This model is then augmented by including indicator variables for parental race or ethnicity (white, black, Hispanic, Asian, other), the highest degree achieved by the parents (associate's, bachelor's, advanced), and peers' college attendance (of people age 22 to 27 in that state-race cell, share who have graduated college):

$$Assets_{it} = \alpha_1 \ income_i + \alpha_2 \ age_{it} + \alpha_3 \ numkids_{it} + \alpha_4 \ mtr \times income_{it} \quad (2)$$
$$+ \alpha_5 \ ParentRace_i + \alpha_6 \ ParentEducation_{it} + \alpha_7 \ PeerEducation_i + I_t + \varepsilon_{it}$$

The extent to which the marginal tax rate affects the propensity to save out of income is indicated by the coefficient on the interaction between the financial aid tax and income. The financial aid tax is calculated as described above (using predicted assets and permanent income). Income is the average total family income over the three sample years – the averaging is intended to smooth out annual variation and better measure the family's permanent income, which is the income that should matter both for savings and taxes. Assets are measured in several alternate ways: total assets, financial assets, net worth (total assets minus debts), or net financial assets (financial assets minus debt). The specification is run as pooled ordinary least squares for the three sample years 1999, 2001, and 2003. Standard errors are Huber-White robust and clustered on family.

Results using total assets as the dependent variable are shown in Table 3. Column 1 contains results from the most basic specification, and shows no evidence of a significant effect of the financial aid tax on total assets. Inclusion of parents' race and education increase the point estimate to -0.87, which is just significant with a standard error of 0.47. These first results indicate that the financial aid tax has a substantial, though marginally significant, adverse effect on asset accumulation: a typical family with two children and income between $50,000 and

$100,000 would be expected to reduce their assets by approximately $9,000, or 12%. This is in line with some of the literature that finds a significant negative effect of the financial aid tax on assets.

2. Is the behavior rational? Does the pattern of asset reduction make sense?

Given the significant effect of the financial aid tax on assets, I next ask whether this asset reduction results from rational saving behavior on the part of families. That is, if families are reducing their assets in response to the implicit financial aid tax, we would expect them to do so in certain ways. The financial aid tax affects different categories of assets differently, and much of the literature finds substantial sensitivity of results to the choice of the aggregate asset measure. In this section, I first investigate the sensitivity of the results to different aggregate asset measures and then look at effects on specific asset categories.

a. Aggregate asset measures

A family's assets can be measured in several alternate ways: total assets, net worth (total assets minus debt), financial assets (excluding home equity, real estate, businesses, etc), or net financial assets (financial assets minus debt). Each of these provides a slightly different perspective on the family's finances, and may show different response to the financial aid tax. In addition, for the present analysis it is important to look at a measure of all assets that are subject to the financial aid tax. I call this aggregation of assets "taxable assets." Taxable assets include cash and savings, stocks and stock funds, and home equity, but exclude retirement assets, other real estate, and businesses.[12]

Table 4 shows the results of the regression of Equation 2 for six different aggregate asset measures: total assets, net worth, financial assets, net financial assets, taxable assets, and non-

[12] Home equity is included as a taxable asset in the Institutional Methodology, but not in the Federal Methodology. It appears that the IM is likely to be more important on the margin, so I choose to reflect the IM in the measure of taxable assets.

taxable assets. The ordinary least squares results, shown in Column 1, indicate a significant reduction in assets for all of the aggregate asset measures except non-taxable assets. The results also show very little sensitivity to the choice of aggregate asset measure: the coefficient varies insignificantly around 0.9 and is somewhat more precise for financial assets, net financial assets, and taxable assets. Inclusion or exclusion of debt does not seem to be an important factor, although the point estimates are slightly higher when debt is included. In addition, it is notable that there is no significant effect of the financial aid tax on *non*-taxable assets. This result is consistent with rational behavior: families are reducing their assets in response to the tax, but they are not reducing the assets that will not be taxed. I investigate this more below. The significance of the result for net financial assets is consistent with Feldstein, Edlin, and Monks. These results do differ from some of the prior literature, particularly Monks and Long, in finding less sensitivity to varying the asset measure.

The results using a Tobit specification (to correct for possible truncation at zero assets) are shown in Column 2, and provide a slightly different picture. There is still a significant effect of the financial aid tax on total assets, net worth, and taxable assets, although the effect is approximately half as large. These results correspond to a 7% reduction in total assets (approximately $6,000) or an 11% reduction in taxable assets for a typical family. For financial assets and net financial assets, however, the effect estimated by the Tobit specification is substantially smaller and insignificant. It appears that much of the effect on assets is occurring through the effect on home equity (which is included in total assets and net worth, but excluded from both financial assets measures). When home equity is excluded and the model allows for truncation at zero, there is no significant effect of the tax on financial assets.

