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The Center On Federal Financial Institutions (COFFI) is a nonprofit, nonpartisan, non-ideological policy institute focused on federal lending and insurance activities.

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Student Loans: Modeling Federal Costs

There is great controversy about how the federal government should calculate its costs for sponsoring student loans. This is particularly important since student loans are provided through two alternative channels, with the federal government lending directly as well as providing guarantees to private lenders. As a result, many observers focus on the comparative budget costs of lending through the two arrangements.

Readers who are not familiar with these programs may wish to start with a companion paper, "Student Loans: A Budget Primer," available at www.coffi.org. That paper explains how the two programs work and how their costs flow through the federal budget.

The student loan controversy is multi-faceted and complex, as illustrated by a recent report by the Government Accountability Office ("Federal Student Loans: Challenges in Estimating Federal Subsidy Costs," available at www.gao.gov.) That 45-page report concluded that the estimates under current law "more fully and accurately present the expected long-term costs of federal student loans than did the prior method." At the same time, "[s]ignificant reestimates of subsidy costs over the past 10 years illustrate the challenges of estimating the lifetime costs of loans."

This paper attempts to clarify the sources of cost differences between the two student loan channels. We do this using a simplified financial model that incorporates the most critical variables, but without the full complexities. Our intention is to show a model simple enough to clearly illustrate the main factors to a non-expert, yet accurate enough to make the conclusions meaningful. However, the results should be viewed solely as illustrations and the cost differences only as estimates of general magnitudes. In particular, our main focus is on the cost differentials between the Direct and Guaranteed Loan programs. (The Guaranteed Loan program is more formally known as the Federal Family Education Loan (FFEL) program.) Many variables which affect the two programs roughly equally are modeled in simple form or omitted. Therefore, our model should be used cautiously when drawing conclusions about absolute cost levels.

COFFI does not normally advocate specific policies. The intent of this paper is to clearly, and neutrally, explain the factors determining federal budget costs.

It is important to note that budget cost is only one policy consideration. There are many segments of the financial markets where the government could provide loans directly at below market rates, while maintaining a low budget cost. (This is because the government uses federal

borrowing rates, the lowest in the world, in its budget calculations.) Yet Congress usually chooses to stay out of the lending business. When it does enter, it generally provides guarantees rather than direct loans, even though direct loans might have lower budget costs.

Legislation is likely to pass this year modifying the parameters of the student loan programs, although without changing the fundamental mechanisms. COFFI's model is based on current law and does not incorporate any elements of these proposals. We plan to expand the analysis at a later date to reflect such changes.

One note on nomenclature – for simplicity, we will generally write as if all student loans were for college education, even though many loans are for students who attend trade schools or graduate schools.

Summary of Overall Results

Figure 1 shows the federal government's net budget cost, in our model, for a hypothetical pool of new loans to entering Freshmen in college. The costs are shown for each of a number of scenarios that differ in their assumptions about the economic environment and the performance of the loans. The table shows the cost for each type of loan under each of the two loan channels, Direct Loans and Guaranteed Loans (also known as FFELP loans.) The rest of the paper explains the results and the model in detail.

The first seven scenarios assume that interest rates as of early November remain constant for the 14-year projection period. This unrealistic assumption is made to provide a clean base from which to illustrate the effects of hypothetical interest rate movements. Scenario 1 further assumes that all loans are paid on time and in full. This is a very profitable case for Direct lending, with a budget benefit of 13% or more of the principal amount, and is slightly profitable for Guaranteed lending. ("Subsidized Stafford" loans, whether made directly or guaranteed, show a loss in this and all other scenarios, because the government provides the loans interest-free while students are in school, at a substantial budget cost.) Scenario 2 adds a more realistic assumption that 12% of Stafford loans and 15% of PLUS loans will default over their lives. The net effect of defaults is relatively modest, since recovery rates are very high. (Bankruptcy law generally does not permit student loans to be expunged and the IRS is available for collections.)

Scenarios 3-7 are based off of Scenario 2, but make changes to the 3 relevant interest rates: the 91-day T-bill rate, the 90-day commercial paper rate (CP) for financial institutions, and the rates for the basket of zero coupon Treasury bonds used for discount rate calculations under federal budget rules. Scenario 4 assumes that the borrower's interest rate can rise without limit, while the other cases use the statutory rate caps.

Scenario 8 is identical to Scenario 2, except that it uses forecasts of future interest rates from the Office of Management and Budget (OMB), as shown in their mid-year update. The remaining scenarios use OMB's interest rate forecasts as a base from which we explore the effects of changes in default rates or interest rates while holding other variables constant.

Note that we show costs as negative figures, in keeping with normal financial market analyses.

