THE MACROECONOMIC EFFECTS OF STUDENT DEBT CANCELLATION

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Executive Summary[1]

More than 44 million Americans are caught in a student debt trap. Collectively, they owe nearly $1.4 trillion on outstanding student loan debt. Research shows that this level of debt hurts the US economy in a variety of ways, holding back everything from small business formation to new home buying, and even marriage and reproduction. It is a problem that policymakers have attempted to mitigate with programs that offer refinancing or partial debt cancellation. But what if something far more ambitious were tried? What if the population were freed from making *any* future payments on the current stock of outstanding student loan debt? Could it be done, and if so, how? What would it mean for the US economy?

This report seeks to answer those very questions. The analysis proceeds in three sections: the first explores the current US context of increasing college costs and reliance on debt to finance higher education; the second section works through the balance sheet mechanics required to liberate Americans from student loan debt; and the final section simulates the economic effects of this debt cancellation using two models, Ray Fair's US Macroeconomic Model ("the Fair model") and Moody's US Macroeconomic Model.

Several important implications emerge from this analysis. Student debt cancellation results in positive macroeconomic feedback effects as average households' net worth and disposable income increase, driving new consumption and investment spending. In short, we find that debt cancellation lifts GDP, decreases the average unemployment rate, and results in little inflationary pressure (all over the 10-year horizon of our simulations), while interest rates increase only modestly. Though the federal budget deficit does increase, state-level budget positions improve as a result of the stronger economy. The use of two models with contrasting long-run theoretical foundations offers a plausible range for each of these effects and demonstrates the robustness of our results.

A one-time policy of student debt cancellation, in which the federal government cancels the loans it holds directly and takes over the financing of privately owned loans on behalf of borrowers, results in the following macroeconomic effects (all dollar values are in real, inflation-adjusted terms, using 2016 as the base year):[2]

- The policy of debt cancellation could boost real GDP by an average of $86 billion to $108 billion per year. Over the 10-year forecast, the policy generates between $861 billion and $1,083 billion in real GDP (2016 dollars).
- Eliminating student debt reduces the average unemployment rate by 0.22 to 0.36 percentage points over the 10-year forecast.
- Peak job creation in the first few years following the elimination of student loan debt adds roughly 1.2 million to 1.5 million new jobs per year.
- The inflationary effects of cancelling the debt are macroeconomically insignificant. In the Fair model simulations, additional inflation peaks at about 0.3 percentage points and turns negative in later years. In the Moody's model, the effect is even smaller, with the pickup in inflation peaking at a trivial 0.09 percentage points.
- Nominal interest rates rise modestly. In the early years, the Federal Reserve raises target rates 0.3 to 0.5 percentage points; in later years, the increase falls to just 0.2 percentage points. The effect on nominal longer-term interest rates peaks at 0.25 to 0.5 percentage points and declines thereafter, settling at 0.21 to 0.35 percentage points.
- The net budgetary effect for the federal government is modest, with a likely increase in the deficit-to-GDP ratio of 0.65 to 0.75 percentage points per year. Depending on the federal government's budget position overall, the deficit ratio could rise more modestly, ranging between 0.59 and 0.61 percentage points. However, given that the costs of funding the Department of Education's student loans have already been incurred (discussed in detail in Section 2), the more relevant estimates for the impacts on the government's budget position *relative to current levels* are an annual increase in the deficit ratio of between 0.29 and 0.37 percentage points. (This is explained in further detail in Appendix B.)
- State budget deficits as a percentage of GDP improve by about 0.11 percentage points during the entire simulation period.
- Research suggests many other positive spillover effects that are not accounted for in these simulations, including increases in small business formation, degree attainment, and household formation, as well as improved access to credit and reduced household vulnerability to business cycle downturns. Thus, our results provide a conservative estimate of the macro effects of student debt liberation.

Introduction

There is mounting evidence that the escalation of student debt in the United States is an impediment to both household financial stability and aggregate consumption and investment. The increasing demand for college credentials coupled with rising costs of attendance have led more students than ever before to take on student loans, with higher average balances. This debt burden reduces household disposable income and consumption and investment opportunities, with spillover effects across the economy. At the same time, the social benefits of investment in higher education—including human capital accumulation, social mobility, and the greater tax revenues and social contributions that flow from a highly productive population—remain central to the economic advantages enjoyed by the United States. In this context, students, educators, and policymakers have called for a range of solutions to the rising cost of college and the encumbrance of borrowers. In this report, we examine the macroeconomic effects of one of the boldest of these proposals: a program of outright student debt cancellation financed by the federal government. If student debt is indeed dampening household economic activity, we expect liberation from this debt to produce a stimulus effect that will partially offset the cost of the program. In fact, we find that cancelling student debt would have a meaningful stimulus effect, particularly in the first five years, characterized by greater economic activity as measured by GDP and employment, with only moderate effects on the federal budget deficit, interest rates, and inflation over the forecast horizon. Overall, the macroeconomic consequences of student debt cancellation demonstrate that a reorientation of US higher education policy can include ambitious policy proposals like a total cancellation of all outstanding student loan debt.

Higher education is a valuable social investment, with research demonstrating social returns up to five times the dollar amount of public spending in the United States (OECD 2015). The diffusion of these benefits across the economy makes them a classic example of positive externalities, a condition in which individual cost/benefit calculations that omit social benefits will result in a market failure. In these cases, public investment is necessary to avoid chronic underinvestment. Yet in the United States over the past three decades, public funding of higher education has been in decline (SHEEO 2015). At the same time, the increasing need for a college credential to access key labor market entry positions provided incentives for more students to take on debt. This student loan debt imposes a significantly higher burden on household finances than ever before, as stagnant real incomes and higher average balances combine to divert a larger portion of household resources toward debt service and away from consumption and investment.

It is possible for the federal government to reduce or remove the burden of student loan debt as a means of direct support to household spending. In this report, we examine the mechanisms that facilitate debt cancellation using T-accounts to map the transactions associated with the program. In a government-financed cancellation program, the current loan portfolio of the Department of Education is cancelled and the federal government either purchases and cancels or takes over the payments for privately owned loans. One of the more significant takeaways here is the realization that, because the loans made by the Department of Education—which make up the vast majority of student loans outstanding—were already funded when the loans were originated, the new costs of cancelling these loans are limited to the interest payments on the securities issued at that time. An alternative route, which some have advocated, involves the Federal Reserve buying up student loan debt and warehousing the losses on its own balance sheet. We consider this option below, noting that this avenue would most likely require authorization from Congress. Importantly, we also show that any program led by the Federal Reserve results in the same consequences for the federal government's budget position as a government-led program—that is, there is no "free lunch" that avoids the budgetary implications of cancelling student debt.

We also simulated the student debt cancellation program using two macroeconometric models to examine the implications of cancellation and incorporate feedback effects that go beyond the balance sheet analysis. The first-round effect of student debt cancellation is an increase in the wealth and disposable income of student loan borrowers. These effects translate to higher spending in a variety of consumption and investment categories, which represent greater economic activity and produce additional income, jobs, and tax revenue. We relied on two macroeconomic models to simulate these effects: Ray Fair of Yale University's US Macroeconomic Model ("the Fair model") and Moody's US Macroeconomic Model, the forecasting model used by Moody's and Economy.com. The Fair model and the Moody's model share a Keynesian short-run theoretical foundation. In the long run, however, the assumed relationships differ, as Moody's takes on a "Classical core" while the Fair model remains fundamentally Keynesian. In addition to two models with distinct foundational assumptions, we also implemented two alternative assumptions about the Federal Reserve's interest rate response to the debt cancellation stimulus. The use of models with contrasting long-run theoretical foundations and alternative scenarios demonstrates the robustness of the results in this report, and also allows us to present a plausible range for each of the estimated effects of a federally financed student debt cancellation.

A program to cancel student debt executed in 2017 results in an increase in real GDP, a decrease in the average unemployment rate, and little to no inflationary pressure over the 10-year horizon of our simulations, while interest rates increase only modestly. Our results show that the positive feedback effects of student debt cancellation could add on average between $86 billion and $108 billion per year to the economy. Associated with this new economic activity, job creation rises and the unemployment rate declines.

The macroeconomic models used in these simulations assume an essentially mechanical Federal Reserve response to lower unemployment. Suppressing this response—in other words, assuming the Fed does not raise its interest rate target—provides an upper bound for the range of possible outcomes associated with more nuanced central bank policy. In fact, both models forecast little to no additional inflation resulting from the cancellation of student debt. In the Fair model, inflation peaks at an additional 0.3 percent and turns negative after 2020, meaning that debt cancellation reduces inflation in later years. In the Moody's model, the inflationary effects are never higher than 0.09 percent throughout the period. These forecasts suggest that there is room for flexibility in the assumptions made about Federal Reserve tactics as a response to debt cancellation. Since even the largest effect on inflation in a single year is of little macroeconomic significance, it is arguable that the Fed would not react to the student debt cancellation program by raising its target interest rate.

Student debt cancellation is a large-scale program in which the government must repay privately held loans and forego interest rate payments on the loan portfolio of the Department of Education. It is reasonable to expect such a program to add to the federal government's budget deficit, absent extraordinarily strong feedback effects from the program's macroeconomic stimulus. Our simulations show that student debt cancellation raises the federal budget deficit moderately. The average impacts on the federal deficit in the simulations are between 0.65 and 0.75 percent of GDP per year. However, the more relevant figures for the annual impact on the federal deficit fall in a range between 0.29 and 0.37 percent of GDP—this accounts for the fact that, for the Department of Education loans, only debt service on the securities originally issued will add to current deficits and the national debt. The simulations, by their nature, assume the full costs of the foregone principal and interest on the Department of Education loans are incurred in the cancellation. In Section 3 and Appendix B, we explain the reasons for this assumption embedded in the simulations (which generates estimates of budget impacts relative to a no-cancellation baseline scenario) and how the lower, more relevant figures (estimates of budget impacts relative to current deficit and debt levels) are arrived at. Only the Fair model enables forecasts of state-level budget positions, and we find improvements in states' budget positions as a result of the stimulus effects of the debt cancellation. These improvements will reduce the need for states to raise taxes or cut spending in the event of future recessions.

It is important to note that the macroeconomic models used in this report cannot capture all of the positive socioeconomic effects associated with cancelling student loan debt. New research from academics and experts has demonstrated the relationships between student debt and business formation, college completion, household formation, and credit scores. These correlations suggest that student debt cancellation could generate substantial stimulus effects in addition to those that emerge from our simulations, while improving the financial positions of households.

Our analysis proceeds in three sections. Section 1, "The Economic Opportunity of Student Debt Cancellation," explores the US context of student borrowing, including reductions in public investment in higher education and the rising cost of a college degree, the social costs of rising debt, and the distributional implications of debt and debt cancellation. Section 2, "The Mechanics of Student Debt Cancellation," explains the instruments of debt relief, whether enacted by the federal government or its central bank (the Federal Reserve), and demonstrates the balance sheet effects of debt cancellation on the government, the Federal Reserve, banks, borrowers, and private lenders. Finally, Section 3, "Simulating Student Debt Cancellation," measures the effects of the program on key macroeconomic variables using simulations in two models—the Fair model and Moody's model—under alternative assumptions, and examines the costs and benefits of student debt relief that are omitted from the models.

Section 1: The Economic Opportunity of Student Debt Cancellation

In the United States, attaining a college degree has long been viewed as a safe investment for individuals and for the nation as a whole. The funding of higher education from both public and private sources exemplifies the joint character of this investment, and a strong system of public education has conferred broad social and economic benefits. Yet over the past three decades our common commitment to education has broken down. American households increasingly shoulder the burden of financing higher education. This private financing of higher education requires a growing share of household consumption and investment spending, drawing resources away from other sectors such as housing and other markets for consumer finance. Most students today meet the growing cost by taking on debt. As a result of the shifting financial responsibility for higher education, student debt is at record highs. College graduates begin their careers with debt payments that absorb income and supplant other important early-adulthood investment opportunities. Moreover, the increasingly private responsibility for financing higher education diverts attention from the important social benefits of an educated population as economic decisions focus more and more on individual returns. Thus, the debt-based system of higher education finance comes at a larger cost: student debt limits the economic opportunities of today's young people, depletes other forms of consumer and investment spending in the economy, and undermines the commonly shared gains that derive from an educated workforce and citizenry.

Social Investment in Higher Education

The individual benefits of a college degree are widely acknowledged, but the increasing focus on individual financing has largely neglected similar calculations on the social scale. The returns to individuals accrue in terms of employment opportunities and lifetime earnings. Comparing workers with a bachelor's degree to those whose education ended with a high school diploma shows that a postsecondary credential is more and more valuable, leading college graduates to higher lifetime incomes and lower unemployment rates relative to those without a degree (Vandenbroucke 2015). However, mounting economic evidence suggests the labor market is increasingly credentialized, and hence persistent higher education wage gaps reflect worsening outcomes for those without degrees—thus the growing imperative of obtaining a higher education credential, even as the costs are shifted to individual students.

These benefits, combined with wider opportunities in both the labor market and the higher education system for women and people of color, have driven rates of college attainment among adults in the United States from less than one in ten 50 years ago to a record high of approximately one in three today (US Census Bureau, Table A-2). Similarly, higher education is a valuable social investment, with positive spillover effects from generating new knowledge and expanding skills at both local and national levels. The higher incomes associated with a college degree represent greater productive capacity and a higher value of human capital stock economy-wide. These direct and often clearly monetized gains accrue in terms of skills, income, and increased productivity that contribute to GDP growth and rising living standards for the entire economy.