Overall, these results show that the financial aid tax reduces asset accumulation in the aggregate, that the choice of aggregate asset measure may matter, and that taxable assets may be more responsive than non-taxable assets. The results also suggest that effects on different asset categories may be substantially different.

b. Specific asset categories: composition of the portfolio

To further test for rational behavior, I examine the effect of the financial aid tax on the propensity to save in *specific* individual asset categories. If families are behaving rationally, they should reduce their saving in taxable asset categories and possibly shift savings into non-taxed categories. Their ability and willingness to make such adjustments to their asset bundle will of course be affected by liquidity and risk preferences. Table 5 shows separate regressions for checking/savings, stock funds, home equity, retirement assets, and debt. (Results for total assets are reproduced in row 1 for reference.) Due to the high rate of non-participation in these specific asset categories, OLS would be biased and a Tobit model is used to account for clustering at zero.

The results for specific asset categories provide some insight into the behavioral response to the financial aid tax. Rows 2 and 3 show that there is no significant effect of the financial aid tax on either checking/savings or stocks. The effect of the financial aid tax on assets does not appear to be working through these asset categories. To the contrary, the coefficient for home equity is almost significant (p-value 0.12) and negative: the financial aid tax reduces the probability of having home equity slightly, and reduces the amount of home equity by approximately 5%. Since home equity is untaxed under the Federal Methodology but taxed by the Institutional Methodology, the expected direction of the effect is unclear and the marginally insignificant result is not surprising. Furthermore, there is evidence of sheltering of assets in

retirement assets: the coefficient for retirement assets is positive and significant. This indication that families are in fact increasing their retirement assets in response to the financial aid tax is the most interesting result so far. A typical family would increase their retirement assets by 10-15% in response to the financial aid tax. Together, the results in rows 4 and 5 of Table 5 seem to indicate that families may in fact be behaving rationally: they are slightly reducing assets that may be taxable (primarily home equity) and at the same time shifting their portfolio more into retirement assets that will not be taxed by the financial aid system. It appears that the financial aid system, while reducing asset accumulation in the aggregate, is encouraging greater saving for retirement.

There is another result of interest in row 6, which shows that families appear to be holding more debt in response to a higher financial aid tax. This translates into an average increase in debt of 25% due to the financial aid tax. This is precisely the opposite of what we would expect. Since financial assets are listed on the FAFSA, but debts are not, a fully rational family would pay off any debts with taxable assets. Such behavior would minimize their visible assets without affecting their true net worth. The current results, however, seem to indicate that the financial aid tax induces families to hold *more debt*, not less. It is possible to explain this paradoxical result with an appeal to risk aversion and a consequent desire for liquidity. While families may realize the need to reduce their assets, they may also want to have sufficient accessible assets available to them to pay necessary expenses. Draining their assets to cancel out debt may therefore be unattractive if it puts them below their desired baseline level of assets. Another possibility is that families do list these debts on the forms, using them to offset other assets. This result, however, remains a puzzle worthy of investigation in future work.

Thus, these results lead us to reconsider and revise the simple "higher tax, lower assets" story. Far from merely reducing their assets, families appear to be engaging in a complex reallocation of their asset portfolio: they are slightly reducing possibly taxable home equity, shifting into untaxed retirement assets, and holding more debt. Thus, the aggregate effect of lower assets comes not from a simple across-the-board asset reduction (or a reduction in relatively liquid financial assets such as stocks), but from reduced home equity and increased debt, offset by increased retirement assets. Recall what a perfectly rational family would do: they would maintain the same asset accumulation target, but shift assets from unprotected accounts like mutual funds into protected accounts such as retirement assets (or home equity, to the extent that it is sheltered from the federal formulae.) The current results indicate that families are not only reducing their savings, but doing in a manner that appears to be at least somewhat rational.

3. Is the behavior rational? Do knowledge and expectations matter?

In this section, I test for rational behavior in a different manner. I propose a simple model characterizing families' preferences and situations, and test whether family behavior appears to be rational in this framework. By incorporating measures of the actual behavior and incentives at work, I can explicitly account for heterogeneous responses to the tax. By including variables representing parents' expectations of college attendance, expectations of college costs, and knowledge of college financing, and interacting those variables with the financial aid tax, I test whether the behavior observed in the data can be explained as the behavior of rational economic actors.

Expectations and knowledge are characterized as follows. Since parents' expectations of the college attendance of their children are likely to draw upon their own experience as well as

the experience of similar families, expectations of college attendance are assumed to depend on the educational attainment of both parents and peers. Expectations of college costs are measured using average college tuition for high school graduates attending college from that state, and can be separated into public and private tuition as necessary. The quality of parental knowledge about the financial aid system is more difficult to quantify. I assume that parents will have a greater incentive to learn about the financial aid system as their children get closer to college. I also assume that parents learn from people like them, and do more of that if they have a stronger social network. Parental knowledge of college financing is thus measured by whether college is coming up soon (in less than five years) and the stability of the population (the share that did not move between 1995 and 2000).[13]

