COLLEGE FINANCIAL AID RULES AND THE ALLOCATION OF SAVINGS*

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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. Furthermore, policy may alter savings incentives, such that families save less for retirement or college if they expect other funds to be available to them for those purposes, perhaps from Social Security or financial aid. However, there is an additional important factor arising from college financial aid: 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 tax on assets, as high as 29 percent. This tax could certainly present a substantial deterrent to saving or a powerful 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. This paper contributes to this literature with the following 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.[1]

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 7 to 12 percent less than they would in the absence of the financial aid tax. Investigation of rational behavior produces mixed results. Asset allocation suggests rational 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 suboptimal retirement savings for some families.[2] A more detailed behavioral model does not, however, yield clear results.

THE FINANCIAL AID SYSTEM AND IMPLICIT TAX RATES

The U.S. financial aid system began with the Higher Education Act of 1965 and has been modified substantially 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) using the Free

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Application for Federal Student Aid (FAFSA). Institutional funds can be distributed according to institution-specific rules (Institutional Methodology or IM), which can differ across institutions. The primary difference between the FM and the IM is that the IM usually includes home equity in assets, whereas the FM does not.

Thus, the financial aid system uses a complex set of rules to decide how much a family can be expected to pay for college (expected family contribution, EFC) and then awards aid to cover the gap between the EFC and the required tuition. Financial aid thereby, in theory, enables families to send their children to any college or university they want. However, because the EFC is a function of income and assets, higher income or higher assets mean a 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.

The FM proceeds as follows. 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. Second, the family's *Available Assets* are calculated as 12 percent of assets above an asset protection allowance.[3] 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 percent marginal contribution rate on AAI above $30,000.[4] Financial aid is then set to cover the gap between the EFC and expected college costs.[5]

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 percent per year (12 percent of assets into AAI times 47 percent of AAI into EFC). This single-year tax needs to be compounded over the number of years of college attendance to arrive at the total tax. For a family with two children spaced two years apart, the maximum tax is 29 percent. As discussed previously, 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 are not expected to make any contribution out of assets (called the *Simplified Needs Test*).

THEORY: EFFECTS OF COLLEGE COSTS AND AID ON ASSET ACCUMULATION AND ALLOCATION

The financial aid tax reduces the return to saving for assets that will be consumed during college or after college: any assets the family has just prior to or during college will create a financial liability (in terms of lost financial aid). Because the tax reduces the incentive to save for college or beyond, it would be reasonable for families to alter their lifecycle savings path and asset allocation.

The structure and effect of the aid tax is more complex, however. The tax is structured in such a way as to induce specific *reallocations* of assets: 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.

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.[6]

Thus, this paper asks the following two-part question: are families reducing their assets in response to the financial aid 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 (1997) find significant effects of the financial aid tax on asset accumulation: they estimate close to a 50 percent 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 percent 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 more detail about assets and family situation to study family savings behavior, the current paper aims to reconcile some of the disparate results.

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 subsample of 1,100 families by including only those with fewer than five children, taxable income less than $300,000, parents between ages 35 and 55, and no children of college age.[7]

A key advantage of the PSID is detailed income and wealth data contained in the Wealth Supplement, 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.

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

RESULTS: THE FINANCIAL AID TAX

As discussed previously, the implicit financial aid tax on assets varies significantly across families. Table 1 shows the share of families in different income and asset categories who face a non-zero marginal tax, and the tax rate for those who do. As expected, families with very low or very high income almost never face a tax. On the other hand, 90 percent of families with income between $25,000 and $100,000 face a tax that averages around 13 to 14 percent 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 percent.

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. In such a calculation, a number of assumptions matter. Financial aid consists of grants and loans, so the value of an aid award is equal to the value of grants plus the net present value of the loans: the allocation of aid between grants and loans is assigned based on income and college cost categories using NELS data, and standard assumptions of the composition of loans and the relevant subsidies yield a cash value of $0.60 for a $1 loan.[8] I assume 2-year spacing of children.[9]

There are also important considerations regarding the income and assets used to calculate the tax. In an attempt to measure permanent income, I use a 3-year average of annual income rather

Table 1
Marginal Financial Aid Taxes

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

b. 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 25	7.6	11.3	4.7	14.5	13.5
25 to 50	13.3	14.5	14.8	14.3	12.6
50 to 100	14.5	13.4	13.0	7.7	8.0
100 to 150	8.6	5.2	6.3		
150 to 300					

Notes. Analysis on PSID sample as described in the text. Tax rate is the basic financial aid tax as described in the text. Income and assets are in thousands of dollars.

than simple annual income. In order to reduce any possible endogeneity of the tax rate, 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. 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.[10] 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 measure of college costs: I use a weighted average of costs at public and private universities in that state, where 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 percent chance of public university and 100 percent chance of private university. This choice can make an important difference, and I address its significance later.

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; and 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; and 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.

RESULTS: EFFECTS ON ASSET ACCUMULATION AND ALLOCATION

Does the Financial Aid Tax Reduce Assets?