Recent research from the Organisation for Economic Co-operation and Development (OECD 2015) shows that the social benefits of public spending on higher education far outweigh the public costs. In the United States, lower unemployment rates, higher tax revenues, and other social contributions associated with educated workers result in net social benefits worth between two and five times the dollar amount of public spending on higher education. Yet even these impressive figures capture only part of the gains. Research shows that better-educated people live longer, healthier lives, commit fewer crimes, and are more civically engaged (OECD 2015). Higher education plays a key role in our nation's socioeconomic mobility and, as a result, access to higher education is a crucial facet of equality of opportunity for young people and families hoping to achieve a better life. Finally, an increasingly productive and highly educated society yields intergenerational advantages, as the associated institutions, networks, and aptitudes are passed down over time. Accounting for each of these benefits would raise estimates of the reward for society beyond the OECD figures by reducing public expenditures on health care and crime, improving quality of life, and contributing to equality of opportunity and political stability.

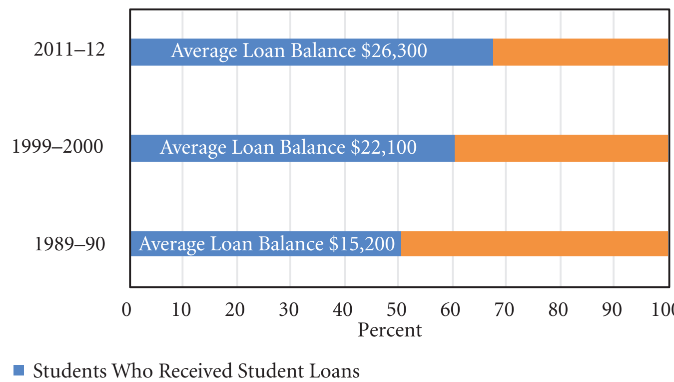
The social benefits of increasing educational attainment are dispersed, generating returns even for those individuals who choose to forego a college degree. These dispersed benefits in the market for higher education are a classic example of positive externalities—benefits accruing as a result of exchange that are not taken into account by private buyers and sellers. Like other markets where positive externalities exist, the omission of social benefits in individual cost/benefit calculations results in a market failure. A higher education market composed of purely private exchange would lead to conditions of chronic underinvestment. The key to avoiding a market failure and capturing the social returns of an educated population is public support. The United States has a history of financing higher education in partnership with students and their families, with the majority of college students attending public institutions supported by state and federal spending (NCES 2015, Table 303.7). Yet over recent decades that partnership has devolved and individuals are taking on a growing share of the cost of higher education.

The rising individual cost burden of attaining a college degree also has spillover effects on the rest of the economy. With declining state support and a persistent social and economic demand for college credentials, postsecondary education is increasingly financed through debt. This debt weighs on household finances, affecting the consumption and investment opportunities of borrowers, with ripple effects across other consumer debt markets and beyond. Debt service payments reduce disposable income and consumption spending. College graduates focused on paying down debt are putting off other investments, like buying a home or starting a family—or taking on yet more debt to obtain graduate degrees that are increasingly necessary as the labor market credentializes. And as the individual investment perspective drives a greater share of the market, society risks losing valuable benefits to a higher education market failure.

The current state of student debt

More than ever before, Americans recognize higher education as an important milestone on the pathway toward prosperity and financial stability. As a result, waning public support for higher education and rising individual costs have prompted the growth of student debt to record levels. According to the Federal Reserve (2016), outstanding student loan debt totaled $1.35 trillion as of the first quarter of 2016—an amount 28 percent greater than all motor vehicle loans and 40 percent greater than the value of outstanding student loan debt just five years ago. The vast majority of this debt originates from federal lending, with the private student loan market accounting for just 7.6 percent ($99.7 million) of all student debt (MeasureOne 2015). The growth in borrowing occurred as more college students turned to loans to finance their education and the typical loan amount per borrower increased (see Figure 1.1). In the 1989–90 academic year, 50.5 percent of undergraduate seniors ages 18–24 relied on student loans for some portion of their college costs. The average loan amount among those borrowing was $15,200. At the end of the 2011–12 academic year, 68

Figure 1.1 Percentage of Undergraduate Seniors Who Received Student Loans



Source: NCES 2014 Digest of Education Statistics, Table 331.95

Table 1.1 Share Borrowing and Cumulative Amount Borrowed for Undergraduate Education among Those with Debt, by Race/Ethnicity and by Institution Type for Graduating Seniors, 2011–12

	Share Borrowing	Cumulative Borrowing
Total	69%	$29,384
Race/Ethnicity (with multiple)		
White	67.5%	$29,065
Black or African American	84.2%	$33,015
Hispanic or Latino	71.9%	$29,517
Asian American	47.2%	$23,135
American Indian or Alaska Native	61.5%	‡
Native Hawaiian/Other Pacific Islander	‡	‡
Other	81.0%	$28,052
More Than One Race	‡	‡
Institution Type		
Public Four-Year	64.1%	$25,458
Private Not-for-Profit Four-Year	73.1%	$32,388
Public Two-Year	‡	‡
Private For-Profit	87.2%	$40,025
Others/Attended More Than One School	71.8%	$29,444

‡ Reporting standards not met.
Source: NCES 2011–12 National Postsecondary Student Aid Study (NPSAS:12)

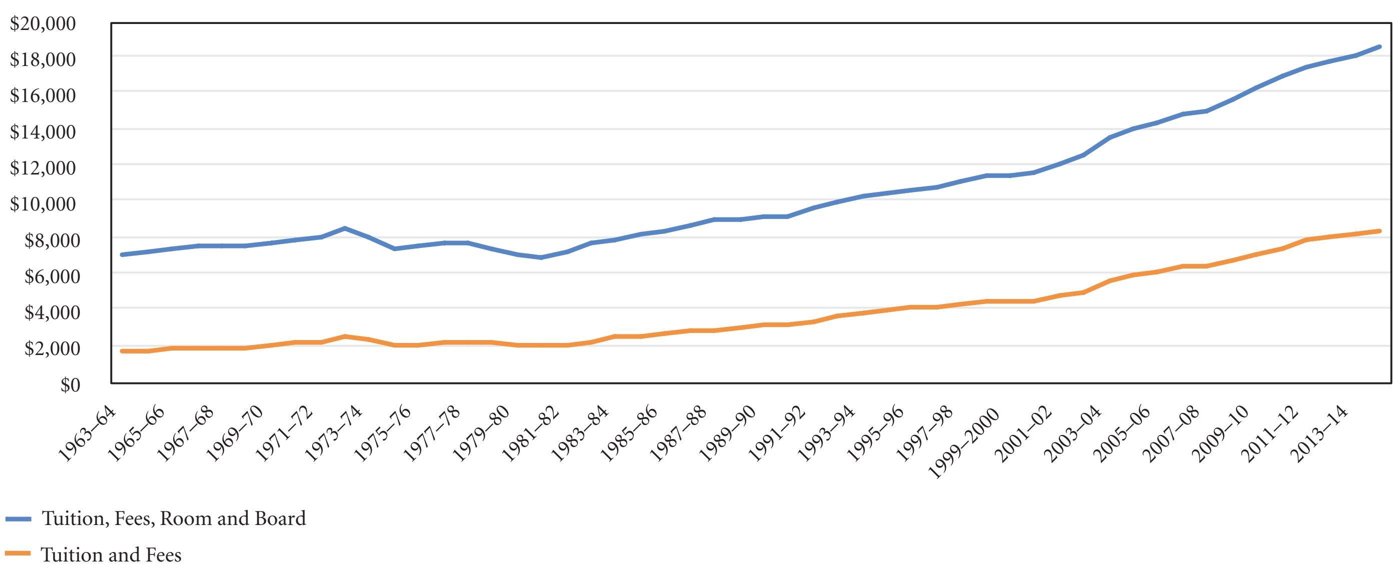
percent of graduating seniors left college with some student debt and the average balance rose to over $26,000 (NCES 2014, Table 331.95). The growing reliance on student loans marks an important generational shift as today's graduates begin their working lives hampered by debt payments that preclude other economic opportunities.

Today the majority of college students incur student debt, but the degree of exposure differs by critical demographic factors such as race and ethnicity and the type of academic institution attended (Table 1.1). Students at public institutions were less likely to borrow than those at private for-profit or not-for-profit institutions, but even at public schools most students relied on loans to some extent (NCES 2013). Black and Latino students are the most likely to take out loans and borrow greater amounts. In 2011–12, 84 percent of black graduating seniors had borrowed for college, as had 72 percent of Latinos, 68 percent of whites, and 48 percent of Asian Americans (NCES 2013). Black and Latino graduates, whose household finances are already affected by racial gaps in wealth, income, and employment—even with a college degree—encounter a disproportionate burden as debt payments after graduation constitute a larger portion of household budgets.[3] Recent research from the Mapping Student Debt project (Steinbaum and Vaghul 2015) shows that even below-average student loan balances can be problematic for low-income borrowers choosing between making on-time payments and other financial demands. And zip codes with high minority populations are significantly more likely to be burdened by their student debt payments (as a percentage of their income), and thus to go delinquent on their loans.

The growth in student loan debt is driven by several important factors, including a rapid rise in the cost of attaining a degree (Figure 1.2) at the same time a college education became increasingly associated with individual advancement and economic success. After remaining relatively stable for decades, average tuition and fees at public, undergraduate, four-year institutions rose 156 percent between the 1990–91 and 2014–15 academic years. The total price tag, including tuition, fees, and room and board, doubled over the period to reach $18,632 in 2014–15 (NCES 2015, Table 330.10).

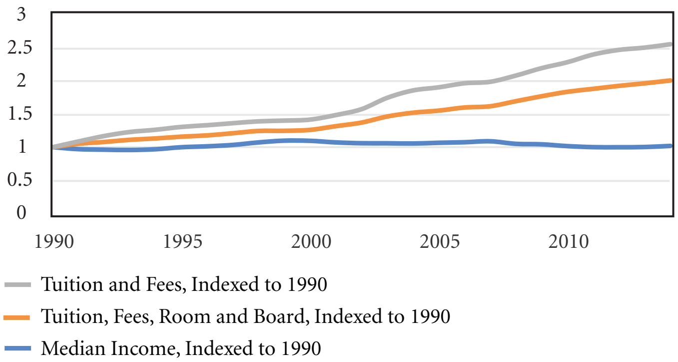
The impact of this growth in the cost of college was magnified by a protracted period of earnings stagnation for the typical American household (Figure 1.3). According to the US Census Bureau, real median household income was just 2 percent higher in 2014 than it was in 1990 (US Census Bureau, Table H-9). The rising cost of attendance over this period required college students and their families to devote a growing portion of household budgets to higher education (Figure 1.4). In 1990, before the rapid escalation of the college price tag, average tuition and fees amounted to 6.3 percent of median household income, 17.6 percent when room and board are included. In 2014, average tuition and fees for one year of college would require 15.9

Figure 1.2 **Cost of Full-Time Attendance at Four-Year Public Institutions (2014–15 dollars)**



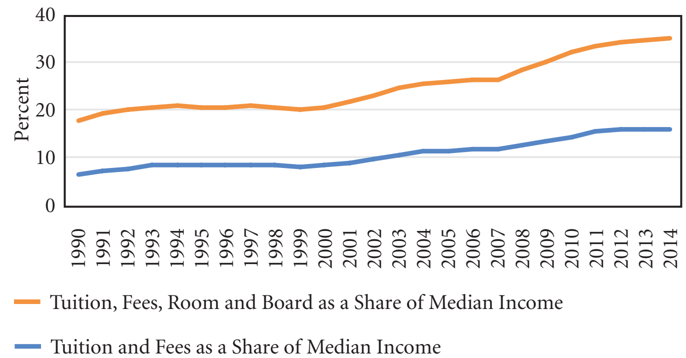
Source: NCES 2015 Digest of Education Statistics, Table 330.10

Figure 1.3 **Growth in Cost of College Attendance and Median Household Income (1990=1)**



Source: NCES 2015 Digest of Education Statistics, Table 330.10; US Census Historical Income Tables H-9

Figure 1.4 **Average Tuition and Fees as a Share of Median Household Income**



Source: NCES 2015 Digest of Education Statistics, Table 330.10; US Census Historical Income Tables H-9

percent of the median household income, or 34.7 percent with the inclusion of room and board (NCES 2015, Table 330.10; US Census Bureau, Table H-9; authors' calculation). For families across the income distribution seeking a college credential, the much faster growth of college costs than household incomes over this period made debt an essential resource.

One major cause of the increases in the price of college and incidence and amount of student debt over this period was the decline in public funding as a share of the cost of education. Although not the sole source of rising prices, analysis from the Federal Reserve Bank of New York (among others) finds that decreases in state and local higher education appropriations are associated with net tuition increases, especially since the 2008–09 recession (Chakrabarti, Mabutas, and Zafar 2012). According to the State Higher Education Executive Officers Association (SHEEO), which tracks the contributions of public funding, tuition payments, and other revenue sources in higher education, real per-student funding last year was 15.3 percent lower than in 2008 and 20 percent below its 1990 level (SHEEO 2015). These decreases in public funding represent a significant shift in higher education finance over recent decades. As public funds receded in importance, tuition payments made up an increasing share of revenues. In 1990, tuition accounted for 25 percent of revenues at public institutions. In 2015, the share of revenues drawn from tuition payments was 46.5 percent (SHEEO 2015). These changes have made a college degree less affordable for American families, contributing to the rise in student debt, and have transformed public higher education from a social investment to an increasingly private one.

The social costs of student debt

Student loan debt today places a significantly higher burden on household finances than ever before, with implications for the entire economy. Many borrowers struggle to make payments due to unemployment, low incomes, and competing financial demands. The US Department of Education publishes default rates for student loan borrowers who have failed to make payments for at least 270 days within the first three years after leaving college. Among those whose loans entered repayment in 2012, 11.8 percent of borrowers have failed to meet their obligations for at least nine months (US Department of Education 2017). The consequences of default can be severe. Once a loan is delinquent for 90 days it is reported to credit rating agencies; at the 270-day default threshold it is assigned to a collection agency (US Department of Education 2016). For households in debt, delinquency and damaged credit can make it impossible to purchase a house, a car, or even a cell phone plan. For the government lender, default raises the administrative cost of student loan programs and heightens risk.