This specification is shown in Table 6 for total assets and taxable assets. Few of the variables have significant coefficients. If the underlying behavior were rational, higher expectations of college attendance, higher expectations of college cost, or more knowledge about college would amplify the effect of the financial aid tax. That is, we should expect negative and significant coefficients on all of the interactions between the financial aid tax and the variables measuring expectations and knowledge. Table 6 shows that the only variables for which we get right-signed and significant coefficients are stable population and the dummy for parents' highest degree being Associate's. Most of the others are insignificant, except for the other dummies for parents' highest degree, which are significant and wrong-signed. In short, incorporating knowledge and expectations in this manner does not yield any indication of rational behavior.[14]

4. Is the behavior rational? Which tax rate matters?

[13] Dafny & Dranove (2005) argue that stable population, measured using the 5-year census migration numbers, is a good way to assess the strength of information transfer in a geographic area.

[14] It is possible that the measures of expectations and knowledge used, while carefully calculated and matched to individual families, are still not sufficiently precise to yield substantive results.

The last test for rational behavior involves examining the sensitivity of the results to the calculation of the marginal tax rate. As discussed above, there are numerous assumptions made in the calculation of the marginal tax rate, many of which could potentially alter the tax substantially. Families should presumably be responding to their "actual" tax rate, or at least to their *perceived* "actual" tax rate. Recall that the tax rate used through the paper assumes two-year spacing of children, uses predicted assets, uses permanent income, includes the simplified needs test, and uses an expected college-cost measure that is an enrollment-weighted average of public and private costs in the state.

Table 7 shows results for total assets, using the basic tax rate and tax rates with several alternate assumptions. Removing the simplified needs test increases the magnitude of the response by about 50%. This could indicate that people are unaware of the simplified needs test, and instead respond to the tax they perceive. Including actual assets and income increases the effect by a factor of six, merely confirming that there is severe endogeneity problem when one uses assets to calculate the tax and then uses the tax to predict assets.

The more interesting results are in rows 4 and 5, which vary the college cost measure used to calculate expected aid and the tax. Row 4 uses the aid tax calculated as if the children will attend public college with certainty, whereas row 5 uses the aid tax calculated as if the children will attend private college with certainty. The public tax rate has a significant coefficient of -1.79 (standard error 0.47) whereas the private tax rate has an insignificant coefficient of 0.02 (standard error 0.386). Families are reducing their assets in response to a tax rate that assumes their children will go to public, not private, college or university. It is important to note that public tuition averages approximately $4,000 compared with private tuition that averages $18,000. Most students attend less expensive colleges: 70% of students

attend colleges with tuition and fees less than $8,000, and only 12% attend colleges that cost more than $20,000.[15] Given these numbers, it is not surprising that families expect public tuition, expect the corresponding tax rate, and respond accordingly. It is also not surprising that they do not expect private tuition, consequently do not perceive themselves as facing the private tax rate, and do not respond to it. This evidence provides mild additional support for the hypothesis that families are engaging in somewhat reasonable and rational behavior.

VII. Discussion and Conclusion

The implicit asset tax from the financial aid system can be widespread and substantial: families with incomes between $25,000 and $100,000 have a 90% chance of facing the tax and a marginal tax on assets of 14% on average. Rational families should respond to this tax by reducing their assets or shifting into untaxed asset categories, and the current results show evidence of just such asset reduction and reallocation. The financial aid tax has a substantial (though marginally significant) adverse effect on asset accumulation: a typical family with two children and income between $50,000 and $100,000 would be expected to reduce their assets by approximately $6,000, or 7%. Furthermore, this effect appears to be the result of rational portfolio reallocation on the part of families. Taxable assets are more responsive to the tax, and there is evidence of sheltering of assets in protected categories: families appear to be reducing home equity slightly (taxable under the IM) and shifting savings into retirement assets (largely protected). Families are also increasing their debt.

The increase in retirement assets is of particular interest because it has implications for the impact of the financial aid tax on lifecycle savings. If the financial aid system did not exempt retirement assets, and instead taxed them like other assets, the financial aid system could

[15] College Board (2002).

present a substantial barrier to intertemporal substitution and an optimal lifecycle savings path. A family's ability to pre-fund their retirement would be greatly reduced, and retirement savings would be lower than optimal. In fact, because the financial aid system exempts retirement assets but taxes other assets, the financial aid system *encourages* additional retirement saving. The current results show that families in fact respond to this incentive by increasing their retirement saving. While this additional saving may be higher than optimal, if we believe that families generally do not save enough and the initial retirement savings were sub-optimal, the financial aid system may serve to correct a market imperfection for some families. In this way, the financial aid system may move families closer to an optimal savings path, albeit in an indirect manner.