Figure 1: Federal Budget Benefit/(Cost) of New Student Loans, as % of principal

Scenario				Unsubsidized Stafford			Subsidized Stafford			PLUS		
	Rate Scenario	Adjustments	Annual Defaults	Direct	FFELP	Diff.	Direct	FFELP	Diff.	Direct	FFELP	Diff.
1	Current		None	13.3	0.5	12.8	-9.0	-19.6	10.6	13.7	2.4	11.2
2	Current		Base	11.5	-1.1	12.6	-10.4	-20.8	10.4	11.4	0.6	10.8
3	Current	All rates +5 pts	Base	-11.0	-21.0	9.9	-35.1	-42.7	7.6	-3.1	-10.9	7.8
4	Current	All rates +5 pts, no caps	Base	9.0	-1.7	10.7	-27.2	-34.7	7.6	8.4	-0.5	8.9
5	Current	T-bill one point up	Base	20.6	0.7	19.9	-6.7	-22.8	16.1	15.9	0.6	15.3
6	Current	CP one point up	Base	11.5	-9.7	21.2	-10.4	-28.2	17.8	11.4	-2.6	14.0
7	Current	Bonds one pt up	Base	2.5	-1.1	3.6	-17.7	-20.4	2.7	6.4	0.3	6.1
8	OMB		Base	10.1	-1.0	11.1	-10.3	-19.4	9.1	10.3	0.6	9.7
9	OMB		Double	8.4	-2.5	10.9	-11.7	-20.6	9.0	9.0	-0.4	9.4
10	OMB	T-bill discount rate	Base	17.1	-1.0	18.1	-4.6	-19.8	15.2	14.3	0.8	13.5
11	OMB	T-bill and CP -1 pt, T-bill disc. rate	Base	17.9	-0.8	18.7	-0.2	-16.4	16.3	15.2	1.1	14.1
12	OMB	T-bill and CP -1 pt, Bond disc. rate	Base	1.5	-0.9	2.5	-14.0	-15.8	1.8	5.8	0.6	5.2

Figures may not add due to rounding

Several points stand out:

The Direct Loan program costs less under all of the scenarios illustrated. The base cases, that do not adjust expected interest rates, generally show a cost differential in the range of 10% of the original principal amount. Direct Loans maintain an advantage in the other interest rate and default scenarios illustrated here. However, as explained below, there are certain interest rate environments in which Direct Loans would be more expensive under current budget rules.

Interest rates make a large difference in absolute budget costs. The profitability of lending in general is largely determined by three factors: interest rate spreads (the difference between the interest rate charged by the lender and the rate that it must pay to obtain its own funding); default rates; and expenses. In the case of federal student loans, two of these factors are quite muted in their effects. Defaults make only a modest difference because recovery rates on student loans are extremely high. For their part, expense levels on the federal budget represent only a percent or two of principal, on average, according to the Education Department and OMB.

This leaves interest rate spreads as the principal driver of federal budget costs. The Direct loan program is affected by the spread between the 91-day T-bill rate, which determines what the borrower pays, and the rate on a basket of zero-coupon government bonds, which determines the discount rate. A one-point rise in the borrower rate without any movement in the discount rate would add 4-9 points of profit, while a downward movement in the spread would subtract roughly the same amount.

The Guaranteed loan program is affected by the spread between the borrower rate, based on the 91-day T-bill rate, and the rate guaranteed to lenders, based on the 90-day CP rate. A one point change in the CP rate without a change to the T-bill rate has a 3-8 point effect on Guaranteed loan costs. (The discount rate itself has only a marginal effect on the Guaranteed loan program costs, due to the relative timing of payments and receipts.)

Interest rates also have a major effect on *relative* budget costs. As noted above, interest rate movements that affect only one or two of the relevant interest rates can change costs for one program without affecting the other. Further, a uniform increase in interest rates tends to reduce the cost differential favoring direct lending. Scenario 3 shows an extreme case, where rates more than double from current levels, rising uniformly by 5 points and remaining there. The effect is to reduce the cost advantage of Direct Loans by about 3 points. The reasons are complex and are explained in more detail under the individual scenario explanations.

The Direct Loan cost advantage reverses if long-term interest rates increase sufficiently more than do short-term rates. The crossover point comes when the difference, or "spread," between long-term rates and short-term rates rises from current levels by roughly 1.4 percentage points for Stafford Loans or 2.4 points for PLUS loans.

In the last 50 years, the spread has been above the cross-over point for Stafford Loans about 30% of the time and above that for PLUS loans about 9% of the time. (This calculation uses the spread between the month-end interest rate on the 10-year T-bond and the 91-day T-bill rate. The 10 year bond rate is used as a proxy for the basket of zero-coupon bonds that would be used as a discount rate.) This is only a very rough indicator of probability, since the conditions of the last 50 years will certainly not repeat themselves precisely.

Congress' choice to use long-term rates in discounting cash flows is a major source of variability in federal budget costs for student loans and in the cost differential between the two programs. There are substantial arguments for use of an alternative short-term rate that would better match the rates used to charge borrowers, (see Appendix 1.) Under this alternative, interest rate swings would have much less effect on the federal budget. For example, under current rules, a one point drop in the 91-day T-bill rate that was not offset by any other rate movements, would have the following effects on the budget costs of an Unsubsidized Stafford loan. The Direct loan program would become 9 points more expensive and the Guaranteed loan program about 8 points pricier. Using a T-bill discount rate, the change for Direct loans would be under 1 point, although the change for Guaranteed loans would widen out by a point to 9 points.

However, the chance of a 1 point change in the spread between the 91-day T-bill rate and the CP rate is much lower than the chance for such a movement in the spread between short term rates and long-term Treasury bond rates. For example, commercial paper rates for financial institutions (extrapolated from regular CP rates for the earlier years) have not exceeded T-bill rates by more than one point since 1989 and have rarely been much above one point since the early 1970's.

Use of a T-bill discount rate would increase the budget cost advantage of Direct loans. The Direct Loan advantage would widen out by 5-8 points compared to Scenario 8, the base case using OMB rate projections. This advantage would hold up under almost all interest rate scenarios. It would take a virtually unthinkable change of more than 4 points in the spread between T-bill and CP rates to make Direct Loans more expensive using this discount rate method.