Even borrowers who are current in their payments face additional constraints as a result of the growing reliance on debt to finance higher education. Households with student loan balances are less likely to own a home and, consequentially, exhibit lower net worth than comparable households with no student debt. According to recent research by the Board of Governors of the Federal Reserve System (Mezza et al. 2016), every 10 percent rise in student loan debt reduces the homeownership rate of borrowers by 1 to 2 percentage points in the first five years after leaving school. When student loan borrowers do purchase homes, they build equity more slowly. Researchers at the Washington University Center for Social Development (Elliot, Grintstein-Weiss, and Nam 2013) find that the home equity of student loan debtors amounts to just half that of nonborrowers. Since home equity is a central wealth-building vehicle for American households, the interaction between student debt and homeownership in the short run can have long-run consequences for borrowers and feedback effects on other markets as consumption patterns respond to lower wealth.

The broader economic effects of high student debt burdens also manifest across markets in the form of reductions in business formation, greater household vulnerability to economic shocks, and reduced consumption spending due to lower disposable income. Research from the Federal Reserve Bank of Philadelphia (Ambrose, Cordell, and Ma 2015) demonstrates that relatively high student loan debt dampens business formation, with the strongest effects among the smallest firms. Small business owners in particular tend to rely on personal credit as a substantial portion of business financing, and student loan debt reduces access to alternative forms of credit. The authors of the Philadelphia Fed study deduce a direct negative relationship between student loan debt levels and small business formation, amounting to a 14 percent decline in new businesses in counties where student loan debts are highest. Student loan debt also creates disproportionate exposure to economic downturns. A study from the St. Louis Federal Reserve (Elliot and Nam 2013) shows that during the most recent recession households with student debt experienced greater reductions in net worth than households with no student debt. According to the authors, every $1 increase in student loan debt in 2007 was associated with $0.87 less net worth in 2009. Finally, given that rising loan payments drain households' disposable incomes, student debt potentially presents new headwinds in the economy. While increasing household debt drove higher spending in the years leading up to the 2008–09 recession, households deleveraged in the wake of the crisis, resulting in a drag on the economy as consumer spending lagged (Albuquerque and Krustev 2015). During the period that households paid down other forms of debt, student loans continued to grow (Brown et al. 2014). Since consumer spending depends on both wealth and income—each of which is affected by the presence of debt and debt service obligations—soaring student loan debt can result in slower growth in the economy overall.

The rising burden of college costs on household balance sheets has been accompanied by new risks, including slow growth, deepening vulnerability to economic shocks, and the potential for a higher education market failure. Complete cancellation of outstanding student loans could undo many of these negative effects. By reversing the drag imposed by $1.35 trillion in outstanding student loans, we expect a net stimulus to the economy through housing markets, small business formation, growth in consumer spending, and the feedback effects these changes create. These directly measurable effects of student debt cancellation would be complemented by unmeasured social benefits like greater social mobility and quality of life. Based on this research, student debt cancellation presents a significant economic opportunity not only for the households burdened by debt but for the entire US economy.

The Distributional Consequences of Student Debt, Student Debt Cancellation, and Debt-Free College

This report finds that cancelling all outstanding student loan debt would modestly improve output and employment. However, the main controversy over student debt generally and debt cancellation in particular has not been its macroeconomic impact, but rather the implications for people in different income and wealth quantiles and the impact on inequality. The controversy arises from the factual observation that among borrowers, those with the largest amount of debt outstanding tend to have the highest incomes, and those who spend the most on college (and who therefore—so the story goes—have the most to gain from the option of free college) come from the highest-earning families.

These observations have been widely interpreted as discrediting the sorts of policies we model here. For example, Sandy Baum (2016) of the Urban Institute writes "forgiving all student debt is such a misguided idea that it is hard to know where to begin…. Because households in the top quartile of the income distribution owe a disproportionate amount of student debt, they would reap a disproportionate amount of the benefits if all education debt were forgiven." Jordan Weissmann (2016) of Slate was even more strident: "An especially half-baked idea for dealing with America's student debt burden has been bubbling up from the far reaches of the political left lately: Washington, a few well-meaning souls say, should just forgive all of the loans—wipe the slate clean." He continues: "The most important thing to realize about student loans is that most borrowers don't have too much trouble handling it."

The widespread criticism of ambitious policies to address the student debt crisis, based on their supposedly regressive impact, is overdrawn. In some cases, it misinterprets the evidence about who is most burdened by student debt and who would benefit most from relief. In this section, we consider the evidence about the distribution of debt and debt burdens in the population and the evolution of those distributions over time. Our main point is that, while the largest loan balances are indeed held by comparatively high-earning households, the extent to which student debt is held by the rich has diminished significantly. Moreover, the argument that the distribution of the burden of student debt has not, in fact, changed very much, even as the total amount of debt outstanding has increased dramatically, fails to consider the significant changes in the population of people with any student debt at all. These issues of interpretation extend beyond accurately assessing the distributional impact of the policies we model—they point to larger problems with the assumptions behind existing higher education, student debt, and labor market policies. The student debt crisis is one of several linked manifestations of those problems. Others are wage stagnation, underemployment, and increasing inequality of household wealth.

Student debt was once disproportionately associated with graduate school and with relatively well-off households, in part because it was possible to graduate from community college or a four-year public institution with little or no debt, and in even larger part because many people did not need to obtain any higher education credentials in order to access the labor market. What has happened in recent decades, and especially since the mid-2000s, is a vast expansion of student borrowing, such that the preponderant share of younger cohorts newly entering the labor market carry student debt. This expansion is due in part to much higher tuition, mostly thanks to state-level cutbacks in funding for higher education, and in part because it is simply far more difficult to access the labor market now without higher education credentials. And that "credentialization," in turn, is due to the underperformance of the labor market since 2000 and especially since the financial crisis and the Great Recession that began in 2008. Since 2000, the most important federal labor market policy has been the extension of student debt and the encouragement of a larger share of the population to obtain debt-financed higher education credentials, on the theory that underemployment and stagnant wages were caused by a "skills gap" that could be remedied through debt-financed higher education. The most obvious and acute effect of that policy was the growth of the high-priced for-profit higher education sector, but it was also evident in rising enrollment across all types of institutions, even as tuition rose. The "skills gap" was a false diagnosis of the labor market's problems, and hence the prescription of more debt-financed credentials not only failed to solve the problem, it also created its own problem in the form of unsustainable debt.

The distribution of student debt and debt burden in the cross section

The total amount of student debt outstanding is disproportionately held by those in the top income quintile. Looney and Yannelis (2015) report that just over a third of all outstanding debt is held by the top 20 percent, as defined either by labor market earnings from the Current Population Survey or by total taxable income as reported in tax return data.[4] By contrast, only 13 percent of debt is held by the lowest quintile as determined by labor market earnings, or 15 percent as determined by taxable income. Thus, debt outstanding is more skewed toward the rich than is the distribution of the number of borrowers: 25 percent of federal borrowers were in the top quintile. The reason for that is simply that the borrowers with the largest balances have a disproportionate share of the debt: a total of 62 percent of all outstanding debt is held by the top quintile of the distribution *of borrowers* (as opposed to the distribution of income). The borrowers with the largest balances have the majority of total debt, and they are largely also drawn from the richest households. These findings are the basis for the claim that student debt cancellation would be regressive.

One thing that is not directly reported in the Looney and Yannelis data is the distribution of income among quintiles of the student debt distribution. According to the authors' calculations, it appears that the top quintile of indebted households by either labor market earnings or total taxable income earns at minimum 50 percent of the total earnings/taxable income[5]—which is greater than their share of debt (between 33 and 36 percent). This means that the richest households have lower total debt-to-income ratios than households in the middle or bottom of the distribution, even if they do have the highest debt loads.

Looney and Yannelis do not report the distribution of "debt burdens"—meaning the student-debt-service-to-income ratio—across households by income. Instead, they report on the distribution of debt burdens for borrowers with debt, regardless of their income. They find that the median burden for borrowers two years after entering repayment in 2010 was 6 percent, a number that has not changed much over the length of their sample (which, for the purpose of calculating debt service, begins in 1999). Akers and Chingos (2014) similarly compute the distribution of debt burdens from a different data source, the Survey of Consumer Finances (SCF). According to their analysis of the 2013 SCF, the median debt burden among households headed by individuals aged 20–40 with any student debt and positive labor market income was 4 percent, with a 16 percent debt burden being the cutoff for the 90th percentile.

In an unpublished analysis of credit reporting data linked to American Community Survey outcomes at the zip code level, Steinbaum and Vaghul (forthcoming) found that the burden of student debt (meaning the ratio of debt service to income) is, in general, inversely correlated with the average income of a zip code. But that pattern obscures a slightly more nuanced geography. The debt burden is highest in two types of zip codes: those in historically disadvantaged areas, urban and rural, where both incomes and absolute loan amounts are low; and those in relatively high-earning urban areas disproportionately populated by young cohorts with a large amount of student debt accumulated and as-yet relatively low earnings given their credentials. That pattern suggests that student debt is a problem of those with low incomes relative to their credentials. It does not suggest that those with credentials are necessarily financially secure.

The evolution of the distribution of student debt burdens over time

One of the key findings motivating the argument that there is no student debt crisis is that the distribution of student debt burdens, conditional on having any student debt, has not changed very much over time. The aforementioned study by Akers and Chingos shows that the median payment-to-income ratio of 4 percent for 2013 has barely moved over successive waves of the SCF. The right tail of that distribution has lengthened over time: as reported above, the threshold for the 90th percentile of households in their sample in 2013 is a debt burden of 16 percent of income, whereas that threshold was 13 percent in 2007. But it was much higher than that longer ago: 22 percent in 1998 and 20 percent in 1992. Akers and Chingos interpret these findings to mean that borrowers are, on the whole, not significantly more burdened by student debt now than they were in the past, and hence there is little to worry about in the way of a student debt crisis.

That is, quite simply, a misinterpretation of the data. The set of households that has any student debt at all is quite different now than it was a decade or two ago. Households that would have appeared as "zeroes"—that is, not included—in the computation of the student debt burden distributions in the 1990s or the mid-2000s now enter those distributions with positive values for their debt burdens. Akers and Chingos condition on positive student debt to include households in their sample, but if they had instead conditioned on a given level or range of income or on a given educational attainment, they would have found that the distribution of debt burdens had shifted substantially to the right. In other words, to reach a given rung on the "job ladder" that characterizes the labor market requires more education credentials and therefore more student debt now than it did in the past, while the earnings available on any given rung have, for the most part, either stagnated or declined.

It may be the case that the *median debt burden* has not changed very much even as the total amount of debt outstanding has increased, but the *median borrower* has changed a great deal. Whereas once debtors were likely to come from the ranks of "traditional students"—that is, those attending either graduate school or private four-year institutions right after high school, often with a family history of higher education and with the family wealth to accompany it—recent student cohorts are much more likely to be nontraditional students, often beginning later in life and without a family background of college attendance. This is exacerbated by rising costs associated with the withdrawal of state support for higher education, which is itself often regressive in the sense that the financially worst-off institutions, which tend to serve nontraditional populations, face the steepest budget cuts relative to enrollment and lack the cushion of strong alumni support to fall back on. For all of those reasons, student debt increasingly burdens a (growing) share of the population that is ill-situated to carry and repay that debt.

An additional finding that highlights the growing burden of student debt is the deteriorating repayment rates across cohorts, especially following the Great Recession. Cohorts entering repayment since 2011 *are carrying more debt now than they were in 2011* (Looney and Yannelis 2015). That means they have made negative progress in absolute terms, and are nowhere close to the benchmark of steady and full repayment over 10 years—thanks to low earnings, high delinquency rates, and a labor market that demands ever-more credentials just to get a job, necessitating more and more degrees and more debt. A recent report by the National Center for Education Statistics

(Woo et al. 2017) found that repayment rates were worse and delinquency rates much higher for the cohort of students who entered college in 2003–04 compared to those who entered in 1995–96, and these disparities were particularly true of minority students, even those who completed their degrees. That dire picture—which would in all likelihood appear even worse if it included data on students who entered college during or after the Great Recession—makes it hard to tell the old story that going into debt to finance higher education is a route to the middle class, and that the debt is easily affordable thanks to the increased earnings graduates can expect.

What does the evolution of student debt tell us about the labor market?

The country's most significant labor market policy of the past several decades is the growth of the federal student loan program to finance higher education for a rising share of the population of entering cohorts across many types of institutions: for-profit, two-year public, four-year public and private traditional undergraduate, and graduate school. The theory behind that ambitious policy was that the labor market is characterized by a "skills gap," whereby workers lack the skills necessary to succeed in the global economy, and increasing higher education attainment would close that gap.[6] Moreover, thanks to the higher wages students could expect when they joined the labor market, the beneficiaries of that expansion would be able to finance it with student loans. The skills gap offered a conveniently unified explanation both for earnings and wage stagnation overall and for rising inequality in earnings among workers: those enjoying large increases, so the story goes, were the ones with the skills that positioned them to succeed in a changing and competitive global economy.

The theory does not look very good in light of the student debt crisis, as well as other labor market indicators: wage and earnings stagnation even for workers with higher education qualifications and the increasing credentialization that sees workers with degrees take jobs that did not previously require them (Clark, Joubert, and Maurel 2014). If the skills gap had indeed been the problem, as student debt increased enormously alongside degree attainment, so would have "human capital," and thus both aggregate earnings and the earnings of the newly educated (who would not have gotten degrees had they been part of earlier cohorts) would have increased. But, in fact, as the share of the population with each level of credential has increased—at the expense of the share with no credentials at all—the effect has been to degrade the value of each credential in terms of what jobs and earnings its holders can expect. The result is a classic "rat race," in the sense that the only thing worse than taking on burdensome debt in order to finance an increasingly expensive credential that leads to worse outcomes than it did previously is not doing so. That rat race only strengthens the argument that the current policy of encouraging the expansion of debt-financed higher education has been a failure, and therefore a radical departure is in order.