While these results provide additional evidence that the financial aid tax may reduce asset accumulation, the primary contribution lies in the investigation of rational optimization behavior underlying this aggregate effect. The results lead us to reconsider and revise the simple "higher tax, lower assets" story. Far from merely reducing their assets, families appear to be engaging in a complex reallocation of their asset portfolio: they are reducing possibly taxable home equity slightly, shifting into untaxed retirement assets, and holding more debt. While this asset reallocation is consistent with a model of rational behavior, the separate investigation incorporating knowledge and expectations of college attendance, cost, and aid does not yield substantial results. There is some indication that families rationally expect public tuition and respond to the corresponding tax rate, but few results are significant.

In sum, the current results indicate that families are reducing their savings and doing so in a manner that is at least somewhat rational. Future work will further investigate the rationality of

the behavior and assess the significance for lifecycle savings and aggregate national savings.[16] The goal is to understand why and how asset reduction and reallocation occurs in response to the financial aid tax, and how this may alter lifecycle savings. Finally, it is important to note that certain trends may render these effects much more significant in the future. Financial aid will affect more families: college costs are rising faster than median income, and financial aid is contributing more for more families.[17] Families will probably be more aware of the implicit financial aid tax: future parents are much more likely to have had experience with the financial aid system in their own educational history. The confluence of greater expectations of college cost and aid with greater awareness of the financial aid tax could lead to a situation in which the implicit financial aid tax is well known and relevant to more families, and thus has a substantial effect on the allocation of savings. Future work will investigate this hypothesis.

[16] Dick, Edlin and Emch (2003) perform excellent detailed simulations estimating the potential aggregate impact of the financial aid system under several alternate knowledge scenarios.
[17] Ibid.

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Appendix A. Marginal Tax Rate Calculation

I. Overview

A. Background

The financial aid system uses a complex set of rules to decide how much a family can be expected to pay for college, given their financial circumstances. Once the expected family contribution (EFC) is determined, financial aid is awarded to cover the gap between the family contribution and the required tuition. Financial aid thereby enables families to send their children to any college or university they want.

A family's ability to pay (reflected in their EFC) is a function of their income and asssets. Consequently, higher income or higher assets mean the family is expected to pay more, and aid will contribute less. So, any extra dollar of income or assets could result in less financial aid being awarded. This is the essence of the "financial aid tax" on assets: if a family saves more, they receive less financial aid. Generally, we assume the elasticity of income with respect to this incentive would be negligible, and do not concern ourselves with a financial aid tax on income. It exists, but likely has little behavioral response. However, we might reasonably expect the elasticity of assets to be non-negligible. Therefore we investigate the effect of this tax on asset accumulation.

B. Overview of Calculation

We use the financial aid formulae to determine the expected family contribution for each family in a given year in the future. Then, incorporating data on tuition, we determine the expected value of financial aid for each family in that same year. By assessing how that aid in that year would change if the family had $1 more of assets, we can calculate the marginal tax rate on assets resulting from the financial aid system in that year. Compounding these asset taxes over all years in which the family has children in college, we calculate a total marginal tax rate on assets. This marginal tax rate indicates, for the last $1 of assets at the beginning of college, what is the value of any displaced financial aid.

II. Calculating the tax rate in an individual year

We must first calculate the marginal tax rate on assets resulting from each individual year of college. The first step is to calculate the family's Expected Family Contribution (EFC) using the federal financial aid formula.

A. Calculating EFC

EFC in a given year depends on income and assets. Essentially, there is a certain portion of income and a certain portion of assets that a family is expected to spend on education. Both income and assets are subject to various allowances and exemptions, which we detail below. After the detailed calculations, the formula produces a value for the contribution from income (Available Income) and the contribution from assets (Available Assets). These are then added

together to produce Adjusted Available Income (AAI). This AAI is then subject to a progressive tax (marginal rates ranging from 22% to 47%), in which families are expected to spend a certain portion of that AAI on college. This is the EFC.

1. Available Income

The calculation of Available Income starts with taxable income, and then removes various allowances.

a. Allowances Against Income

i) Federal Income Tax Allowance

This allowance is for the amount of federal income tax paid. Federal income tax rates for tax year 2001 (the middle of the sample period) are used to calculate this value. The table below shows the marginal tax rate schedule in 2001.

Unmarried

	Income Range				
	0-27,050	27,051-65,550	65,551-136,750	136,750-297,350	297,351+
Tax Rate	15%	27.50%	30.50%	35.50%	39.10%

Married

	Income Range				
	0-45,200	45,201-109,250	109,251-166,500	166,501-297,350	297,351+
Tax Rate	15%	27.50%	30.50%	35.50%	39.10%

ii) State Tax Allowance

This allowance varies by state and income, with the allowance for high income families one percent lower than the allowance for low income families. The cutoff for the higher income allowance was $15,000 in 2001-2004. The high income rate varies between 2% and 10%. The rate is applied to total taxable income.

iii) Social Security Tax Allowance

An allowance for Social Security tax paid. This consists of 7.65% of income up to $85,000 and 1.45% of any additional income.

iv) Income Protection Allowance

This provides for an allowance against income depending on the size of the family and the number of students enrolled. Due to our assumptions about the spacing of children, the number of students enrolled can be only 0, 1 or 2. It ranges from $10,950 to $40,730.

v) Employment Expense Allowance

This should be assessed differently depending on whether both parents are present and working. If there is only one parent, it is the lesser of 35% of earned income and $3,000. When both parents are working it is equal to the lesser of 35% of the smaller earned income and $3,000. If there are two parents in the household but only one is working, it is 0. This is

calculated based on the total family income variable and is equal to the lesser of 35% of total family income and $3,000.

b. Available Income

The above allowances are all subtracted from taxable income to yield available income (AI):

Available Income = Taxable Income
- federal income tax - state income tax - social security tax
- income protection allowance - employment expense allowance

This will be the basis of the family's ability to pay out of income.