"Subsidized Stafford" loans cost the government the most and PLUS loans the least. "Subsidized Stafford" loans do not charge interest to students while in school, creating a major cost to the federal government. PLUS loans charge interest from the beginning and have higher interest rates by law. "Unsubsidized Stafford" loans fall in the middle of the cost range, since interest is charged in all years (even if added to principal and paid back over time), but is charged at a lower rate than for PLUS loans.

Loan defaults affect the two programs in virtually identical amounts. Federal costs generally rise modestly with increases in default rates. Default costs were a real problem at one time, but much tougher collection approaches now mean that most of the principal and accrued interest on defaulted loans is ultimately recovered, muffling the effect of this variable.

The cost differential between the programs is even less affected. The federal government ultimately bears a very high percentage of the default cost even under the Guaranteed Loan program, so the two programs are affected very similarly by a given level of defaults. In theory, the two programs could experience differing default rates, which would change the relative costs. However, according to reports from the Government Accountability Office, comparisons between the default rates of the two programs at similar types of schools tend to show little difference. (This is intuitively reasonable, since private lenders absorb so little of the default risk that they face only a small economic incentive to lend solely to those most likely to repay or to take extraordinary measures to avoid default.)

The Model

COFFI's model was developed to allow an apples-to-apples comparison of the costs of new lending under different sets of assumptions. We assume in each scenario that Congress authorizes $1,000,000 of new college lending for the coming year. The model then calculates the budget cost if the loan is issued through the Direct Loan program or, alternatively, through the Guaranteed Loan program. Each scenario produces cost estimates for each of the three loan types: Subsidized Stafford Loans, Unsubsidized Stafford Loans, and PLUS Loans. The differences between the scenarios result from differing assumptions about future interest rates, default and recovery rates, and school year of issuance (Freshman, etc.).

This approach of looking at a pool of new loans with similar characteristics allows us to avoid a common problem in comparing budget costs between the two programs. The existing portfolio of Direct Loans differ in composition from that of Guaranteed Loans along a number of dimensions, including:

- Remaining maturity of loans
- Year of original issuance
- Contractual interest rate
- Type of institution attended, such as trade school, college, graduate school
- Type of loan

Differences in aggregate historical or projected profitability thus result from many factors other than the channel used to deliver the loan to the student: the Direct Loan or Guaranteed Loan program. Our approach eliminates these factors and allows a clean direct comparison of the cost differential between the two programs for new loans. The trade-off is that our model does not directly provide estimates of the aggregate historical or future costs of either program. It could be extended to do so for new loans by expanding it to run the core model once with the right assumptions for each portfolio of loans and then aggregating the results based on the proportion of loans in each portfolio.

A number of simplifying assumptions are made that considerably reduce the analytical difficulty, without excessively affecting the calculation of the cost differential between the two programs. (There would be a greater effect on absolute cost estimates, but these are not the primary focus of this analysis.) The assumptions include:

No loans are "consolidated." Students who have multiple loans have an option to consolidate them into one loan. (They may also "consolidate" a single large loan into a new consolidated loan.) Many students have found this attractive both for the administrative convenience and because they are allowed to lock in a fixed rate and possibly a longer maturity.

Loan consolidations have a large effect on the absolute cost of the total student loan programs. However, analysis of loan consolidation would require major extensions to the model that are not likely to be justified by the level of increased accuracy of estimates of the cost differential between the two programs for the period prior to consolidation.

Students repay their loans over a 10-year period after graduation. Some students in fact prepay their loans while others extend their repayment period as a result of adverse financial circumstances. The magnitude of this effect is unlikely to differ much between the two programs.

Grace periods upon graduation are ignored. For simplicity, the model ignores the six-month grace period available to most students after graduation before they must begin repaying principal on Stafford loans. Nor do we factor in longer deferments available under certain circumstances. Thus, the model may modestly understate costs, but the amount of understatement for the two programs should be very similar.

Flat levels of principal are repaid, rather than even levels of principal and interest. As a result, our model assumes principal is paid down somewhat faster than in reality, since the principal and interest method produces payments with a low proportion of principal in the early years and a high proportion in later years. Our approach, which is much easier to model, would modestly overstate the cost differential in some scenarios and understate it in others.

All Unsubsidized Stafford Loan borrowers choose to defer paying interest while in school. The reality is close to this and the cost differential between the two programs due to this approximation should not be great.

Guaranty Agencies are treated as external entities. In reality, some of the funds held by Guaranty Agencies are owned by the federal government. For simplicity, the model treats these funds as if they were owned by the Guaranty Agencies. The effect on the costs of Guaranteed Loans depends on whether Guaranty Agencies in a particular scenario are collecting more in fees that would belong to the government or paying out more in costs that would come from segregated funds belonging to the government. The net effect should not be a major distortion.

Administrative expenses are based on overall OMB estimates. The level of the government's administrative expenses is relatively low in relation to the size of the cost differentials analyzed here. We use OMB's recent estimates for the aggregate administrative expenses, expressed as a percent of principal, for each of the Direct and Guaranteed programs. Note that we include administrative expenses as budget costs in our model, since they do affect the federal budget, even though they are not included in the specific federal subsidy calculations on the budget. (They show up in expense accounts elsewhere.)