The first question is whether families reduce their assets in anticipation of the financial aid tax. I regress assets on income, parents' age, number of children, the interaction between the financial aid tax and income, and year dummies. This model is then augmented by including indicator variables for parental race or ethnicity, parents' highest degree, and peers' college attendance:

$$\textbf{(1)} \quad Assets_{it} = \alpha_1\, income_i + \alpha_2\, age_{it} + \alpha_3\, numkids_{it} + \alpha_4\, mtr \times income_{it} + \alpha_5\, ParentRace_i + \alpha_6\, ParentEducation_{it} + \alpha_7\, PeerEducation_i + I_t + \varepsilon_{it}.$$

The extent to which the marginal tax rate affects the propensity to save out of income is indicated by the coefficient α_4 on the interaction between the financial aid tax and income.[11] The financial aid tax is calculated as described previously (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 permanent income (the income that should matter 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 2. The basic specification 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 percent.

Is the Behavior Rational? Does the Pattern of Asset Reduction Make Sense?

I next ask whether this asset reduction results from rational behavior on the part of families. If families are reducing their assets in anticipation of 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 investigate the sensitivity of the results to different aggregate asset measures and then look at effects on specific asset categories.

Aggregate asset measures

A family's assets can be measured in several 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

Table 2
Effect of the Financial Aid Tax on Total Assets

	(1)			*(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: Associates				20.36	*	(12.63)
Parents highest degree: Bachelors				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 p-values below 0.10 and ** for p-values below 0.05.

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: these "taxable assets" include cash and savings, stocks and stock funds, and home equity, but exclude retirement assets, other real estate, and businesses.[12]

Table 3 shows results for six different aggregate asset measures. The OLS results 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. Debt does not seem to be an important factor, although the point estimates are slightly higher when debt is included. Notably, there is no significant effect 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 later. These results are largely consistent with the literature, aside from finding less sensitivity to varying the asset measure.

The results using a Tobit specification (to correct for possible truncation at zero assets) present 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 smaller, corresponding to 7 percent reduction in total assets or an 11 percent 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. These results suggest that much of the effect on assets is occurring through the effect on home equity (which is excluded from the financial assets measures).

Overall, the foregoing 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.

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 4 shows separate regressions for checking/savings, stock funds, home equity, retirement assets, and debt. Due to the high rate of nonparticipation in these specific asset

Table 3
Effect of the Financial Aid Tax on Different Aggregate Asset Measures

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

Notes. Specification is identical to that shown in Table 2, and the dependent variable is indicated on the left hand side. 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 $\Phi(X\beta/\sigma)$. This is the unconditional expected value.) Significance is indicated by * for p-values below 0.10 and ** for p-values below 0.05.

Table 4
Effect of Financial Aid Tax on Assets in Specific Categories

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

Notes. Specification is identical to that shown in Table 2, and the dependent variable is indicated on the left-hand side. Column 1 shows the Tobit coefficient; column 2 shows the effect on the probability that the dependent variable is positive; and column 3 shows the marginal effect (at the mean) of financial aid tax X income, conditional on the dependent variable being positive. Significance is indicated by * for p-values below 0.10 and ** for p-values below 0.05.

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. There is no significant effect on checking or savings and stocks. 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 percent. 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. Most interestingly, there is clear evidence of sheltering in retirement assets: a typical family would increase their retirement assets by 10-15 percent. It appears that families may indeed be trying to shield assets from the financial aid tax by shifting them into protected retirement accounts. Together, the results in rows 3 and 4 suggest that families may 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 also encouraging greater saving for retirement.

Finally, the last row of the table shows that families appear to be holding about 25 percent more debt in response to the financial aid tax. Since financial assets are listed on the FAFSA but debts are not, this result is unexpected: a rational family would instead pay off debts with taxable assets, thereby minimizing 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. One possible explanation for this paradoxical result is that families may simply think of their net worth rather than the specific measure on the form – they may misunderstand the FAFSA instructions (which are indeed unclear on this point), using the debts to offset other assets when reporting their net worth. Another possibility is that while families do seek to reduce their assets, their risk aversion and preference for liquidity makes them refrain from draining their assets to cancel debt. This result, however, remains a puzzle worthy of further investigation.

Overall, 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 possible 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 formula.) The current results indicate that families are not only reducing their savings, but doing so in a manner that appears to be at least somewhat rational.

Is the Behavior Rational? Which Tax Rate Matters?

The last test for rational behavior involves examining the sensitivity of the results to the calculation of the marginal tax rate. As discussed previously, 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* tax rate. Recall that the tax rate used through the paper assumes 2-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.

Performing the analysis using alternate tax rates yields some intriguing findings. Removing the simplified needs test increases the magnitude of the response of total assets by 50 percent, possibly indicating that people are unaware of the simplified needs test and instead respond to the tax they perceive. Using actual assets and income increases the effect by a factor of six, confirming that there is a severe endogeneity problem when assets are used to calculate the tax and the tax is then used to predict assets. Varying the college cost measure used to calculate expected aid also matters: a tax assuming public college attendance produces an effect that is significant and twice as large as the baseline (-1.79, s.e. 0.47), whereas assuming private college yields an insignificant effect (0.02, s.e. 0.39). Given that most students attend less expensive public colleges,[13] it is not surprising that families expect public tuition, expect the corresponding tax rate, and respond accordingly. This provides mild additional support for the hypothesis that families are engaging in somewhat rational behavior.