2. Available Assets

Parents and children are also expected to be able to contribute from their assets. The FAFSA form is very specific about what constitutes assets. The desired measure is net worth of investments, not including home equity or retirement accounts. The following is the relevant question on the FAFSA form:

81. As of today, what is the net worth of your parents' current investments?

Net worth means current value minus debt. If net worth is one million or more, enter 999999. If net worth is negative, enter 0.

Investments include real estate (do not include the home you live in), trust funds, money market funds, mutual funds, certificates of deposit, stocks, stock options, bonds, other securities, education IRAs, college savings plans, installment and land sale contracts (including mortgages held), commodities, etc.

Investment value includes the market value of those investments as of today. Investment debt means only those debts that are related to the investments.

Investments do not include the home you live in, cash, savings, checking accounts, the value of life insurance and retirement plans (pension funds, annuities, noneducation IRAs, Keogh plans, etc.), or the value of prepaid tuition plans.

a. Allowances against assets

There is a single allowance against assets, the education savings and asset protection allowance. This depends on the age of the older parent and whether there or not there are two parents. For 2001, it varies between 0, for a parent of 25 years old, $44,000 for two parents who are 50 years old, to 68,200 for two parents over 65. (Essentially, for each year that the elder parent is beyond 25 years old, a two-parent family is entitled to about $4,000 and a one-parent family is entitled to $2,000.)

b. Available Assets

Families are expected to be able to contribute 12% of assets in excess of the asset protection allowance. We call this amount Available Assets (AA).

Available Assets = (Non-retirement financial assets - asset protection allowance) * 0.12

3. Available Income and Assets = Adjusted Available Income

The family's adjusted available income is then calculated as the sum of available income and available assets:

Adjusted Available Income (AAI) = Available Income (AI) + Available Assets (AA)

4. Expected Family Contribution

a. Parental contribution

Parents are expected to contribute a certain amount out of the adjusted available income. The parental contribution is calculated according to the following table of progressive marginal tax rates:[18]

AAI range	< 3,410	3,409-11,800	11,801-14,800	14,801-17,800	17,801-20,800	20,801-23,900	23,901+
Marginal Tax Rate	0	22%	25%	29%	34%	40%	47%

b. Student contribution

Students are expected to contribute 35% of their assets towards college in each year. We do not have information on student assets, and therefore assume the student contribution to be zero.

c. Expected Family Contribution (EFC)

EFC is obtained by combining the parental contribution with the student contribution. Since the student contribution is assumed to be zero, EFC is equal to the parental contribution

B. The Financial Aid Tax

a. The Financial Aid Award

i) Tuition

Average tuition values for public and private colleges in a state are drawn from NCES data. Total tuition for a family in a given year adds up the tuition for all children from that family enrolled in college: it therefore depends on the state of residence, the institution type, and the number of children enrolled. (The assumption that children are spaced 2 or more years apart mean that no more than two students will ever be concurrently enrolled.)

ii) Aid

We now have two measures: expected family contribution and total tuition. Financial aid is expected to cover the gap between what the family is expected to contribute and the total tuition they have to pay. If the value of EFC is less than the total tuition owed in a year, then the family is eligible for financial aid in that year. They will receive aid to close the gap:

Aid = total tuition - EFC .

If EFC is greater than the total tuition, the family can be expected to cover all expenses themselves and they are not eligible for aid.

[18] The contribution for an income of -3,410 or less is actually -750. A case where this applies does not, however, appear in the sample.

We assume there is no gapping: that is, we assume all need is met, either with grants or with loans.

iii) The Value of Aid

The gap between EFC and total tuition is the face value of the financial aid award. In reality, the aid award is composed of grants (with value equal to their face value) and loans (with value lower than their face value). Thus, the actual value of the aid package depends on the grant/loan composition of the aid package *and* the grant-value equivalent of a dollar of loan aid. The percentage of the package that is comprised of loans depends on tuition, whether the institution is public or private, and family income. These values are obtained from actual student aid data from the NELS. The grant-equivalent value of loan aid is 60%, reflecting the effect of the interest subsidy over a long repayment period.