Tax revenues are disregarded. U.S. budget analyses of program costs do not take account of offsetting taxes that would be collected from companies and individuals who would profit from related government contracts or compensation paid to government employees. (Virtually every federal expenditure produces taxable income somewhere in the economy.) As a result, we have not followed the suggestion of those who advocate inclusion of tax revenues as an offset to the budget costs of Guaranteed Loans. For completeness, we note that America's Student Loan Providers, a trade group for providers of Guaranteed Loans, argues that including tax effects would reduce the net subsidy rate for Guaranteed Loans by about 1.9 percentage points, while reducing net subsidies for Direct Loans by only 0.06 points. Direct Loan advocates argue that inclusion of these tax effects in the federal budget is inappropriate and that the purported change in the differential between the costs of the two programs is strongly overstated.

"Grandfathered" lending is disregarded. Certain lenders are able to make new loans that are covered by a much higher federal interest rate guarantee. We assume that the portfolios of loans analyzed here do not involve such lenders. This assumption understates the subsidy costs of Guaranteed Loans in the aggregate, to the extent such lending continues to occur in reality. However, it appears likely that such lending will be curtailed and we did not want to confuse readers with an unnecessary complication.

We should also note that the model is deterministic, rather than probabilistic. The cost estimates assume that the set of economic and performance assumptions all prove to be correct. Uncertainties are dealt with by looking at a variety of scenarios and seeing the range of outcomes. In a probabilistic model, the major assumptions would be given expected values and a formula for random variations around that expected value. The output would be a set of probabilities as to what the budget costs would be. We chose a deterministic model because it is much easier for a reader to understand and audit, which is one reason that official budget estimates are most often prepared on a deterministic basis.

Finally, it is important to note that we show federal costs as negative figures, in keeping with normal financial market analyses, but contrary to the usual budgetary presentation.

Sample Scenario Results

For illustration, Figure 2 shows the student cash flows for an Unsubsidized Stafford loan under the assumptions of scenario 8. This scenario uses OMB interest rate projections, without adjustment, and a 12% lifetime default rate for Stafford loans and a 15% rate for PLUS loans. In the interest of legibility, certain years are omitted.

Figure 2 Scenario 8: Unsubsidized Stafford, Student Cash Flows: Selected Years, $000

	Year							
Annual Cash Inflows/(Outflows)	**Initial**	**1**	**2**	**3**	**4**	**5**	**10**	**14**
Principal Disbursement/(Repayment)	1,000	0	0	0	0	-97	-96	-149
Interest Payments		0	0	0	0	-77	-37	-8
Payments of Capitalized Interest		0	0	0	0	-22	-22	-34
Origination Fee	-30	0	0	0	0	0	0	0
Total Cash Flow	970	0	0	0	0	-196	-155	-191
Principal	1,000	1,051	1,106	1,164	1,228	1,067	471	0
Principal Default		0	0	0	0	-43	-11	-2
Interest Capitalized to Principal		51	55	59	64			
Interest Rate		5.10%	5.20%	5.30%	5.50%	6.30%	6.30%	6.30%
Discount Rate		4.33%	4.40%	4.46%	4.52%	4.51%	4.73%	4.85%

It may be easiest to visualize the scenario as being one in which 1,000 incoming Freshmen borrow $1,000 each in Unsubsidized Stafford loans. At an initial interest rate of 5.10%, a student would be charged $51 in interest in the first year. However, in an Unsubsidized Stafford loan, the interest is allowed to "capitalize," meaning it is not paid by the student while in school and is instead added to the principal. At the end of the fourth year, the principal therefore grows to $1,228.

Following graduation, the loan goes into repayment, with a payment of $100 due in the first year (as noted above, we ignore the typical 6-month "grace period" for simplicity.) Some students will be unable to make their initial payment, reducing the average payment in this scenario to $97 in the first repayment year. At this rate, the loan is entirely repaid, with interest, 10 years after graduation, or 14 years after the origination of the loan. The $149 payment figure in the final year reflects a bit under $100 in repayment for that year, plus the net present value of recoveries in the years beyond our projection period. (This is a necessary artifice to avoid the need to continue the modeling for a number of years after the final payment is due, in order to follow the progress of recoveries of previously defaulted principal and interest.)

Interest payments decline markedly over the years, reflecting progressively lower levels of principal on which interest is due. The row of figures for Payments of Capitalized Interest shows the steady repayment of the interest capitalized during the in-school years. Some students will default on these repayments, leading to the same pattern as for repayment of the original principal. Annual capitalized interest payments are lower than they would otherwise be, due to defaults, but recoveries on these defaults boost later years, with the final year including the value of recoveries in the years beyond the projection period.

If the loans were made under the Direct Loan program, then the cash flows for the federal government would be virtually identical to those of the student, but of opposite sign. Every cash flow into the student's pocket is an outflow for the government and every payment by the student is a receipt by the government. However, there are three exceptions to this general rule:

Origination fees are adjusted for two items that vary with the choice of loan program or loan type. We start with a standard 3% origination fee included in the student cash flows. For Direct Loans, we need to adjust this downward by 1.5 points initially, due to a rebate offered to encourage timely payment of the first 12 months of principal. Many students fail to make timely payments, so there is a corresponding recoupment in year 6. Secondly, PLUS loans face an additional one point of origination fee.

The government incurs administrative expenses that do not have a corresponding student cash flow. As noted above, we use OMB's aggregate estimate of 1.45% of principal for our projection of these costs in the Direct Loan program.

Finally, in most cases, the federal government pays outside venders for their help in recovering defaulted principal and interest. 16% of the amount recovered is deducted for the three-quarters of recoveries that are not accomplished through IRS actions.