Many researchers who have investigated the student debt crisis, and in particular the issue of delinquency on student loans, agree that the weak labor market is the prime culprit (Dynarski 2016; Muller and Yannelis 2017). But that does not mean that higher education or student debt policy is not to blame, because they are premised on the labor market value of debt-financed higher education. Rising delinquency is one manifestation of the failure of that premise, and the fact that credentialed workers continue to take jobs at the expense of those without credentials (who increasingly lack access to employment opportunities at all) does not imply that continuing or escalating the rat race is a sound policy. Yet that is what is implied by continued insistence on the stability of the college wage premium—thanks to deteriorating outcomes for those without credentials—as justification for the status quo. On the contrary: it is time to undertake a real labor market policy, and to overcome squeamishness about acknowledging the failures of the status quo. This includes acknowledging that student debt accumulated to date might not be economically feasible for debtors to carry and, eventually, pay off.

How does student debt interact with longstanding economic disparities?

One inescapable conclusion from studying the incidence and impact of student debt is that black and Hispanic borrowers suffer disproportionately from its effect (Steinbaum and Vaghul 2016; Huelsman 2015a). Delinquency is highest in minority neighborhoods and, for a given level of educational credential, minority borrowers take on more debt and have more trouble paying it off. The causes of that disparate impact are longstanding racial disparities in both the credit and labor markets, household and family wealth far lower than white counterparts (even for those making similar incomes), and segregation in higher education itself, which clusters minority students in poorly resourced institutions that are the least likely to lead to the most valuable employment networks. The for-profit education sector, where the most acute victims of the student debt crisis are to be found, itself exists because more economic options are often effectively closed off to nontraditional students, who are likely to be minorities (McMillan Cottom 2017).

The pattern of racial disparity in student debt is especially injurious because, as the engine of social mobility, higher education is supposed to be the solution to disparities in background and family wealth. But what we are seeing now with the student debt crisis repeats the themes that came to light during the housing crisis and the Great Recession. Financing the purchase of an asset with debt as a supposed mechanism of social mobility is a facile policy for closing racial gaps when it fails to account for disparities in access and quality. As with housing, so with higher education: a mythology associated with its value as an agent of social mobility gives rise to policies that encourage borrowing to finance its acquisition. When the asset turns out to be worth much less than promised, it is those who began at the greatest disadvantage who are left holding the most burdensome debts and who struggle to pay them off.

It is for this reason that a "public option" for higher education would be worth the most to the most disadvantaged students (Huelsman 2015b). The supposedly egalitarian argument against free or debt-free college is that those who currently spend the most on higher education are those from the most well-off backgrounds, and they would have the most to gain by switching to the cheaper option. But that flies in the face of evidence about the impact of universal public services: the rich do not, generally, switch to them. Instead, it is those who lacked all access before or who were forced to use substandard providers who will benefit most from an affordable and universally accessible option and the competitive pressure that puts on incumbent providers who had previously been able to benefit from a captive, segmented market.

The real distributional impact of student debt cancellation and free or debt-free college

The arguments against student debt cancellation and free or debt-free college arising from their ostensibly inegalitarian impact fail to account for the reality of the student debt crisis and those who are its greatest victims. In this report, we show that a radical policy for ending the student debt crisis could be undertaken without doing economic harm—in fact, to moderate macroeconomic benefit. That does not mean it is the *only* possible solution, but there is no reason to constrain the policy space based on outdated assumptions about the distribution of student debt and its implications for both the underperformance of the labor market and for longstanding economic disparities.

Section 2: The Mechanics of Student Debt Cancellation

This section will describe the mechanics of student debt cancellation carried out by the federal government and the Federal Reserve. As a basis for understanding and explaining the instruments of debt relief, we first examine the current mechanics of student debt and demonstrate balance sheet effects via T-accounts throughout. T-accounts are tools that track changes in assets (labeled A) and liabilities or equity (L/E) that result from transactions or debt cancellations. It is important to keep in mind, however, that the financial statement effects shown and discussed here are *not* the same as the ultimate macroeconomic effects that emerge from the policy. That is, the financial statement effects shown in the T-accounts are the immediate ones for the government, private investors, and student loan borrowers. Additional effects—multiplier effects, as they are often labeled—and feedback effects influencing the federal government's budget position (as in so-called "dynamic scoring") are by necessity omitted. These important but omitted dynamic effects will be explicitly considered in Section 3, using large macroeconometric models to simulate the debt cancellation.

There are two rationales for presenting these mechanics. First, they present the direct effects of student debt cancellation on government spending and revenue, household income and net financial wealth, and private investors; these are the transactions incorporated into the macroeconometric models in the following section. Second, and most fundamentally, because every transaction in the economy affects the financial statements of those involved, knowing how financial statements are affected is a basic prerequisite to fully comprehending the transaction itself (which is the key unit of analysis in the field of economics). This final point also relates to the core concern of this report, which is the macroeconomics of student debt cancellation: while there are competing approaches to "accounting" for the government's cost of student loan programs (such as "fair value"), for the purposes of understanding the macroeconomic effects it is the impacts on financial statements of the various sectors that are of interest.

The following analysis results in two key takeaways:

- The cancellation of the Department of Education's loans will result in an absolute increase in the national debt equal to the debt service due on the securities previously issued to fund these loans, not the amount of the loans themselves.
- There is no "free lunch" if the Federal Reserve carries out student debt cancellation instead of the federal government. That is, the direct effects upon the federal government's immediate and future budget position would be essentially the same whether the federal government or Federal Reserve carries out the cancellation. As a later part of this section explains, however, there are a few potential caveats to this conclusion, involving what some might consider creative accounting on the part of the Federal Reserve—though for several reasons these accounting maneuvers would probably require changes to current laws and are likely to be politically contentious.

The Mechanics of Student Debt Cancellation Carried Out by the Government

Current servicing of student loans from a balance sheet perspective

It is useful to first consider the effects of current student loan repayment on the balance sheets of the borrowers, government, and private owners of student loans. Table 2.1 shows the financial statement effects of debt service on loans held by the Department of Education (hereafter, ED) using T-accounts. Table 2.1, as with all T-account tables in this section, shows T-accounts for the federal government, Federal Reserve, banks, student loan borrowers, and private investors. When borrowers make a student loan payment, it reduces their deposits as the payment is settled. Borrowers are assumed to be households, so

Table 2.1 **Balance Sheet Effects of Servicing of Student Loans Owned by Department of Education**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Borrowers Service ED Loans	+Tsy Acct (p,i)			-RBs (p,i)	-RBs (p,i)	$-D_{HH}$ (p,i)	$-D_{HH}$ (p,i)	-Loans (p)		
	-Loans (p)	$+Eq_{Govt}$ (i)		+Tsy Acct (p,i)				$-Eq_{HH}$ (i)		

the reduction in the deposits of households is represented $-D_{HH}$ in the table. The payments also reduce the amount of outstanding student loans (-Loans). In addition, because the payments include an interest component, the payments and thus reduction in deposits are greater than the reduction in student loans, reducing the borrowers' equity ($-Eq_{HH}$). On the banks' balance sheet, the banks settle the borrowers' payment to the ED by reducing the borrowers' deposits ($-D_{HH}$, which reduces bank liabilities), while their own reserve balances held at the Fed are debited (-RB, an offsetting reduction in assets). On the Federal Reserve's balance sheet, banks' reserve balances (RBs) are debited while the Treasury's account at the Fed is credited (+Tsy Acct). On the federal government's balance sheet, the credit to the Treasury's account (+Tsy Acct)—which would internally be credited to the ED—reduces outstanding student loans (-Loans) while the interest portion of the debt service payment raises the net worth or equity of the federal government ($+Eq_{Govt}$). Finally, (p) refers to a payment of loan principal, or an entry of the same size; (i) refers to the same for the interest portion of debt service payments; and (p,i) refers to a payment of principal and interest, or an entry of the same combined size. While the mechanics are a bit complex due to the necessary inclusion of the banks and the Fed, the net effect is to reduce student loans outstanding while transferring deposits and net worth to the federal government via the Treasury's account at the Fed.

Changes in balance sheets for the servicing of student loans held by the private sector are shown in Table 2.2. Here the entries for the borrowers are the same as in Table 2.1. The private investors will be credited with deposits ($+D_{PI}$) by their banks, which, as in Table 2.1, will be larger than the reduction in loan principal, thereby raising equity ($+Eq_{PI}$). Banks in the aggregate simply debit the accounts of the borrowers and credit the accounts of investors. (To avoid unnecessary complexity, Table 2.2 abstracts from transfers of reserve balances between the borrowers' banks and the investors' banks.) It is worth mentioning that while the servicing of student loans results in both equity and deposits effectively being transferred from debtor to creditor in both Tables 2.1 and 2.2, in the latter the transfers are within the private sector and thus alter the distribution of deposits and net worth within the sector, whereas in the former there is a reduction in the private sector's total net worth as well as a reduction in the total quantity of deposits (that is, the "money supply").

Possible methods of government-financed student debt cancellation

Though there may be many details, the mechanics of debt cancellation are simple in general. The primary actions would be the following:

- The current portfolio of student loans held by the ED would be cancelled or, equivalently, borrowers would simply be allowed to stop making payments and any principal due on a given date would be cancelled at that time (that is, the loan would effectively be cancelled in stages as payments come due). As of the second quarter of 2016, the ED's outstanding loans totaled $986.19 billion.[7]
- The federal government would either purchase and then cancel, or, equivalently, take over the payments on student debt currently held by the private sector. As with the ED's loans, if the government purchases the privately held loans it can choose to cancel them immediately or as borrowers' payments come due. The government-guaranteed loans are $266.69 billion, while nonguaranteed privately issued loans are $101.58 billion, both as of the second quarter of 2016. Having the government assume these payments or purchase and cancel the loans is preferable to cancellation by private investors. The latter would require the private sector to write down nearly $370 billion in both assets and equity, which could be highly destabilizing (or worse) for the affected sectors.

Table 2.2 Balance Sheet Effects of Servicing of Student Loans Owned by Private Investors

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Borrowers Service Private Loans						$-D_{HH}$ (p,i)	$-D_{HH}$ (p,i)	-Loans (p)	$+D_{PI}$ (p,i)	$+Eq_{PI}$ (i)
						$+D_{PI}$ (p,i)		$-Eq_{HH}$ (i)	-Loans (p)	

The government cancels the Department of Education's loans all at once

The ED's loans were originally funded via sale of Treasury securities.[8] The loan payments from student borrowers then in theory enable the retirement of the securities, while the government profits from the difference between the interest earned on the ED's loans less interest on the Treasury securities (though there are some other considerations such as administrative costs of the program and whether or not interest on the loans is tax deductible for the borrowers). The balance sheet effects are shown in Table 2.3. In the first transaction, the government increases its liabilities (the Treasury securities, or +Tsys) and receives payment for them into its account at the Fed when private investors (not necessarily the same investors as in Table 2.2; at the margin these are Treasury dealers) have their bank accounts debited while their banks have their reserve balances debited. The loan reduces the Treasury's account and adds back reserve balances and deposits. The deposits are listed as belonging to the academic institution (+D_{UNI} for "university" in this case). The loan simultaneously raises the borrowers' liabilities and reduces net worth. Not shown here due to space constraints is that the deposit would add to the net wealth of the academic institution (ceteris paribus). While it is often the case that the borrower receives some of the deposits—given that student loans regularly cover expenses related to college, not just direct costs of college itself (tuition, room and board, books, and so forth)—as the borrower spends these funds, the end result will be a reduction in net wealth as the complementary entry to the loan. The final entries present totals or net effects of the two transactions.

The cancellation of debt held by the ED is a concurrent reduction in the federal government's assets and its equity, while it is simultaneously a reduction in debt and an increase in equity for the debtors. This is shown in Table 2.4. Also, while it reduces the government's equity, the cancellation of publicly owned student debt on its own *does not* increase the debt (i.e., liabilities) of the federal government. An increase in the federal government's debt can only result from issuing debt directly via Treasury securities or similar means. For the student loan borrowers, the cancellation reduces debt (the student loans) and raises net worth, exactly offsetting the totals from Table 2.3.

When a loan is cancelled and equity reduced, an accompanying entry charges this reduction in equity to the income statement, which thereby reduces profits. This reduction in profits is a noncash charge that brings internal consistency for the income statement and balance sheet. However, for the federal government, the income statement position is most often

Table 2.3 Treasury Issues Securities to Private Investors and Department of Education Lends to Student Borrowers

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Government Issues Securities	+Tsy Acct(p)	+Tsys(p)		-RBs(p)	-RBs(p)	-D_{PI}(p)			-D_{PI}(p)	
				+Tsy Acct(p)					+Tsys(p)	
ED Lends to Student Borrowers	-Tsy Acct(p)			+RBs(p)	+RBs(p)	+D_{UNI}(p)		+Loans(p)		
	+Loans(p)			-Tsy Acct(p)				-Eq_{HH}(p)		
Totals	**+Loans(p)**	**+Tsys(p)**				**-D_{PI}(p)**		**+Loans(p)**	**-D_{PI}(p)**	
						+D_{UNI}(p)		**-Eq_{HH}(p)**	**+Tsys(p)**	

Table 2.4 Cancellation of Student Loans Owned by Federal Government

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
ED Loans Cancelled	-Loans (p)	-Eq_{Govt} (p)						-Loans (p)		
								+Eq_{HH} (p)		

presented in the context of the government's budget surplus or deficit, which is more of a cash flow measure that largely omits such noncash charges in order to have consistency with the government's issuing, repurchasing, or retiring of Treasury securities (that is, changes in the government's liabilities). In the case of cancelling the ED's loans, the budgetary effects (and thus the effects on the government's outstanding liabilities) would be incurred as debt service payments from borrowers that are not received, reducing the government's revenues relative to what would have been projected and relative to expenditures.