b. Financial Aid Taxes

i) When the tax applies

The relationship between EFC and total tuition determines whether there is any financial aid tax. The financial aid tax results when the presence of an extra dollar of assets displaces some aid. Therefore, to have a nonzero value for the tax a family must have some aid at risk of displacement. The EFC value is compared to the total tuition in each year to see whether the aid tax applies at all. If a family's EFC is less than the total tuition, the tax applies. If the EFC is greater than total tuition, the tax rate is 0 in that year.

ii) The size of the tax

If the aid tax does apply, we need to know the value of the tax. The information above enables us to calculate the size of this marginal tax rate on assets. Summarizing, the calculation can be broken down into three steps:

1) the marginal rate of conversion of assets into the available assets
   This is 0.12 for all families.
2) the rate of conversion of available assets into parental contribution
   This is obtained from the table above, and depends on the available income. (Where a family is on this progressive schedule depends on their AAI.)
3) the value of aid displaced by a rise in total parental contribution.
   This is calculated from NELS data.

For example, consider a family which has AAI above $30,000, is eligible for aid, and receives half of their aid in loans. For this family, 1) the marginal rate of conversion of assets is 0.12 (as it is for all families. The rate of conversion of available assets into parental contribution is 0.47 (from the table above). The value of $1 of aid is ½ x $1 + ½ x 0.60 x $1 = $0.80. Thus, the marginal tax rate from that year on assets is 4.5%:

$$MTR = 0.12 * 0.47 * 0.80 = 0.045$$

III. Calculating the total tax rate on assets: the final step

The final goal is to determine the rate at which an additional dollar of assets in the first year of college attendance is taxed *over the entire period of college attendance*. That is, a given dollar of assets is taxed a little bit in each year of college attendance. The total asset tax is the

accumulated effect of all of those smaller taxes. We therefore calculate the marginal tax rate in each year and then compound those rates over all years of attendance. The net marginal tax rate over the whole period is:

$$\text{Net Marginal Tax Rate} = 1 - (1-mtr_1)*(1-mtr_2)*\ldots.*(1-mtr_{14})$$

For most families in the sample, total tuition will be 0 in the later years of the sample and the marginal tax rate in such years will be 0. Nevertheless, the later years are included to accommodate families with many children and alternative assumptions about the spacing of children.

A different marginal tax rate is calculated based on the average public and private tuition in a state, and the net marginal tax rate in each year is based on an average of the two weighted by the possibility of attendance.

Appendix B. Data

Panel Study of Income Dynamics

The PSID is the main data set used in the paper. It contains information on all families that immediately descended from or split off from families included in the original sample in 1968. The PSID has detailed cross-year information on each family's head and 'wife' such as income, education and race. In later years the survey is biannual and data are drawn only from the years 1997, 1999, 2001 and 2003. Because some questions are not re-asked each year except when a new head or 'wife' arrives, it was necessary to bring forward data from previous years on the variables for education. Four main components of the PSID are combined to produce complete cross-year files for each family which include data on income and assets. These four components are the Family Files, the Individual Files, the Income Plus Supplement and the Wealth Supplement.

Family Files

These files track each family in the sample over time, including any split-offs. As a result, the number of observations in the family file increases over time as each subsequent generation consists of more families than the previous one. Variables for the state of residence, family structure, number of children, the age of the youngest child, and the age, education and race of the head and 'wife' are drawn from this family file. For the years 2003 and 1997, data on the head and 'wife's' taxable income are drawn from this file as well. In other years they are not available in this file.

Individual Files

There is no identifier to help in linking a family between years to create a cross-year file for that family. Instead, families must be linked across time using a unique identifier for the head which does remain the same between years. The individual file consists of a complete multi-year record for each head; merging this file with the head's identifier in the family files allows a family to be followed over time. No data is ultimately drawn from the individual files but they are used to create a cross-year file for each family.

Income Plus Supplement

The Income Plus Supplement contains data on each family's income. It is used to obtain the taxable income of the head and 'wife' for the years when this is not available in the family files. Information on taxable income is drawn from this file in the years 1999 and 2001.

Wealth Supplement

The wealth supplement contains detailed wealth information for each family. We are particularly interested in certain asset categories, because some categories are subjected to the financial aid tax while others are not. For the years 1999, 2001 and 2003, the level of detail is sufficient to determine the value of assets subject to the tax and the value of assets not subject to the tax. Particularly important is the presence of a variable for the value of any IRA or similar retirement accounts, because such accounts are protected from the financial aid tax. Data drawn from the wealth supplement concern the value of such accounts and a detailed breakdown of

assets into categories: businesses, checking accounts, debts, real estate, stocks and mutual funds, and total wealth, both including and excluding home equity. These asset measures are ultimately the dependent variables used to analyze the effects of the financial aid tax.

Other Data

In addition to the PSID, other data sources are also incorporated to accurately calculate a family's expected tuition, the probability of college attendance and the value of any aid displaced by savings. The percentage of aid in the form of loans is drawn from the National Educational Longitudinal Study 1988 (NELS 88). Expected tuition and the probability of attendance are drawn from college attendance data provided by the National Center for Education Statistics (NCES).