Figure 3 shows the total cash flows and their net present values for the same scenario assuming a Direct Loan. The results are combined into categories that focus on the key underlying factors. As explained in "Student Loans: A Budget Primer", the federal budget cost is equal to the net present value of the expected cash flows.

Figure 3: Net Present Value of Federal Cash Flows: Direct Loan, $000

	Total Cash Flow	**NPV**
Principal Disbursement	-1,000	-1,000
Principal Repayment	880	581
Recoveries of Principal & Interest, ex capitalized int.	138	85
Other Costs Related to Recoveries	-17	-10
Interest on Principal, before Capitalization	545	426
Subtotal, principal and interest	547	81
Interest Capitalized	-228	-204
Repayment of Capitalized Interest	201	133
Recoveries of Capitalized Interest	32	19
Other Costs Related to Recoveries	-4	-2
Interest on Capitalized Interest	94	69
Subtotal, capitalization of interest	94	14
Federal Interest Subsidy	-	-
Origination Fee, net of interest rebate	21	20
Administrative Expenses	-15	-15
Total	**647**	**101**

Over the course of the loan, the government would receive back $1,547 in principal and interest for each original loan of $1,000, after subtracting recovery costs, for a net positive cash flow of $547. Defaults, recoveries, and related expenses virtually cancel out, with $120 in defaults ($1,000 minus $880 of timely principal payments), $17 of recovery costs, and $138 in offsetting recoveries of accrued principal and interest. (Recoveries generally run higher than the original defaulted principal for the student loan program. This is due to very high recovery rates, combined with recovery of accrued interest for the period the loan was not being repaid, plus any recovery fees charged to the borrower.)

The rest of the $1,547 represents interest on the loan. However, the value of the $1,547 in receipts is only $81 higher than the value of the original $1,000 in principal, once the time value of money is taken into account. The $1,000 cash outflow occurs at the beginning of the loan, but the $1,547 is taken in over 14 years and therefore is reduced by an appropriate discount factor.

There is a similar, though smaller, effect from the capitalization of interest while the student was in school. This is equivalent to the government making a side-loan of $228 to cover the four years of in-school interest payments, for which it then received $322 in repayments. The repayment consists of $229 for the original capitalized interest, including the effects of defaults and recoveries, and $94 in additional interest payments on the implicit side-loan (Note that the government does not actually advance any funds to capitalize the interest, but the economic effects of foregoing the interest payments are equivalent to putting up the money.) The $94 positive total cash flow on the side-loan has a much lower net present value of $14, again due to the pattern of cash flows, with the government foregoing cash flow in the first four years, with repayments spread over the next 10 years.

Finally, there is a small positive cash flow from the origination fee charged the student, minus administrative costs for the loan program.

Figure 4 shows the total federal cash flows and their net present values for the same scenario, assuming that the loan was made as a Guaranteed Loan.

Figure 4: Net Present Value of Federal Cash Flows: Guaranteed Loan, $000

	Cash Flow	**NPV**
Payments to lenders on Defaulted Principal	-137	-100
Recoveries on Defaulted Principal	136	84
Special Allowance Payments to Lenders	-24	-19
Subtotal, principal and interest	-25	-35
Fees Paid to Guaranty Agency	-4	-4
Origination Fee Collected by Government	30	30
Loan Fee from Lenders	5	5
Subtotal, fees	31	31
Administrative Expenses	-7	-7
Total	**-1**	**-10**

Unlike in Direct lending, the government has no outflow for the initial loan principal, nor later inflows as that principal is repaid, since private lenders provide the actual loan. The main federal costs relate to the guarantees it provides lenders that principal and interest will be repaid and that lenders can count on a certain minimum spread between an index serving as a proxy for their own cost of funds and the rate charged to borrowers for the student loans.

The net effect of loan defaults and recoveries for a Guaranteed Loan will always be similar to that for a Direct Loan, since the federal government absorbs virtually all of the default risk. Our Direct Loan analysis showed a gain of $1 on defaults, after accounting for recoveries and related costs. The Guaranteed Loan case has a net loss of $1 for the government. This consists of $137 of guarantee payments on the defaults offset by $136 of recoveries.

Although defaults are balanced by recoveries in gross terms, the net present value effect is worse, because default payments are made earlier than recoveries are received. Defaults cost $16 more in net present value terms than is recovered. (An equivalent effect occurs for Direct Loans, since the timing is fundamentally the same.)

The private lenders receive $24 in Special Allowance Payments to compensate them for a modest difference between the interest rate paid by the students and the rate guaranteed to the lenders, based on a spread over commercial paper rates.

Finally, the government collects $30 in origination fees from students, $5 in loan fees from lenders, and pays $4 to Guaranty Agencies for their part in the initial paperwork. There are also federal administrative costs of $7 for coordinating with, and monitoring, lenders and Guaranty Agencies. Again, this is based on OMB estimates for the Guaranteed Loan program in aggregate.

The biggest factor behind the higher federal cost for Guaranteed Loans comes from the lack of an opportunity to profit from lending to the students at a rate higher than the discount rate used in the budget calculations. For example, in the first year of a Direct Loan, the federal government would charge $51 in interest on a $1,000 loan while the discount rate would result in an implicit charge of only $43, for a net gain of $8.

In total, each $1,000 loan in this scenario would cost $111 more, in budget terms, as a Guaranteed Loan than it would as a Direct Loan. As noted, this largely reflects the lost opportunity to lend to students at a rate higher than the federal government's budget costs.