However, this neglects a point that has significant implications: the absence of payments from borrowers is not in fact a transaction but a counterfactual. Considering Tables 2.3 and 2.4 together in order to clarify, recall that the loans themselves were originally funded by issuing Treasury securities and that the borrowers' payments were to have enabled the payment of interest and retirement of principal on these securities. That is, absent debt cancellation, the timing of the borrowers' debt service payments and the government's payments to the security holders were to have lined up for the most part. Therefore, the deficits incurred each period that the borrowers' debt service is not received *do not* result in additional government liabilities. Instead, the existing liabilities will be rolled over (that is, a new security is issued to pay for the maturing one) and the liabilities incurred when the loans were created simply become permanent. In the sense that the government's liabilities were projected to be reduced via student loans being paid down, the cancellation results in additional government debt *relative to that baseline*, but in terms of the absolute size of the government's outstanding liabilities, the cancellation of the ED's loans will result in no addition to the government's liabilities, relative to a precancellation baseline (except for the amount of debt service due).

The government cancels the Department of Education's loans as borrowers' payments come due

The conclusions reached regarding the effect of the cancellation of the ED's loans on the federal government's outstanding liabilities are more clearly shown by assuming the government instead allows borrowers to cease payments and cancels the loan principal due each period. In this scenario, it is easier to illustrate the financial statement changes that would occur each period and to then explain which of them are actual transactions that occur as a result of cancellation and which result from a comparison to projections without debt cancellation (that is, are counterfactuals).

Table 2.5 presents the cancellation of principal owed on the ED's student loans each period. As the label indicates, the first entry in Table 2.5 simply reverses the transaction in Table 2.1. This is the counterfactual, which is not an actual transaction but shows financial statement changes relative to the no-cancellation scenario. The second entry is a transaction—the government cancels the portion of the loan principal that would have otherwise been due. This is much like the debt cancellation in

Table 2.5 Department of Education Loans Cancelled as Principal Comes Due—Relative to No Cancellation

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
REVERSE Borrowers Service ED Loans	-Tsy Acct(p,i)	$-Eq_{Govt}(i)$		+RBs(p,i)	+RBs(p,i)	$+D_{HH}(p,i)$	$+D_{HH}(p,i)$	+Loans(p)		
	+Loans(p)			-Tsy Acct(p,i)				$+Eq_{HH}(i)$		
Government Cancels Principal Now Due	-Loans(p)	$-Eq_{Govt}(p)$						-Loans(p)		
								$+Eq_{HH}(p)$		
Government Issues Securities	+Tsy Acct(p,i)	+Tsys(p,i)		-RBs(p,i)	-RBs(p,i)	$-D_{PI}(p,i)$			$-D_{PI}(p,i)$	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys(p,i)**				$\mathbf{+D_{HH}(p,i)}$	$\mathbf{+D_{HH}(p,i)}$	$\mathbf{+Eq_{HH}(p,i)}$	$\mathbf{-D_{PI}(p,i)}$	
		$\mathbf{-Eq_{Govt}(p,i)}$				$\mathbf{-D_{PI}(p,i)}$			**+Tsys(p,i)**	

Table 2.6 **Department of Education Loans Cancelled as Principal Comes Due—Actual Transactions**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Government Cancels Principal Now Due	-Loans(p)	-Eq_{Govt}(p)						-Loans(p)		
								+Eq_{HH}(p)		
Government Issues Securities	+Tsy Acct(p,i)	+Tsys(p,i)		-RBs(p,i)	-RBs(p,i)	-D_{PI}(p)			-D_{PI}(p)	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Government Retires Securities and Pays Interest	-Tsy Acct(p,i)	-Tsys(p)		+RBs(p,i)	+RBs(p,i)	+D_{PI}(p,i)			+D_{PI}(p,i)	+Eq_{PI}(i)
		-Eq_{Govt}(i)		-Tsy Acct(p,i)					-Tsys(p)	
Totals	**-Loans(p)**	**+Tsys(i)**						**-Loans(p)**	**+Tsys(i)**	**+Eq_{PI}(i)**
		-Eq_{Govt} (p,i)						**+Eq_{HH}(p)**		

Table 2.3, but in this case refers only to the principal due on the specific date. The third entry shows the government issuing new securities to offset the reduction in the government's budget position. The final row of entries presents the totals or net of the two entries, which shows that the net effect is for student loan borrowers to have more deposits and higher net worth than is the case when they make debt service payments, and for the federal government to have both reduced equity and increased liabilities equal in size to the foregone principal and interest payment. Another way of stating this is that student loan borrowers now have an extra, say, $300 per month on average *not debited* from their bank accounts that becomes available to spend, save, borrow against, or some combination of these, relative to the no-cancellation scenario.

Because the first entry in Table 2.5 is a counterfactual, the actual transactions are presented in Table 2.6. The first two transactions are the same as the second and third entries in Table 2.5. The significance of considering actual transactions is seen in the combination of transactions two and three in Table 2.6. What happens is government securities that would have been retired by debt service payments are coming due. Absent the debt service payments, the government instead issues new Treasury securities to replace or roll over the previously issued securities. The payment due on Treasury securities is partly principal and partly interest, so as the government issues new securities to cover this payment, its liabilities increase by the amount of interest due. (Note that the payment of interest on the Treasury securities reduces the government's equity and raises that of the investors.) Therefore, the new securities issued will be in this amount—that is, the national debt does in fact increase modestly each year by the amount of interest due on the securities issued when the loans were originated. Importantly, however, the cancellation of the ED's loans does not increase the national debt by the value of the loans cancelled, but rather only by the size of the interest payment due annually on the Treasury securities that financed the loans.

Government-led debt cancellation where the government assumes payments on student loans issued by private investors

Unlike the ED's loans, the government does not yet own these private loans and thus would issue new Treasury securities to purchase them. Financing the purchase and cancelling the privately owned loans would be essentially simultaneous, and therefore the changes to both the budget and liabilities of the government would also be essentially simultaneous. As with the ED's loans, the government could also choose to cancel debt service as it becomes due. A third option is for the government to take over the borrowers' debt service payments on these loans, in which case the changes to the government's budget and liabilities would be incurred over the rest of the lives of the loans themselves. The discussion here begins with the latter option, then turns to the former cases involving the government's purchase of these loans.

Table 2.7 presents entries for the federal government's assumption of debt service on student loans owned by private investors. In the first entry, as in Table 2.5's counterfactual,

Table 2.7 **Federal Government Assumes Debt Service on Privately Owned Student Loans—Relative to No Cancellation**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
REVERSE Borrowers Service Private Loans						+D_{HH}(p,i)	+D_{HH}(p,i)	+Loans(p)	-D_{PI}(p,i)	-Eq_{PI}(i)
						-D_{PI}(p,i)		+Eq_{HH}(i)	+Loans(p)	
Government Services Private Loans	-Tsy Acct (p,i)	-Eq_{Govt}(p,i)		+RBs(p,i)	+RBs(p,i)	+D_{PI}(p,i)		-Loans(p)	+D_{PI}(p,i)	+Eq_{PI}(i)
				-Tsy Acct (p,i)				+Eq_{HH}(p)	-Loans(p)	
Government Issues Securities	+Tsy Acct (p,i)	+Tsys (p,i)		-RBs(p,i)	-RBs(p,i)	-D_{PI} (p,i)			-D_{PI} (p,i)	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys (p,i)**				**+D_{HH} (p,i)**	**+D_{HH} (p,i)**	**+Eq_{HH} (p,i)**	**-D_{PI}(p,i)**	
		-Eq_{Govt} (p,i)				**-D_{PI} (p,i)**			**+Tsys (p,i)**	

Table 2.8 **Federal Government Assumes Debt Service on Privately Owned Student Loans—Actual Transactions**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Government Services Private Loans	-Tsy Acct (p,i)	-Eq_{Govt}(p,i)		+RBs(p,i)	+RBs(p,i)	+D_{PI}(p,i)		-Loans(p)	+D_{PI}(p,i)	+Eq_{PI}(i)
				-Tsy Acct (p,i)				+Eq_{HH}(p)	-Loans(p)	
Government Issues Securities	+Tsy Acct(p,i)	+Tsys (p,i)		-RBs (p,i)	-RBs (p,i)	-D_{PI}(p,i)			-D_{PI}(p,i)	
				+Tsy Acct (p,i)					+Tsys (p,i)	
Totals		**+Tsys (p,i)**						**-Loans(p)**	**-Loans(p)**	**+Eq_{PI}(i)**
		-Eq_{Govt}(p,i)						**+Eq_{HH}(p)**	**+Tsys(p,i)**	

borrowers do not service their loans—this simply reverses all transactions in Table 2.2. In the second entry, the government makes the debt service payments, which debit its account at the Fed and its equity by the principal and interest. This raises reserve balances held by the Fed by the same amount as banks then credit the deposits of the private investors. The loans are assumed to still be liabilities of the borrowers (since the federal government did not purchase these loans), so the government's debt service payment reduces the principal of the loan and raises the net worth of the borrowers by the same amount. For this entry, the government's net worth has fallen by the value of the principal and interest; the borrowers' net worth has increased by the value of the principal payment; and the private investors' net worth has increased by the value of the interest payments. In the third entry, the government issues securities to cover the shortfall, just as in Tables 2.5 and 2.6. The sum or net of these entries is an increase in household deposits and net worth, both by the value of principal and interest; a decrease in the government's net worth of the same size, offset by an increase in its liabilities; and the net for the private investors is a purchase of the new Treasury securities (note that the private investors holding the student loans are not assumed to be the same investors purchasing the new Treasury securities). Table 2.7 also shows that, as a result of the cancellation, the borrowers now have deposits and net worth they would not otherwise have had, much like in Table 2.5.

The actual transactions for the government's assumption of debt service payments for privately owned loans are in Table 2.8, which omits the reversal of borrowers' debt service (from Table 2.7). The totals row shows that the government has issued liabilities as its net worth has fallen; student loan borrowers have seen their loan principal fall and net worth rise in kind; and private investors have had some loan principal paid off, increased net worth by the amount of interest due in the period, and purchased Treasury securities in the amount of principal and interest (again, the investors holding the student loans are not necessarily the same as those investing in Treasury securities). Note that the totals for the government are the same for Tables 2.7 and 2.8. In other words, the counterfactual is not relevant to the government's position: the government's liabilities are increasing by the combined principal and interest payment, both relative to no cancellation and in absolute terms. This is also the core difference from the ED's loans, which only raise the government's liabilities in absolute terms by the amount of interest due annually.

Government-led debt cancellation where the government simultaneously purchases and then cancels loans owned by private investors

As noted above, an alternative to assuming the debt service to private investors is to have the federal government purchase these loans from the private investors at the outset. Table 2.9 presents the T-accounts for transactions involved in this scenario. The first transaction is the government issuing Treasury securities that will replenish the Treasury's account at the Fed and enable the purchase of the private securities. The second transaction is the purchase of the privately owned student loans, which essentially reverses the entries from the first transaction, except that private investors have effectively swapped student loans for Treasury securities. Table 2.9 assumes, for simplicity, that the government acquires the loans from private investors at their book value with no interest accrued since the most recent payments from the borrowers (alternative assumptions for either of these would likely not have macroeconomic significance and would not change the nature of the analysis

Table 2.9 Federal Government Purchases Privately Owned Student Loans

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Government Issues Securities	+Tsy Acct(p)	+Tsys(p)		-RBs(p)	-RBs(p)	-D_{PI}(p)			-D_{PI}(p)	
				+Tsy Acct(p)					+Tsys(p)	
Government Purchases Private Loans	-Tsy Acct(p)			+RBs(p)	+RBs(p)	+D_{PI}(p)			+D_{PI}(p)	
	+Loans(p)			-Tsy Acct(p)					-Loans(p)	
Totals	**+Loans(p)**	**+Tsys(p)**							**+Tsys(p)**	
									-Loans(p)	

Table 2.10 Federal Government Purchases and Cancels Privately Owned Student Loans

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Totals from Table 2.9	+Loans(p)	+Tsys(p)							+Tsys(p)	
									-Loans(p)	
Government Cancels Private Loans	-Loans(p)	-Eq_{Govt}(p)						-Loans(p)		
								+Eq_{HH}(p)		
Totals		**+Tsys(p)**						**-Loans(p)**	**+Tsys(p)**	
		-Eq_{Govt}(p)						**+Eq_{HH}(p)**	**-Loans(p)**	

here). The totals or net changes for Table 2.9 are simply swaps of Treasury securities for privately owned student loans among the federal government and private investors.

Table 2.10 adds the government's cancellation of the student loans, which reduces the government's equity while also raising the equity of the student loan borrowers. An accounting difference between the government taking over the payments, as in the discussion above, and purchasing/cancelling the loans here is that only the principal amounts show up in the transactions. This is because the purchase and cancellation occur essentially simultaneously, rather than over the remaining life of the loans. However, this is simply a difference in timing of the transactions, not in gross size of total transactions (of macroeconomic significance). Having sold the loans, investors can reinvest the proceeds from the sale to earn the interest they would have earned on the loans (of course, interest rates on the new investments could be different from those previously earned on the student loans). Similarly, and as in the scenario in which the government takes over debt service payments to private investors, borrowers that have had their loans cancelled will effectively have the foregone principal and interest payments as additional income at the time debt service would have been due, and thus additional deposits and equity relative to no cancellation. From the government's perspective, it is simply incurring the deficits related to principal payments to private investors at the beginning rather than over the course of the loans' maturities, and thus it is simply a difference between the present value and future value of the loan cancellation. As with the ED's loans, the cancellation has eliminated its source of revenue to service the Treasury securities issued in Table 2.9. The government therefore will be issuing Treasury securities in the future as it rolls over the portion of the outstanding liabilities that is maturing and the liabilities effectively become permanent. As it rolls these liabilities over, it will also increase its liabilities by an amount equal to the debt service due on them.