NELS 88

In order to calculate the value of any aid that is displaced by additional savings, it is necessary to know the percentage of aid that came in the form of loans. This information is drawn from the National Education Longitudinal Study of 1988 (NELS 88). The sample was in eighth grade at the time of the original interview in 1988 but the follow-up in 2000 includes questions about college attendance, tuition and aid. Data are available on tuition, family income and the percentage of aid that was in the form of loans. An expected percentage of loans is calculated for each family in the PSID based on this data and on that family's income and expected tuition values.

NCES

The NCES Digest of Education Statistics provides state-by-state data on college attendance and tuition. These data are used to determine the probability that a child attends college at all based on his state of residence and race. Additionally, the expected public and expected private tuition in a specific state are also drawn from these data. A person's overall college expectation and expected aid tax are a function of these five variables drawn from the NCES: the probability of attendance, the probability of going to a public college, the probability of going to a private college, the average public tuition in a state and the average private tuition in a state.

Census

The Integrated Public Use Microdata Samples of the U.S. Census for the year 2000 are used in two ways. The share of peers who graduated from college is calculated as the share of persons of the same race in the same state, age 22 to 27, who have graduated from college. The stability of the population in a state is calculated as the share of the population in that state in 2000 who lived in that same state 5 years earlier as well.

Table 1. Summary of Variables

	Mean	*Std. Dev.*	
Tax rates			
Marginal Tax Rate	9.10	(9.13)	
Share with non-zero tax	65%		
Income			
Taxable income	62.29	(37.11)	
Total family income	68.09	(37.66)	
Aggregate assets			
Total assets	119.24	(140.95)	
Net worth	113.28	(141.08)	
Financial assets	32.92	(66.82)	
Net financial assets	26.96	(67.24)	
Taxable assets	73.44	(93.37)	
Specific assets			*Share non-zero*
Checking/savings	10.43	(20.66)	82%
Stocks and funds	41.16	(61.56)	23%
Home equity	68.44	(70.41)	82%
Retirement accounts	48.11	(67.55)	31%
Debt	10.27	(13.58)	58%
Demographics			
Age of Parents	42.90	(4.41)	
Race - white	60%		
Race - black	30%		
Race - hispanic	7%		
Number of children	1.80	(0.84)	
Parents Educ - AA	5%		
Parents Educ - BA	14%		
Parents Educ - Advanced	8%		
Share of peers who graduated college	23%		
Other			
Tuition - average	13.16	(3.53)	
Tuition - public	9.17	(1.70)	
Tuition - private	20.83	(4.32)	
Share less than five years from college	38%		
Share of population stable	81%		
Number of Observations	3411		

Notes. Data is from the PSID 1999, 2001, 2003 as described in the text. Dollar values are in thousands of 2001 dollars. Means for the "specific asset categories" are the means in the subsample with a positive value in that asset category. The shares of those with positive values in the category are shown to the right.

Table 2. Marginal Financial Aid Taxes.

Table 2a. Share who have a non-zero marginal financial aid tax rate

			Asset range				
Income range			0 to 25	25 to 50	50 to 100	100 to 150	150 to 300
0	to	25k	11%	13%	33%		
25k	to	50k	86%	88%	96%	90%	88%
50k	to	100k	98%	99%	97%	95%	97%
100k	to	150k	65%	53%	49%	45%	56%
150k	to	300k	0%	0%	0%	0%	0%

Table 2b. Mean marginal tax rate (for those who have a non-zero tax)

			Asset range				
Income range			0 to 25	25 to 50	50 to 100	100 to 150	150 to 300
0	to	25k	7.6	11.3	4.7		
25k	to	50k	13.3	14.5	14.8	14.5	13.5
50k	to	100k	14.5	13.4	13.0	14.3	12.6
100k	to	150k	8.6	5.2	6.3	7.7	8.0
150k	to	300k					

Notes. Analysis on sample from PSID 1999, 2001, 2003 as described in the text. Tax rate is the basic financial aid tax as described in the text.

Table 3. Effect of the Financial Aid Tax on Total Assets.

	Total Assets (Spec 1)		Total Assets (Spec 2)	
Financial Aid Expectations				
Implicit Tax Rate x Income	-0.27	(0.49)	-0.87 *	(0.47)
Demographics				
Age of Parents (average)	2.08 *	(0.57)	2.33 *	(0.56)
Race - Black			-23.54 *	(8.62)
Race - Hispanic			-8.61	(9.43)
Race - Asian			-46.53 *	(20.61)
Race - Other			26.13	(30.40)
Income				
Income (permanent)	2.10 *	(0.11)	1.79 *	(0.12)
College Attendance Expectations				
Number of Children	1.17	(2.96)	2.33	(2.90)
Parents highest degree: Assoc			20.36 *	(12.63)
Parents highest degree: BA			13.84	(9.08)
Parents highest degree: Advanced			46.66 *	(13.93)
Share of peers who graduated college			137.81 *	(46.12)

Notes. Analysis on PSID sample as described in text. Regression is pooled OLS on a sample for the years 1999, 2001, and 2003. Standard errors are clustered on family and shown in parentheses. Significance is indicated by * for a p-value below 0.10.