Federal Budget Costs under Different Scenarios

Figure 1 (repeated): Federal Budget Benefit/(Cost) of New Student Loans, as % of principal

Scenario				Unsubsidized Stafford			Subsidized Stafford			PLUS		
	Rate Scenario	Adjustments	Annual Defaults	Direct	FFELP	Diff.	Direct	FFELP	Diff.	Direct	FFELP	Diff.
1	Current		None	13.3	0.5	12.8	-9.0	-19.6	10.6	13.7	2.4	11.2
2	Current		Base	11.5	-1.1	12.6	-10.4	-20.8	10.4	11.4	0.6	10.8
3	Current	All rates +5 pts	Base	-11.0	-21.0	9.9	-35.1	-42.7	7.6	-3.1	-10.9	7.8
4	Current	All rates +5 pts, no caps	Base	9.0	-1.7	10.7	-27.2	-34.7	7.6	8.4	-0.5	8.9
5	Current	T-bill one point up	Base	20.6	0.7	19.9	-6.7	-22.8	16.1	15.9	0.6	15.3
6	Current	CP one point up	Base	11.5	-9.7	21.2	-10.4	-28.2	17.8	11.4	-2.6	14.0
7	Current	Bonds one pt up	Base	2.5	-1.1	3.6	-17.7	-20.4	2.7	6.4	0.3	6.1
8	OMB		Base	10.1	-1.0	11.1	-10.3	-19.4	9.1	10.3	0.6	9.7
9	OMB		Double	8.4	-2.5	10.9	-11.7	-20.6	9.0	9.0	-0.4	9.4
10	OMB	T-bill discount rate	Base	17.1	-1.0	18.1	-4.6	-19.8	15.2	14.3	0.8	13.5
11	OMB	T-bill and CP +1 pt, T-bill disc. rate	Base	17.9	-0.8	18.7	-0.2	-16.4	16.3	15.2	1.1	14.1
12	OMB	T-bill and CP +1 pt, Bond disc. rate	Base	1.5	-0.9	2.5	-14.0	-15.8	1.8	5.8	0.6	5.2

Figures may not add due to rounding

This section explains the results for 12 scenarios. Scenarios 1 through 7 assume rates for T-bills, commercial paper, and a set of zero coupon Treasury bonds remain constant during the 14 years at November's levels. This allows us to illustrate certain relationships without confusions caused by rate changes over time. Scenarios 8 and higher use rates projected by OMB in their mid-year review (except for the zero coupon bond rates, which are as of early November.) Rates beyond the OMB projection period are assumed to remain flat at the level of the final projected year. Both sets of scenarios produce roughly the same overall relationships, such as between the costs of the two loan programs and between the costs of different loan types. All scenarios shown here assume that the borrower is a Freshman in college.

Scenario 1

Both student loan programs are basically profitable in our model if current interest rates held indefinitely and there were no loan defaults. The exception to this profitability is for the Subsidized Stafford loans, since four years of the federal government absorbing the interest costs is sufficient in all of our scenarios to offset the interest rate spread earned on the basic loan.

The budget cost of Direct Loans is cheaper than for Guaranteed Loans by 11-13% of the original principal amount under the various loan types. As noted, the main driver of this differential is the spread between the rate charged to borrowers and the discount rate used for federal budget purposes, which is based on the government's own, lower, borrowing costs.

Scenario 2

Factoring in defaults reduces the profitability by a point or two, with little effect on the cost differential between the programs. The absolute impact is low because recovery rates are so high for college loans. The *relative* impact is much lower still, since the federal government absorbs virtually of the default cost under both programs, either directly or through guarantee payments. The base level of defaults is assumed to be 12% over the life of Stafford loans and 15% over the life of PLUS loans. The majority of defaults are projected to occur in the first three repayment years.

Scenario 3

A massive rise in all interest rates would be very expensive for the federal government, due to caps on the interest rates that can be charged to students and parents. If all rates more than doubled, by rising a uniform 5 percentage points, then college loans would become unprofitable to the tune of 3-43% of the original principal amount.

An Unsubsidized Stafford loan made through the Direct program swings 22.5 points, from 11.5% positive to a negative 11.0% budget cost. (Guaranteed Loans move by 22.1 points.) Almost all of this negative swing is due to the rate caps that limit the interest paid by borrowers without holding down the government's own interest costs, either its direct borrowing costs or the cost of ensuring the promised interest spread to lenders in the Guaranteed program. Scenario 4, which assumes rate caps are abolished, shows only a 2.5 point decline in profitability.

Subsidized Stafford loans are hit worst, since the cost of foregoing interest payments entirely for the in-school period rises when interest rates increase.

Even after a doubling of interest rates, Direct loans would remain cheaper than Guaranteed loans, by 8-10 points.

Scenario 4

This scenario shows that it is the caps and not the absolute rise in interest rates that creates the unprofitability. Direct Lending for Unsubsidized Stafford and PLUS loans would be only 2-3 points less profitable if rates rose by 5 points, but caps were not in place. Federal costs for Subsidized Stafford lending naturally climb more, since the cost of providing four years of free interest to the students is much larger at high interest rates. Guaranteed Loans remain 8-11 points more expensive than Direct Loans.

Scenario 5-7

Varying the three individual rates by one point each, while holding the others constant, produces divergent effects, depending on which rate is moved.