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 percent chance of facing the tax and a marginal tax on assets of 14 percent 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 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 7 to 12 percent. 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 that are protected. Families are also increasing their debt. Overall, 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. Future work will further investigate the rationality of the behavior and assess the significance for lifecycle savings and aggregate national savings.[14]

The increase in retirement assets is of particular interest. If the financial aid system did not exempt retirement assets, and instead taxed them like other assets, the financial aid system would in fact present a substantial barrier to intertemporal substitution and an optimal lifecycle savings path. However, by exempting retirement assets the financial aid system actually *encourages* additional retirement saving. The current results show that families in fact respond to this incentive by increasing their retirement saving. If initial retirement savings are suboptimal, the financial aid system may in fact serve to correct a market imperfection for some families.

Notes

[1] In addition, in work not reported here, I test for rational behavior 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. This analysis yields insignificant results, but current work to improve the measures of knowledge and expectations is promising.

[2] Venti and Wise (2000) provide a useful analysis of the optimality of retirement savings.

[3] The income protection allowance depends on the size of the family and the number of students enrolled, and

varies from $10,950 to $40,730. The asset protection allowance is increasing in parental age and protects $44,000 of assets for a two-parent family with a 50-year-old elder parent.

[4] EFC actually includes a student contribution in addition to the parental contribution, but I assume the student contribution is negligible.

[5] More detail of the aid calculation is available in an Appendix to the paper on the author's Web site.

[6] Note that this paper investigates how families change their asset allocation behavior in anticipation of the financial aid tax. Families are observed *prior* to their children's college attendance. The basic premise is that, in order to set themselves up to "look poor" when their children are in college in the future, or to have fewer assets available for the financial aid system to take, families might reduce their assets prior to their children's college attendance.

[7] 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.

[8] 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. 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.

[9] The PSID only provides the age of the youngest child, not the age of each child. Assuming 3-year spacing does not affect the tax rate in any substantial way: the correlation between the two tax rates is above 0.9.

[10] Families with income below $50,000 and no substantial assets (determined by their eligibility to file a Form 1040-A or Form 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.

[11] Note that the coefficient α_1 represents total assets divided by permanent income, ceteris paribus, or the accumulation of the family's average propensity to save out of income. The coefficient α_4 reflects how this relationship between income and assets may be modified by the existence of the financial aid tax. If a family, anticipating a positive and substantial financial aid tax in the future, saves less relative to their income than they otherwise would, that will be reflected in a negative value of α_4.

[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.

[13] College Board (2003a, 2003b) provide useful information regarding levels and trends of college costs and student aid.

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

References

Case, Karl E. and Michael S. McPherson. Student Aid Incentives and Parental Effort: The Impact of Need-Based Aid on Savings and Labor Supply. Washington, D.C., College Board, 1986.

College Board.

Trends in College Pricing 2002. Washington, D.C., 2003a.

Trends in Student Aid 2002. Washington, D.C., 2003b.

Dick, Andrew W. and Aaron S. Edlin. The Implicit Taxes from College Financial Aid. *Journal of Public Economics* 65 (September 1997): 295-322.

Dick, Andrew W., Aaron S. Edlin, and Eric Emch. The Savings Impact of College Financial Aid. *Contributions to Economic Analysis and Policy* 2 (June 2003): Article 8.

Edlin, Aaron S. Is College Financial Aid Equitable and Efficient? *Journal of Economic Perspectives* 7 (Spring 1993): 143-158.

Feldstein, Martin. College Scholarship Rules and Private Saving. *American Economic Review* 85 (June 1995): 552-66.

Kane, Thomas. Savings Incentives for Higher Education. *National Tax Journal* 51 (September 1998): 609-620.

Kim, Taejong. College Financial Aid and Family Saving. *Economics*. Cambridge: Massachusetts Institute of Technology, 1997.

Long, Mark. The Impact of Asset-Tested College Financial Aid on Household Savings. *Journal of Public Economics* 88 (January 2004): 63-88.

Monks, James. An Empirical Examination of the Impact of College Financial Aid on Family Savings. *National Tax Journal* 57 (June 2004): 189-207.

University of Michigan. Panel Study of Income Dynamics. Institute for Social Research, Ann Arbor, various years.

University of Minnesota. Integrated Public Use Microdata Sample of the 2000 U.S. Census. Minnesota Population Center, Minneapolis, 2000.

U.S. Department of Education.

National Center for Education Statistics. Institute of Education Sciences, Washington, D.C., various years.

National Education Longitudinal Study. Institute of Education Sciences, Washington, D.C., various years.

Venti, Steven F. and David A. Wise. Choice, Chance, and Wealth Dispersion at Retirement. Cambridge, MA: National Bureau of Economic Research, 2000. NBER Working Paper 7521.