Table 4. Effect of the Financial Aid Tax on Different Aggregate Asset Measures.

		OLS	Tobit
		(1)	(2)
1.	*Total Assets*	-0.871 *	-0.520 *
		(0.471)	(0.296)
2.	*Net Worth*	-0.980 *	-0.499 *
		(0.481)	(0.299)
3.	*Financial Assets*	-0.863 *	-0.115
		(0.221)	(0.127)
4.	*Net Financial Assets*	-0.972 *	-0.091
		(0.229)	(0.130)
5.	*Taxable Assets*	-0.900 *	-0.493 *
		(0.307)	(0.194)
6.	*Non-taxable assets*	0.029	0.202
		(0.266)	(0.167)

Notes. Specification is identical to that shown in Table 3. For the OLS specification, the table shows the coefficient on financial aid tax X income. For the Tobit specification, the table shows the marginal effect (at the mean) of financial aid tax X income. (The marginal effect is calculated by multiplying the regression coefficient by the correction factor $\Phi(X\beta/\sigma)$.)

Table 5. Effect of financial aid tax on assets in specific categories.

		Tobit coefficient	Tobit: *effect on probability nonzero*	Tobit: *marginal effect at mean, conditional on nonzero*
		(1)	(2)	(3)
1.	*Total Assets*	-0.618 (0.352)	-0.001 (0.001)	-0.389 (0.222)
2.	*Checking & Savings*	0.060 (0.063)		
3.	*Stock Funds*	0.411 (0.349)		
4.	*Home equity*	-0.319 (0.205)	-0.002 (0.001)	-0.173 (0.111)
5.	*Retirement assets*	0.693 * (0.330)	0.003 * (0.001)	0.164 * (0.078)
6.	*Debt*	0.272 * (0.054)	0.007 * (0.001)	0.100 * (0.020)

Table 6. The Role of Expectations and Knowledge.

	Total Assets				Taxable Assets			
Financial Aid Expectations								
Implicit Tax Rate x Income	14.12	(5.06)			4.31	(3.44)		
Income								
Income (permanent)	1.93	(0.06)			1.27	(0.04)		
Demographics								
Age of Parents (average)	2.87	(0.50)			1.77	(0.34)		
Race - Black	-34.64	(8.20)			-17.27	(5.59)		
Race - Hispanic	-14.25	(11.11)			0.58	(7.59)		
Race - Asian	-37.55	(18.31)			-27.71	(12.46)		
Race - Other	20.14	(24.90)			3.13	(16.98)		
	Main effect		*X tax*		*Main effect*		*X tax*	
College Attendance Expectations								
Number of Children	1.73	(3.39)	-0.33	(0.34)	0.10	(2.33)	0.13	(0.23)
Parents highest degree: Assoc	47.67	(14.01)	-2.33	(1.19)	29.10	(9.50)	-1.26	(0.80)
Parents highest degree: BA	-2.26	(9.05)	2.01	(0.91)	1.11	(6.15)	0.99	(0.62)
Parents highest degree: Advanced	21.49	(10.90)	3.66	(1.16)	7.01	(7.41)	2.54	(0.79)
Share of peers who graduated college	98.99	(53.62)	-0.34	(3.38)	124.15	(36.42)	0.77	(2.29)
College Cost Expectations								
Tuition	0.04	(1.09)	0.10	(0.11)	-0.23	(0.75)	0.12	(0.07)
Knowledge								
Less than 5 years to college	-10.53	(6.00)	-0.75	(0.64)	-10.06	(4.11)	0.03	(0.44)
Stable population (share)			-0.19	(0.07)			-0.09	(0.05)

Table 7. Sensitivity to Marginal Tax Rate Measure.

		Coefficient on mtr X income
1.	*Basic*	-0.87 *
		(0.47)
2.	*Without simplified needs*	-1.28 **
		(0.52)
3.	*Without predicted assets and permanent income*	-4.50 **
		(0.46)
4.	*Basic, just for public tuition*	-1.79 **
		(0.47)
5.	*Basic, just for private tuition*	0.02
		(0.39)

Notes. The table reports the coefficient on mtrXincome for various calculations of the marginal tax rate on assets. The dependent variable is total assets, and the specification is identical to that shown in column 2 of Table 3. The basic marginal tax rate employed in row 1 is the same as that used in the rest of the paper. It assumes two-year spacing of children, uses predicted assets, uses permanent income, includes the simplified needs test, and uses an expected college-cost measure that is a weighted average of public and private costs in the state. Subsequent rows show the results of the regression of total assets on the marginal tax rate when these assumptions are altered as indicated.