An increase in the T-bill rate raises the interest rate paid by the student, buoying the federal profitability considerably compared to Scenario 1. Direct lending receives the greatest increase in profitability compared to Scenario 2, since every extra dollar of interest flows to the government. Lenders would retain some of the increased interest earnings from Guaranteed Loans, increasing the cost differential for the government between Direct Loans and Guaranteed Loans. This is most extreme with PLUS loans, where the higher interest rate paid by parents is completely absorbed by lenders, since Special Allowance Payments are already at zero in Scenario 2 and therefore cannot go lower.

The profit improvement is smaller for both programs for Subsidized Stafford Loans, since the government has a greater cost of foregone interest for the first four years where interest is not charged to the students. Unsubsidized Stafford loans made through the Direct program gain the most, both in absolute terms and relative to the Guaranteed program. This is because the "side-loan" for capitalized interest, which only occurs with Unsubsidized Stafford loans, becomes very profitable. The government captures all of this benefit in the Direct program, but only a small piece in the Guaranteed program.

Raising the commercial paper rate for financial institutions by one point, without changing other rates, would have no effect on the budget cost of the Direct Loan programs, but would make Guaranteed Loans more expensive. A higher commercial paper rate raises the level of the minimum guaranteed interest rate promised to lenders, increasing the need to make Special Allowance Payments to them. The effect is smaller for the PLUS program, since the first portion of the one point increase would merely eliminate the margin between the rate paid by students and the, initially lower, minimum guaranteed rate.

It should be noted that commercial paper rates move closely with T-bill rates, so that a full one point rise in one with no effect on the other is very improbable, as explained above.

Finally, moving the 10-year Treasury Bond rate up by one point without a change in short term rates is more plausible, since long term rates move somewhat independently of shorter term rates. Such a move would act on federal budget costs only through a resulting one point rise in the discount rate. This would have much more effect on Direct Loans, since federal cash outflows occur almost entirely in the first year while the inflows are spread over many years. (Guaranteed Loan cash flows are more evenly spread as a percentage of total cash flows.)

If current rates otherwise remained in effect throughout the period, a 1.4 point rise in the discount rate would make Direct and Guaranteed Stafford loans roughly equal in cost to the government. PLUS loans remain more profitable as Direct loans than as Guaranteed loans – it takes a roughly 2.4 point rise in the discount rate for these to break even. This is because PLUS loans pay off more quickly and are therefore less affected by discount rates and because the profit differential is greater to start with for PLUS loans.

In the last 50 years, the spread has been above the cross-over point for Stafford Loans about 30% of the time and above that for PLUS loans about 9% of the time. (This calculation uses the spread between the month-end interest rate on the 10-year T-bond and the 91-day T-bill rate.) This is only a very rough indicator of probability, since the conditions of the last 50 years will certainly not repeat themselves precisely.

Scenario 8

OMB projections are likely to be more accurate than merely projecting present rates forward for the next 14 years, therefore the remainder of our scenarios use OMB rate projections. There will almost certainly be more rate movement in reality than in OMB's projections, but it is difficult to know the timing and direction of these variances.

The base OMB case, with our standard default assumptions, shows profitability patterns similar to those with current rates shown in Scenario 2. The cost differential between Direct and Guaranteed loans is about a point and a half lower, but not dramatically different, and shows the same pattern of cost differentials across loan types as with Scenario 2.

Scenario 9

A doubling of the annual default percentage reduces profitability by 1-2% of the original principal amount. This factor is virtually identical for all types of loans and both lending programs, since private lenders and Guaranty Agencies absorb only small amounts of the default risk, leaving the

government with a similar net cost of defaults between the two programs. As a result, the cost differential moves by only about 0.2 points when defaults double.

Scenario 10

As explored in Appendix 1, there is a serious argument that the discount rate for student loans should be tied to a short-term rate index, rather than to a long-term bond rate. If the 91-day Treasury bill were used as the discount rate, just as it is used to determine the interest rate paid by students, then the budget cost of Direct Loans improves by 4-7 points. Since Guaranteed Loans are only slightly affected by the discount rate, this would result in a considerable widening of the cost differential between Direct and Guaranteed Loans.

Scenario 11

A major advantage of switching to a short-term discount rate for these floating rate loans would be that budget costs would be significantly less sensitive to interest rate movements. Changes in long-term rates would entirely stop affecting the budget numbers, since no calculations would any longer use long-term rates. Movements in short-term rates would tend to balance out. For example, a decrease in the T-bill rate would lower interest collected from students, but would also lower the discount rate in a similar proportion, raising the value to the government of future inflows.

Scenario 11 shows that a one point decline in both the 91-day T-bill rate and the CP rate would have less than a one point impact on budget costs for loans without an in-school interest waiver, assuming a T-bill rate is used as the discount rate. As discussed earlier, T-bill and CP rates tend to move in tandem, at least within a fraction of a percentage point, so a full one point move would be a very large swing by historical standards. Both Direct and Guaranteed Loan costs remain virtually flat, although Subsidized Stafford loans are still helped somewhat by a lower interest rate, due to the waiver of interest payments for students who are in school. Interest waivers cost less when rates are lower.

Scenario 12

For comparison with Scenario 11, the same one point decline in T-bill and CP rates would make a much greater difference in budget costs using the current-law discount rate. Direct Loan costs increase by 4-8 points compared to Scenario 8. Just as in Scenario 11, Guaranteed Loan costs are little changed, except for Subsidized Stafford loans – again due to their in-school interest waiver.