Government-led debt cancellation where the government purchases student loans issued by private investors and cancels principal as payments come due

As with the ED's loans, the process of rolling over principal from the securities originally issued and then issuing new securities to cover interest payments due is more straightforward in the case in which the government purchases the privately owned student loans and cancels principal as payments come due. In Table 2.11, the first entry is the reversal of the debt service payments, or the counterfactual. The second entry is the cancellation of the principal due. The third entry is the issuance of Treasury securities, since the cancelled borrowers' debt service is not forthcoming to service the Treasury securities issued when the government purchased the privately issued loans in Table 2.9. The total or net effect relative to the no-cancellation scenario is that borrowers have additional deposits reflecting the

Table 2.11 Federal Government Purchases and Cancels Privately Owned Student Loans as Payments Come Due—Relative to No Cancellation

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
REVERSE Borrowers Service Private Loans Owned by Government	-Tsy Acct (p,i)	-Eq_{Govt} (i)		+RBs(p,i)	+RBs(p,i)	+D_{HH}(p,i)	+D_{HH}(p,i)	+Loans(p)		
	+Loans(p)			-Tsy Acct (p,i)				+Eq_{HH}(i)		
Government Cancels Principal Now Due	-Loans(p)	-Eq_{Govt} (p)						-Loans(p)		
								+Eq_{HH}(p)		
Government Issues Securities	+Tsy Acct(p,i)	+Tsys (p,i)		-RBs(p,i)	-RBs(p,i)	-D_{PI}(p,i)			-D_{PI}(p,i)	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys (p,i)**				**+D_{HH}(p,i)**	**+D_{HH}(p,i)**	**+Eq_{HH}(p,i)**	**-D_{PI}(p,i)**	
		-Eq_{Govt} (p,i)				**-D_{PI}(p,i)**			**+Tsys (p,i)**	

Table 2.12 Federal Government Purchases and Cancels Privately Owned Student Loans as Payments Come Due—Actual Transactions

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Government Cancels Principal Now Due	-Loans(p)	-Eq$_{Govt}$(p)						-Loans(p)		
								+Eq$_{HH}$(p)		
Government Issues Securities	+Tsy Acct(p,i)	+Tsys (p,i)		-RBs(p,i)	-RBs(p,i)	-D$_{PI}$(p,i)			-D$_{PI}$(p,i)	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Government Retires Securities and Pays Interest	-Tsy Acct(p,i)	-Tsys(p)		+RBs(p,i)	+RBs(p,i)	+D$_{PI}$(p,i)			+D$_{PI}$(p,i)	+Eq$_{PI}$(i)
		-Eq$_{Govt}$(i)		-Tsy Acct(p,i)					-Tsys(p)	
Totals	**-Loans(p)**	**+Tsys(i)**						**-Loans(p)**	**+Tsys(i)**	**+Eq$_{PI}$(i)**
		-Eq$_{Govt}$(p,i)						**+Eq$_{HH}$(p)**		

increased net worth each period, private investors (which are Treasury dealers, at the margin) have purchased Treasury securities, and the government's reduced net worth and offsetting additional liabilities are equal in amount to the foregone principal and interest for the period.

The actual, direct transactions are shown in Table 2.12. As previously, the reversal of the student loan payment in Table 2.11 is not an actual transaction, even though the borrowers do have more income due to reduced financial obligations for the period relative to no cancellation. In Table 2.12, the government cancels principal currently due, then issues securities for the combined principal and interest foregone in order to retire and pay interest on securities sold when the privately held loans were purchased. As with the ED's loans, the securities maturing are equal in size to the principal payment, so the net issuance of securities is equal to the interest portion. However, by contrast with the cancellation of the ED's loans—which were already funded with the issuance of Treasuries when the loans were created—the securities issued by the government to purchase privately owned loans, as illustrated in Table 2.9, are a new budgetary cost, relative to current deficit and debt levels.

Concluding remarks on government-led cancellation of privately owned student loans

As with the ED's loans, the difference between Tables 2.11 and 2.12 depends on whether one considers the cancellation in comparison to the no-cancellation scenario or in terms of actual transactions. For the borrowers, the former is more useful, since they will have additional income available that would otherwise have been committed to the principal and interest payment. For the government, the latter is more useful, since it purchased the loans with the purpose of cancelling them. Therefore, it is most appropriate to view the government's purchase of privately owned student loans as raising its liabilities by the same amount, while the foregone debt service after the principal is cancelled (either at once or as it comes due) raises the government's liabilities annually by the amount of interest due on the securities issued to purchase the loans.

Overall, aside from the timing of the government's transactions, there is no difference of macroeconomic significance for those involved if the government purchases and then cancels the loans, as Tables 2.9, 2.10, 2.11, and 2.12 present, or takes over the responsibility for repaying the loans, as assumed earlier in Table 2.8. The only issue of much note is whether to cancel the loans immediately after purchasing them or as the borrowers' payments come due, but this is simply an issue of present value of the loans compared to the future value. And in either case, the government will essentially roll over the Treasury securities issued to purchase the loans as the borrowers' payments come due, while adding to them new securities issued in the amount of interest due annually.

Concluding remarks on government-led debt cancellation

The net financial effects of student debt cancellation for student loan borrowers would be (1) an increase in net financial wealth, and (2) an increase in after-tax income available to spend, save, or borrow against rather than commit to debt service. Further, even if all of the loans remained liabilities for borrowers and were only cancelled in small steps as each payment came due, it would be reasonable for households to behave as if these loans had been cancelled all at once—since, regardless of the timing of the cancellation, households will find themselves with the additional income that would have otherwise been used for debt service. It is the same from the government's perspective—the timing of the effects on its budget position and rolling over of liabilities is largely unaffected by the choice of whether to cancel the loans outright or as payments come due. Finally, it is also largely irrelevant for the government's budget position and liabilities whether it assumes debt service payments or purchases the loans.

There is, however, a significant difference with respect to the impact on the government's liabilities between the cancellation of the ED's loans and the loans owned by private investors. For the former, because the liabilities have already been issued in the past to make these loans, in absolute terms cancellation results in new liabilities only in the amount of interest due on the securities issued earlier; for the latter, however, new liabilities will be incurred in order to purchase the loans. The point of presenting tables for both the counterfactuals and the actual transactions is that there is a large difference, which has substantial political significance, between the actual increase in the government's liabilities that results from cancellation of the ED's loans and the increase relative to the no-cancellation scenario (which scenario/table is more relevant depends on the question being asked). Particularly in an environment of very low interest rates, the interest due on $1.1 trillion in government securities may be as low as $10 billion to $30 billion per year (depending on maturity of securities issued and time of issuance), which is obviously much different than incurring the entire $1.1 trillion in cancelled loans (plus interest) as new government liabilities.

The Mechanics of Student Debt Cancellation Carried Out by the Federal Reserve

This section will discuss debt cancellation carried out by the Fed, rather than by the government, since some advocates have argued in favor of this approach. The primary rationale for suggesting the Fed carry out the cancellation appears to be a belief that there may be a "free lunch" in the sense that the government's budget position does not need to be affected. As this section will demonstrate, that is probably not the case. The discussion here will consider the same scenarios as those in which the federal government carries out the debt cancellation. The core takeaway from this section is that there is no macroeconomically significant difference for the federal government's budget position and liabilities issued (that is, the national debt) if the Fed carries out the debt cancellation rather than the federal government.

The Federal Reserve purchases the Department of Education's loans

Since the ED loans are not marketable, an act of Congress would appear necessary if it is not legally permissible for the ED to sell the loans to the Fed. Even if it is permissible, congressional action could be necessary if the Fed were unwilling to take such action on its own (particularly given the ultimate purpose of cancelling the loans). Once the Fed acquires the loans, it credits the Treasury's account at the Fed for the same amount. A reasonable assumption—though not necessary in terms of macroeconomic significance—is that the Fed would acquire the loans at their current value. In this case, the transaction is a simple transfer of loans and balances between the federal government and its central bank. This is shown in Table 2.13. As the current value of student loans held by the ED is near $1 trillion, the Treasury now has this much added to its account. The federal government is therefore essentially $1 trillion further under the national debt ceiling than it was prior to the Fed's acquisition of the student loans.

Table 2.13 **Federal Reserve Acquires Loans Owned by Department of Education**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Buys Loans from ED	+Tsy Acct (p)		+Loans (p)	+Tsy Acct (p)						
	-Loans (p)									

Some fundamentals of the Federal Reserve's remittances and their relevance to student loan cancellation

To understand the mechanics of the Fed carrying out student loan cancellation, it is useful to consider first what happens if the Fed owns loans but instead *does not* cancel them and simply collects payments as they become due. This is shown in Table 2.14. As borrowers pay debt service, their debt and deposits fall, but so does their net worth, due to the additional interest cost of the debt service. The borrowers' banks simply debit the deposit accounts of the borrowers while their own reserve accounts are debited in kind. The loans owned by the Fed are debited by the amount of principal paid down. Due to the interest portion of the debt service payment, the quantity of reserve balances debited is greater than the reduction in the student loan principal, thereby raising the Fed's equity.

The portion of the Fed's equity that has increased is called "surplus capital," to distinguish it from the "paid-in capital" contributed by member banks. The Fed's additions to surplus capital—profits after costs and dividend payments to member banks on their paid-in capital—were capped by law at $10 billion by the 2015 Fixing America's Surface Transportation Act (FAST Act), which amended the Federal Reserve Act to require that any capital surplus greater than this amount be transferred to the Treasury.[9] The Fed's "surplus capital" account is much like a corporation's "retained earnings" account on its balance sheet; therefore, the Fed is essentially limited to cumulative retained earnings of $10 billion. In January 2016, for instance, the Fed transferred $98 billion of what would otherwise have been added to the capital surplus, or "retained earnings," to the Treasury's account, as well as another $19 billion that had been accumulated beyond the $10 billion statutory limit prior to the imposition of the new cap.[10]

The transfer from the Fed's surplus capital to the Treasury's account is shown in Table 2.15. The first entry repeats Table 2.14. In the second entry, the Treasury's account is credited for the interest payments as a result of the Fed's transfer of its additional capital surplus to the Treasury's account. The total or net effect is that the profits from the loan are now added to the government's budget position, while the Fed is returned to a position in which its equity is unchanged.

The Federal Reserve cancels the Department of Education's loans all at once

Turning to the cancellation, now assume all of the ED loans are cancelled. In Table 2.16, the first entry is the Fed's purchase of the loans from the ED. The second entry is the cancellation. This is not the end though, because the reduced Fed equity position will be transferred to the Treasury over time as the Fed

Table 2.14 Borrowers Service Student Loans Owned by Federal Reserve

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Borrowers Service Loans			-Loans(p)	-RBs(p,i)	-RBs (p,i)	$-D_{HH}$(p,i)	$-D_{HH}$(p,i)	-Loans(p)		
				$+Eq_{Fed}$(i)				$-Eq_{HH}$(i)		

Table 2.15 Transfer from Federal Reserve's Surplus Capital Account to Treasury's Account

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Borrowers Service Loans			-Loans(p)	-RBs(p,i)	-RBs(p,i)	$-D_{HH}$(p,i)	$-D_{HH}$(p,i)	-Loans(p)		
				$+Eq_{Fed}$(i)				$-Eq_{HH}$(i)		
Fed Remittances to Government	+Tsy Acct(i)	$+Eq_{Govt}$(i)		+Tsy Acct(i)						
				$-Eq_{Fed}$(i)						
Totals	**+Tsy Acct(i)**	**$+Eq_{Govt}$(i)**	**-Loans(p)**	**-RBs(p,i)**	**-RBs(p,i)**	**$-D_{HH}$(p,i)**	**$-D_{HH}$(p,i)**	**-Loans(p)**		
				+Tsy Acct(i)				**$-Eq_{HH}$(i)**		

Table 2.16 **Federal Reserve Cancels Loans Purchased from Department of Education**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Buys Loans from ED	+Tsy Acct (p)		+Loans (p)	+Tsy Acct (p)						
	-Loans (p)									
Fed Cancels Loans			-Loans(p)	-Eq_{Fed}(p)				-Loans(p)		
								+Eq_{HH}(p)		

Table 2.17 **Federal Reserve Cancels Debt Service Payments for Department of Education Loans—Relative to No Cancellation**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
REVERSE Borrowers Service Loans			+Loans(p)	+RBs(p,i)	+RBs(p,i)	+D_{HH}(p,i)	+D_{HH}(p,i)	+Loans(p)		
				-Eq_{Fed}(i)				+Eq_{HH}(i)		
Fed Cancels Loan Principal Now Due			-Loans (p)	-Eq_{Fed}(p)				-Loans(p)		
								+Eq_{HH}(p)		
Totals				**+RBs(p,i)**	**+RBs(p,i)**	**+D_{HH}(p,i)**	**+D_{HH}(p,i)**	**+Eq_{HH}(p,i)**		
				-Eq_{Fed}(p,i)						

waits until it accumulates enough profits—which would likely require several years, if not a decade or more—for its surplus capital to return to $10 billion. Thereafter, the Fed's profits send its surplus capital above $10 billion, at which time the Fed finally has profits to remit to the Treasury as in Table 2.16.

The core point here is that there is no budgetary "free lunch" available to the federal government if the Fed carries out the loan cancellation. Whether the Fed or the government cancels the ED's loans, the loss will be incurred by the government. A minor difference would be that the losses would follow the pattern of the Fed's profits. In the case of the government carrying out the cancellation, it is the path of principal and interest payments on the Treasuries issued (in order for the ED to lend to student borrowers) that determines the annual effects on the government's budget position and the securities that are then issued to roll over the principal and interest payments.

The Federal Reserve cancels debt service payments for the Department of Education's loans

As with the government carrying out the cancellation, interactions between the Fed and the Treasury's account are easier to present in the case where student debt is cancelled as payments come due. Table 2.17 presents this scenario relative to no cancellation. In the first row of Table 2.17, households' deposits increase by the principal and interest, while their loan liability and equity increase by principal and interest due. For the Fed, this raises the loan principal and reserve balances but reduces surplus capital by the accrued interest. When borrowers' loan principal coming due is cancelled in the second entry, their equity or net worth rises in kind. For the Fed, loan principal falls and reduces equity in kind. The totals show that household deposits and equity have risen by the amount of the principal and interest due, the Fed's equity has fallen by the same amount, and bank reserve balances have risen.