A note on Risk-Adjusted Discount Rates

A careful reader may have noted that none of our scenarios illustrate the effects of changing to another potential discount rate methodology. Many experts support the use of a risk-adjusted rate for measuring the budget costs of all federal lending programs, rather than the current method of using the government's overall borrowing rates. (See a summary discussion in "Budgeting for Federal Credit Programs: A Primer," available at www.coffi.org.) Unfortunately, our model cannot easily simulate such a change in methodology.

It might seem that this could be simulated in our model by raising the discount rate without changing other rates. However, this would produce misleading results. The risk adjustment should be set to reflect the actual risks involved. In this case, the major risks are related to defaults and to interest rate movements. For student loans, the federal government takes on all of these risks in the Direct Loan program and much of them in the Guaranteed Loan program. Thus, any switch to risk-adjusted rates should show increased subsidy costs for both programs.

A simple increment to the discount rate would not produce this result, because of the strong differences in the timing of federal cash flows between the two channels. A higher discount rate would have the desired effect for Direct Loans, since all years beyond the first show net inflows, whose net present value would be reduced by a higher discount rate. Thus, federal budget costs would be higher, the larger the risk factor. However, federal cash flows in the Guaranteed Loan cases are generally outflows after the first year. A higher discount rate would make these outflows smaller in present value terms, paradoxically *decreasing* the federal budget cost. There appears to be no economic argument for such a result. Thus, a more complicated methodology would need to be developed to fairly compare the budget costs of adjusting college loans for their riskiness.

America's Student Loan Providers, a trade group for providers of Guaranteed Loans, made a rough adjustment to reflect their perception of the risk factors. They added 0.25% per year to the cost of funds for the Direct Loan program, for a net present value effect on the subsidy level of 1.5 points. It is unclear from their white paper whether this is intended to represent the *net* effect of differences in federal risk exposure between the two programs or just the gross effect of risks in the Direct Loan program. If it is just for Direct Loans, then a similar analysis would need to be done to evaluate the appropriate adjustment for the government's default and interest rate risks in the Guaranteed Loan program. In either event, more information would be needed to evaluate the choice of a 0.25% risk adjustment. (In fact, the trade group itself called for a more thorough study.)

One interest rate risk that should probably not be included in the analysis is the artificially created mismatch between the long-term discount rate used for budget purposes and the borrowers' short-term interest rate. This issue is discussed further in Appendix 1, in the context of an appropriate discount rate methodology for budget purposes. Whatever one chooses for budgeting, the mismatch does not represent an intrinsic economic risk to the government. The Treasury Department could easily eliminate the risk by choosing to fund the student loan program by issuing 91-day T-bills and locking in a guaranteed interest rate spread.

Appendix 1

Should the Discount Rate Be on a Floating Rate Basis?

The following excerpt from "Student Loans: A Budget Primer", available at www.coffi.org, discusses the question of a floating rate discount rate.

The student loan program is unusual among federal lending programs in that the borrower generally pays a floating rate. (The rate is reset once a year, based on the relevant 91-day T-bill rate.) This has raised the analytical question as to whether it would be more appropriate to use a discount rate based on short-term interest rates, rather than using a rate based on the final maturity of the loan. There was little or no discussion in Congress of this issue when the Federal Credit Reform Act of 1990 was passed, in part because there were no significant floating rate lending programs at that point. (Student loans were still offered on a fixed rate basis.) There has been discussion of this issue periodically since then, including in the early days of the Direct Loan program, but no action has been taken.

As noted above, Congress has chosen to use the government's cost of funds as the basis for the discount rates used. Congress further chose to define the cost of funds not as the actual borrowing rate experienced by the Treasury Department for a particular program, but as the borrowing rate that eliminated any interest rate risk on a fixed rate loan. That is, the rate on a 10-year government borrowing is used as the discount rate for a payment 10 years in the future, even if the likelihood is that the Treasury Department would finance the 10 years through a series of shorter term borrowings that were rolled over. This is consistent with the views of financial economists, regulators, and financial markets as to the lowest risk way to finance a future payment.

Similar logic would suggest that the lowest risk way to finance a floating rate lending program would be to borrow at a floating rate with similar characteristics. That is, funding the student loan program through 91-day T-bills would produce future interest costs that would most closely match the expected interest receipts. (The most precise match would have to take account of the fact that the rate is a 91-day rate, but it is only reset once a year. The best fit might therefore be an instrument a bit longer than the 91-day T-bill, although not as long as the 1-year T-bill.)

This funding pattern might not intuitively seem to be the lowest risk choice, since the cost of funds would be considerably more variable than locking in a long-term fixed rate. However, this looks at only one half of a linked equation. Congress presumably cares about the net cost of the program, which is determined by the **difference** between the lending rate and the cost of funds. This difference is highly volatile today, since long-term bond rates can move significantly differently from the 91-day T-bill rate. Using the same rate for both would eliminate this source of volatility.

Congress appears to view the discount rate as if it were the actual underlying cost of funds. On that basis, evaluating the floating rate student loan program by using a long-term fixed rate is equivalent to a private lender borrowing long-term and lending short-term. Lenders sometimes do this for pieces of their overall portfolio as an explicit interest rate bet, but it is considered

irresponsible if applied as a consistent strategy to the whole firm. This type of asset-liability mismatch was a major contributor to the Savings & Loan crisis.

For a private lender, this mismatch would produce major swings in profitability. For the government, the mismatch between the bases for determining the discount rate and the interest rate paid by students has produced similar swings in the budget cost of student lending.