The fall in the Fed's equity, booked as a reduction in surplus capital, then reduces the Fed's remittances to the federal government by the same amount. Therefore, the cancellation of the student loan payments raises the government's budget deficit by the same amount relative to no cancellation, which is shown in Table 2.18. The first entry is the totals row from Table 2.17. The second is the reduction in remittances. The totals for Table 2.18 show that the Treasury's account and equity—and thus the federal government's budget position—have been reduced by the foregone principal and interest.

Whether the fall in the Treasury's account in Table 2.18 results in the Treasury issuing new securities depends on what the government does with credits to its account from Table 2.16. While the additional balances might appear to enable the government to "print money" rather than spend via tax revenues or issuing Treasuries, the balances credited in Table 2.16 are instead already "spoken for," since they will offset reduced remittances from the Fed cancelling student debt service payments.

Nonetheless, the government can choose to use the balances credited to its account in Table 2.16 to either offset subsequent remittance reductions or retire previously issued securities. Again, one might consider the latter choice equivalent to "monetizing the debt," but the budgetary consequences of the two choices are essentially the same. Table 2.19 shows the government retiring Treasury securities after the Fed purchases the ED's loans. The first entry is the same as in Table 2.16. In the second entry, the retirement of securities raises the Fed's reserve balances in kind. The totals show that while the government has used the loan proceeds to retire liabilities incurred when the ED made the loans, the reserve balances remain.

As explained in Appendix C in the digression on the Fed's daily operations in the federal funds market, for the Fed to achieve its interest rate target in the presence of such a large increase in the supply of reserve balances requires it to pay interest on the reserve balances (IOR) at its target rate to banks (see Figure C.3 in Appendix C). But IOR payments to banks reduce Fed profits and then reduce Fed remittances, leaving the government bearing the cost of IOR at roughly the same magnitude as

Table 2.20 **Federal Reserve Cancels Debt Service Payments for Department of Education Loans—Actual Transactions**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Cancels Loan Principal Now Due			-Loans (p)	$-Eq_{Fed}(p)$				-Loans(p)		
								$+Eq_{HH}(p)$		
Fed Reduces Remittances	-Tsy Acct(p)	$-Eq_{Govt}(p)$		-Tsy Acct(p)						
				$+Eq_{Fed}(p)$						
Government Issues Securities	+Tsy Acct(p,i)	+Tsys(p,i)		-RBs(p,i)	-RBs(p,i)	$-D_{PI}(p,i)$			$-D_{PI}(p,i)$	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Govt Retires Securities and Pays Interest	-Tsy Acct(p,i)	-Tsys(p)		+RBs(p,i)	+RBs(p,i)	$+D_{PI}(p,i)$			$+D_{PI}(p,i)$	$+Eq_{PI}(i)$
		$-Eq_{Govt}(i)$		-Tsy Acct(p,i)					-Tsys(p)	
Totals	**-Tsy Acct(p)**	**+Tsys(i)**	**-Loans(p)**	**-Tsy Acct(p)**				**-Loans(p)**	**+Tsys(i)**	$\mathbf{+Eq_{PI}(i)}$
		$\mathbf{-Eq_{Govt}(p,i)}$						$\mathbf{+Eq_{HH}(p)}$		

it would bear the cost of interest on the securities if it did not retire them. In other words, whether or not the government uses the credits in Table 2.19 to retire securities, its budget position will be impacted *as if* it did not retire them.

Overall, as the Fed passes the cost of cancelled student debt payments to the government via reduced remittances, the government will either draw down its account at the Fed, as in Table 2.18, or issue new securities that effectively replace those retired in Table 2.19. The net impact on the government's budget position relative to no cancellation is thus unaltered by whether the Fed or the government cancels the ED's loans.

Table 2.20 shows the actual transactions for the Fed cancelling student debt service payments. The first two transactions are the second entries for Tables 2.17 and 2.18, respectively. For simplicity, Table 2.20 assumes that the government keeps the balances credited to its account in Table 2.16 instead of retiring securities. In the third and fourth transactions, therefore, the government rolls over the securities issued when the ED made its loans, resulting in a net issuance of new securities that covers interest due. In the totals, credits to the Treasury's account in Table 2.16 fall by the cancelled principal payments. This repeats each period until all principal payments are cancelled and all balances credited in Table 2.16 are debited.

Instead of issuing new securities to make the interest payments, in Table 2.20 the government of course could debit the balances credited in Table 2.16. But this would add reserve balances, resulting in IOR payments to banks ultimately borne by the government via reduced remittances.

Overall, in Table 2.20 there is again no financial benefit to the government if the Fed purchases the ED's loans and cancels them.

The Federal Reserve assumes debt service payments for loans owned by private investors

If the Fed assumes debt service payments on loans owned by private investors, it will be making direct principal and interest payments to the investors on behalf of a third party. This will directly reduce the Fed's profits and thus its equity. As in the case of the ED's loans, it is expected that an act of Congress would be required for the Fed to take over the debt service payments on privately owned loans or purchase the loans and then cancel them.

The transactions are shown relative to no cancellation for this scenario in Table 2.21. The first entry is the counterfactual in which borrowers do not service the loans. In the second entry, the Fed services the loans by creating reserve balances that then result in the private investors' banks crediting their deposit accounts. In the third entry, the Fed reduces remittances by the amount of the fall in its equity for the period, which reduces the government's budget position by the same amount. The fourth entry is the government issuing securities in response to the budget shortfall. The totals here are the same as when the government assumed these debt service payments in Table 2.7; while the Fed is making the payments, the ultimate effects impact the government's budget position and its liabilities, not the Fed's.

The actual transactions are in Table 2.22. As in Table 2.8 where the government assumed the payments, the totals for the government are the same in Tables 2.21 and 2.22. Table 2.22 simply shows that the private investors will receive their payments, while the households will have their principal cancelled. Table 2.21, by contrast, shows that, relative to no cancellation, there is no difference for the private investors (they receive their payments regardless), while the households have both principal and interest available as additional disposable income.

The Federal Reserve purchases and cancels loans owned by private investors

Table 2.23 shows the T-accounts for the Fed's purchase and cancellation of the privately owned student loans. Here again, as a simplifying assumption, the Fed is purchasing the student loans at the current value, thereby not affecting the equity of the private investors.[11] Because the cancellation reduces the Fed's equity by the amount of the loans, the Fed will reduce its annual remittances until they sum to this amount. This will reduce the government's budget position annually, requiring the government to issue and pay interest on new securities of the same

Table 2.21 Federal Reserve Assumes Debt Service on Privately Owned Student Loans—Relative to No Cancellation

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
REVERSE Borrowers Service Private Loans						$+D_{HH}(p,i)$	$+D_{HH}(p,i)$	+Loans(p)	$-D_{PI}(p,i)$	$-Eq_{PI}(i)$
						$-D_{PI}(p,i)$		$+Eq_{HH}(i)$	+Loans(p)	
Fed Services Private Loans				+RBs(p,i)	+RBs(p,i)	$+D_{PI}(p,i)$		-Loans(p)	$+D_{PI}(p,i)$	$+Eq_{PI}(i)$
				$-Eq_{Fed}(p,i)$				$+Eq_{HH}(p)$	-Loans(p)	
Fed Reduces Remittances	-Tsy Acct(p,i)	$-Eq_{Govt}(p,i)$		-Tsy Acct(p,i)						
				$+Eq_{Fed}(p,i)$						
Government Issues Securities	+Tsy Acct(p,i)	+Tsys(p,i)		-RBs(p,i)	-RBs(p,i)	$-D_{PI}(p,i)$			$-D_{PI}(p,i)$	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys(p,i)**				**$+D_{HH}(p,i)$**	**$+D_{HH}(p,i)$**	**$+Eq_{HH}(p,i)$**	**$-D_{PI}(p,i)$**	
		$-Eq_{Govt}(p,i)$				**$-D_{PI}(p,i)$**			**+Tsys(p,i)**	

Table 2.22 Federal Reserve Assumes Debt Service on Privately Owned Student Loans—Actual Transactions

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Services Private Loans				+RBs(p,i)	+RBs(p,i)	$+D_{PI}(p,i)$		-Loans(p)	$+D_{PI}(p,i)$	$+Eq_{PI}(i)$
				$-Eq_{Fed}(p,i)$				$+Eq_{HH}(p)$	-Loans(p)	
Fed Reduces Remittances	-Tsy Acct(p,i)	$-Eq_{Govt}(p,i)$		-Tsy Acct(p,i)						
				$+Eq_{Fed}(p,i)$						
Government Issues Securities	+Tsy Acct(p,i)	+Tsys(p,i)		-RBs(p,i)	-RBs(p,i)	$-D_{PI}(p,i)$			$-D_{PI}(p,i)$	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys(p,i)**						**-Loans(p)**	**-Loans(p)**	**$+Eq_{PI}(i)$**
		$-Eq_{Govt}(p,i)$						**$+Eq_{HH}(p)$**	**+Tsys(p,i)**	

Table 2.23 **Federal Reserve Purchases and Cancels Privately Owned Student Loans**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Purchases Private Loans			+Loans(p)	+RBs(p)	+RBs(p)	+D_{PI}(p)			+D_{PI}(p)	
									-Loans(p)	
Fed Cancels Private Loans			-Loans(p)	-Eq_{Fed}(p)				-Loans(p)		
								+Eq_{HH}(p)		
Totals				**+RBs(p)**	**+RBs(p)**	**+D_{PI}(p)**		**-Loans(p)**	**+D_{PI}(p)**	
				-Eq_{Fed}(p)				**+Eq_{HH}(p)**	**-Loans(p)**	

Table 2.24 **Federal Reserve Purchases and Cancels Privately Owned Student Loans as Payments Come Due—Actual Transactions**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Cancels Principal Now Due			-Loans(p)	-Eq_{Fed}(p)				-Loans(p)		
								+Eq_{HH}(p)		
Fed Pays IOR				+RBs(i)	+RBs(i)	+Eq_{Banks}(i)				
				-Eq_{Fed}(i)						
Fed Reduces Remittances	-Tsy Acct(p,i)	-Eq_{Govt}(p,i)		-Tsy Acct(p,i)						
				+Eq_{Fed}(p,i)						
Government Issues Securities	+Tsy Acct(p,i)	+Tsys (p,i)		-RBs(p,i)	-RBs(p,i)	-D_{PI}(p,i)			-D_{PI}(p,i)	
				+Tsy Acct(p,i)					+Tsys(p,i)	
Totals		**+Tsys(p,i)**	**-Loans(p)**	**-RBs(p)**	**-RBs(p)**	**-D_{PI}(p,i)**		**-Loans(p)**	**-D_{PI}(p,i)**	
		-Eq_{Govt}(p,i)				**+Eq_{Banks}(i)**		**+Eq_{HH}(p)**	**+Tsys(p,i)**	

annual amount to cover the reduced remittances. As with the Fed cancelling the ED's loans all at once, the timing of the budgetary impacts will match the remittance shortfall rather than the path of debt service payments foregone.

Because the reserve balances the Fed used to purchase the private loans are left circulating, the Fed will have to pay IOR on them at its target rate. These IOR costs of the Fed will be borne by the government as the Fed's remittances fall. Then, while the Fed's remittances fall until the total value of the loans has been accounted for, the government will be issuing additional Treasury securities that will, over time, effectively replace the reserve balances. Thus, whether the Fed purchases the loans with new reserve balances or the government does it by issuing new securities, the government will bear the interest costs of financing the purchase.

The Federal Reserve purchases loans owned by private investors and cancels debt service payments

As with the government carrying out the cancellation, the results discussed for the Fed purchasing and then cancelling the privately owned loans all at once are more easily seen when it is assumed that debt service payments are cancelled as they come due. Nonetheless, this is a more complex case to illustrate than the case of the government cancelling these loans. Therefore, only the T-accounts for the actual transactions are shown—the counterfactual or "relative to no cancellation" scenario is omitted. Table 2.24 shows the actual transactions for this scenario. The first transaction is the Fed cancelling principal now due. The second transaction is the Fed paying interest on reserves on the reserve balances created when it purchased the privately owned loans in Table 2.23. Together, the cancelled principal and IOR payment (which raises banks' equity) reduce the Fed's remittances by the combined amount in the third transaction. This reduces the government's budget position by the same amount and leads the government to issue new securities in kind. From the totals, the government has issued new securities in the amount of principal plus interest. This amount is equal to the Fed's IOR payment from its purchase of the loans and the reduction in the Fed's reserve balances; in other words, the Fed's liabilities created by the purchase of the loans—the reserve balances—are reduced by the amount of the principal due, while the government's liabilities increase to offset.

Over the life of the loans, the Fed's reserve balances created by the purchase will fall each year, eventually to zero, while the Treasury's liabilities will rise eventually to the amount of the Fed's original purchase plus all IOR payments made throughout. Thus, unlike Table 2.12, in which the government issued securities up front to purchase the loans and thereafter new government liabilities were only equal to the annual debt service on these securities, here the government's liabilities increase each period by the amount of principal and interest due. Nevertheless, there is once again ultimately no "free lunch" from having the Fed carry out the cancellation, as the end result is that the full amount of the original purchase plus interest is eventually added to the government's liabilities.

Potential options to avoid costs to the federal government of student loan cancellation carried out by the Federal Reserve

The keys to understanding the argument to this point—that there is no "free lunch" from having the Fed carry out the cancellation rather than the federal government—are as follows: (1) the Fed's surplus capital above $10 billion each year is remitted to the Treasury, and (2) the Fed necessarily provides interest on reserve balances (or some alternative to it, like reverse repurchase agreements) at its target rate in the event that the quantity of reserve balances supplied is beyond the quantity demanded at the target rate. Nevertheless, this section explores two options (both highly theoretical) that could potentially enable the Fed to carry out a student loan cancellation while also obtaining a "free lunch"—that is, where the costs would not ultimately affect the federal government's budget.[12] As suggested previously, it is highly unlikely that the Fed would desire to carry out student loan cancellation. Moreover, it is questionable whether the Fed has the legal authority to do so—and even if it technically does have such authority, exercising it may result in legal and political repercussions for the Fed's prized independence. Consequently, it is presumed that an act of Congress and presidential signature would be required to allow (or force, as the case may be) the Fed to engage in any such actions (Carrillo et al. forthcoming).

The first option recognizes that the Fed funds itself mostly via interest on its portfolio of securities and loans. As several rounds of quantitative easing since the financial crisis have shown, the Fed's profits can rise substantially as its balance sheet expands. In theory at least, as the Fed cancels the student loans that it owns, it could begin purchasing other financial assets, and the earnings on the latter could offset the losses, thereby not affecting remittances to the Treasury. Again, this is all quite theoretical. The Fed's losses from student loan cancellation could rival or even significantly exceed the profits it currently earns on a balance sheet of around $3 trillion in a given year. Any proposal that the Fed purchase perhaps *another* $3 trillion in financial assets—or a lot more than this—would quickly run into many difficulties, such as (most obviously) the potential effect on interest rates and asset prices.

A second option would be to expand on the Fed's existing accounting practices regarding operating losses. Currently, if the Fed experiences an operating loss in any week, it capitalizes the losses as a "deferred asset" that is a negative liability rather than reducing surplus capital; remittances to the Treasury are not paid until an operating profit is run large enough to offset any previous operating losses. If the Fed were instead able to isolate losses from cancelling student loans from the rest of its operating profits—perhaps by deferring them *permanently*—it could in theory result in the losses not negatively affecting remittances to the Treasury (Carrillo et al. forthcoming). In this case, the Fed would create a separate, deferred account on its asset side, rather than its liability side. In terms of balance sheets, the T-account transactions would look like those in Table 2.25. An alternative could be for the Fed to not write down the loans and its equity but instead capitalize the losses or write down both as an asset and as a "deferred asset" on the liability side (similar to loan-loss provisioning by banks), which Table 2.26 presents

Table 2.25 **Federal Reserve Capitalizes Losses from Cancelling Student Loan Debt Service**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Cancels Loan Payments			-Loans	No Change Eq_{Fed}				-Loans		
				+Capitalized Loan Writedown				$+Eq_{HH}$		

Table 2.26 **Federal Reserve Capitalizes Losses from Cancelling Student Loan Debt Service without Writing Down Loans**

	Federal Government		Federal Reserve		Banks		Student Loan Borrowers		Private Investors	
	A	L/E	A	L/E	A	L/E	A	L/E	A	L/E
Fed Cancels Loan Payments			No Change Loan Values	No Change Eq_{Fed}				-Loans		
			+Capitalized Loan Losses	+Deferred Loan Losses				$+Eq_{HH}$		

(“deferred loan loss” is used here rather than “deferred asset” to avoid potential confusion from crediting an asset as a liability).

In either case (from Table 2.25 or 2.26), under the appropriate legal circumstances the Fed’s operating profits—and thus its surplus capital and subsequent remittances to the Treasury—could be shielded from being affected by the losses it would otherwise incur from carrying out student loan cancellation.

In conclusion, while both options discussed here are not “usual” approaches to managing the Fed’s operating profits, they are potential avenues for obtaining a “free lunch” in carrying out student loan cancellation. Obviously either option would be quite controversial, and would likely be opposed by the Fed as stridently as anyone else. In the absence of either of these two options being instituted, there is no “free lunch” in having the Fed carry out the debt cancellation, and it is erroneous to consider such actions by the Fed as analogous to its earlier quantitative easing operations.

Section 3: Simulating Student Debt Cancellation

We simulated the student debt cancellation using two macroeconometric models in order to examine the implications of student debt cancellation and incorporate feedback effects that go beyond financial statement analysis. This section presents the results from simulations of a debt cancellation carried out within the Moody's model and the US version of the Fair model.[13] Feedback effects necessarily omitted from financial statement analysis of the mechanics of student debt cancellation are explicitly accounted for in these simulations. At the same time, it is very important to understand that many potential effects are outside the scope of macroeconometric models. For instance, neither model explicitly integrates different income or wealth tiers within the private sector, business startup decisions, and so forth. To the degree that benefits beyond the scope of these simulations are present (discussed later in this section), the results presented here represent a subset of the benefits (or costs, as the case might be) of student debt cancellation. Both models are well regarded among economists. The Moody's model is well-known among professional macroeconomic forecasters and is frequently referenced in the press, particularly in the context of policy debates. For its part, simulations of and econometric investigations into the Fair model have been the subject of several dozen academic publications over the past 40 years or more.

Models and Assumptions Used for Simulating Student Debt Cancellation

Introduction to the Moody's model

The Moody's model is the macroeconomic forecasting model used by Moody's and Economy.com. It has around 1,800 variables and "can best be described as 'Keynesian in the short run, and classical in the long run'" (Zandi and Hoyt 2015). The model is "structural," taking a middle ground between pure time-series-based models and those founded on strict microeconomic theoretical foundations, which means it attempts to balance theoretical assumptions with econometric evidence (Zandi and Hoyt 2015). The methodological documentation of Moody's model by Zandi and Hoyt explains that,

> By taking a middle ground between theory and data, this approach attains neither the theoretical elegance of the DSGE [Dynamic Stochastic General Equilibrium] approach or the empirical flexibility of a VAR [Vector Autoregression]. At the same time, however, it manages to avoid the shortcomings of either one; imposing theory to restrict the flexibility of econometric specifications allows more efficient estimation and greater explanatory power than a VAR can achieve. However, structural macroeconomic models do not require some of the extreme and somewhat unrealistic assumptions that render DSGEs susceptible to misspecification. (2015, 2)

A structural model is built via numerous aggregative equations that have a grounding in macroeconomic theory; these "stochastic" equations are then estimated econometrically either individually or simultaneously. The econometric regressions determine key variables that are then inserted into identity equations (such as those from National Income and Product Accounts or Flow of Funds) in order to determine the rest of the model's endogenous variables through an iterative method that solves all of the identities simultaneously. As Zandi and Hoyt (2015, 2) put it, the strength of structural models "is the great detail they can provide."

> Though VARs and DSGEs can incorporate no more than a few variables of interest such as aggregate GDP, a benchmark bond yield, and CPI inflation, structural macroeconomic models are able to specify and generate forecasts for a rich array of macroeconomic data, detailing the composition of both spending and industrial activity, the entire maturity yield curve and many other interest rates, and prices for goods, services, and assets throughout the economy.

The paper by Zandi and Hoyt provides the specification and estimation results for several of the model's stochastic equations, including consumer services spending, vehicle sales, investment in industrial equipment, private inventories, goods exports, vehicle and parts imports, hourly compensation, the federal funds rate, rates on the 10-year Treasury note, corporate profits, aggregate hours worked, industry employment, labor force, wages and salaries, single-family permits, and a housing price index. Several of these are discussed below within the context of the simulations of student debt cancellation.

Introduction to the Fair model

The Fair model is a large-scale, structural, macroeconometric model designed by Ray Fair at Yale University. Created in the 1970s, the model's structure has changed little across more than 40 years of business cycles and macroeconomic events. The "US model" version of the Fair model has about 225 variables within 25 stochastic equations and 100 identity equations that completely integrate National Income and Product Accounts and Flow of Funds data. The simulations presented in this report are via the US model because it is updated quarterly; Fair's "Multicountry" version of the model, which includes the US model's 125 equations but then adds roughly 1,550 additional equations for around 50 other countries, has not been updated since 2013. Several books, published papers, and a website are the primary sources for the Fair model.[14] The approach to building the model's structural equations is derived from the Cowles Commission, which, like the design of the Moody's model, uses macroeconomic theory to guide the design of stochastic equations that are then estimated (in the Fair model's case, via two-stage least squares techniques) and repeatedly tested for statistical significance, misspecification, the structure of error terms, stability, predictive ability, and so forth.[15] The entire models are then rigorously tested for consistency with empirical evidence and predictive ability (Fair 2013, 2004, 1992). Fair presents updated estimates for structural equation coefficients and single equation tests each quarter in an "Appendix" posted to his website. His published research argues that the Fair model dominates VAR, New Keynesian, and Real Business Cycle models in predicting real GDP both four and eight quarters ahead (Fair 2007, 2004). Overall, like Zandi and Hoyt, Fair finds the DSGE models to be less useful than the larger structural econometric models for real-world policy analysis.

Whereas the Moody's model has a self-described "Classical core"—or long-run assumptions based upon estimated supply-side fundamentals—to complement a more "Keynesian" short run, the Fair model is more traditionally Keynesian throughout. In contrast to the Moody's model, Fair's econometric studies have rejected the so-called nonaccelerating inflation rate of unemployment (NAIRU) dynamics. To be more precise, Fair finds that the more accurate relationship between inflation and unemployment is nonlinear, whereby inflation is not very responsive to unemployment rates across a wide range, but could become much steeper at very low unemployment rates, perhaps around 2 percent (that is, at very low unemployment rates, inflation could rise substantially). To be clear, though, with so few real-world observations, Fair's econometric studies were not able to entirely confirm or reject the likelihood of a steep rise in inflation at very low unemployment rates (Fair 2013, 147–60).

Both models have been used to project events in the macroeconomy. The economic proposals for both 2016 presidential candidates were simulated in the Moody's model. The model is updated monthly for incoming macroeconomic data in order to provide new macroeconomic forecasts and other simulations presented in various Moody's publications (Zandi et al. 2016; Zandi, Lafakis, and Ozimek 2016). Fair's books from 2004 and 2013 provide summaries of numerous earlier published papers (often in leading macroeconomic journals) forecasting the effects of the Obama stimulus (the 2009 American Recovery and Reinvestment Act); effects of monetary and fiscal policies; econometric analyses of unemployment, inflation, and production; financial crises; and so forth. Finally, Fair predicted the 1990s stock market bubble after structural stability tests of the Fair model's stochastic equations showed that only the variable associated with capital gains in equities had evidence of a structural break.[16]

Assumptions for the simulated student debt cancellation

The version of student debt cancellation simulated in the models is based upon the mechanics provided in the previous sections: the federal government cancels student loans owned by the Department of Education (ED) and takes over payments owed on privately owned student loans. Assumptions for the simulations are the following:

1) The student debt cancellation occurs at the beginning of 2017. For the first quarter of 2017, we assume debt in each of the three categories of student loans to be at the following levels:
    - Debt owned by the ED = $1,024 billion.
    - Debt owned by private investors and government-guaranteed = $277 billion.
    - Debt owned by private investors and not government-guaranteed = $105 billion.
2) From the perspective of those borrowers servicing student loans prior to the debt cancellation, the effect of cancelling the ED-owned loans and taking over payments of loans owned by private investors is to essentially cancel all of their student loan debt at the beginning of 2017. In other words, they will act as if their student loans are cancelled. The sum of the three categories of student loans is $1.406 trillion;

borrowers currently servicing student loans will feel as if their net wealth has increased by this amount. Further, the income that households would have devoted to servicing their loans is now available for households to spend, save, or borrow against. These two effects—the rise in net financial wealth from the debt cancellation and additional disposable income previously devoted to debt service—are the avenues through which the debt cancellation stimulates the macroeconomy in the simulations.[17]

3) From the perspective of the private investors owning student loans, there is no change, as they continue to receive the payments they would receive in the absence of the cancellation. The difference is that the borrowers are now in possession of greater discretionary income, since they are no longer the ones making these payments.
4) For simplicity of comparison, in the absence of the cancellation, all student loans owned by the ED and all privately issued, not government-guaranteed loans are assumed to have otherwise been paid down in equal principal installments over 10 years, in accordance with the ED's standard repayment plan. All privately issued loans that are guaranteed by the government are assumed to have otherwise been paid off by the end of 2020, also in equal principal installments. This scenario also assumes a 10-year repayment plan for privately issued, government-guaranteed student loans, since the federally guaranteed student loan program ended in 2010.
5) Interest rates on the three types of student loans are assumed to be the following:
    - Debt owned by the ED = 4.6 percent (consistent with current law).
    - Debt owned by private investors and government-guaranteed = the previous quarter's short-term interest rate (determined within the models' simulations) plus 2.3 percent (consistent with current law).
    - Debt owned by private investors and not government-guaranteed = 10 percent (as a proxy average for interest rates on current outstanding loans).[18]

Baseline values and macroeconometric simulation

Simulations require a baseline level for comparison and evaluation of the simulated changes. That is, the simulation of a policy change itself is only meaningful relative to a model's baseline, since the latter represents the model's simulated values without the policy in place. This is particularly the case for simulations involving model forecasts for more than a few years, as structural models thereafter converge to a "trend" or longer-run path that may have little to offer in terms of a useful forecast without careful adjustments to many exogenous variables. For the Fair model, the baseline is the forecast for the model from 2017 to 2026. Fair currently provides forecasts on his website through 2022 only. To simulate 2023 to 2026, we extrapolated Fair's assumptions for changes in certain exogenous variables—all of which are reported on his website—forward to 2026. Additionally, Fair's empirical research finds macroeconomically significant age-related effects, such as the ratio of working-age to non-working-age people. To incorporate these, US Census population projections were used to design the variables Fair incorporates into stochastic equations. The Fair model simulations were carried out using the Fair-Parke program, available on Fair's website. For Moody's model, the baseline is defined as the model's projection for 2017–26.[19]

We demonstrate the relevance of one additional policy assumption in the simulations by presenting results under two scenarios for each model. First, we simulate the models with the Fed's interest rate reaction function included—that is, the Fed's interest rate target adjusts to "lean against" macroeconomic changes associated with the cancellation. Next, we simulate an alternative scenario in which the Fed's interest rate reaction function is "turned off." In other words, the behavior of the short-term interest rate in these latter simulations will be identical to that in the respective baseline simulations. The rationale for turning off the Fed is that the student debt cancellation produces little to no inflationary impact in either model (shown and discussed below). Despite the Federal Reserve's essentially mechanical responses to lower unemployment assumed within the models as the positive macroeconomic effects of the debt cancellation appear, there might be little actual rationale for real-world central bankers to raise interest rates and subsequently dampen these positive effects.

It is important to recall that in both models there is no breakdown of the private sector into borrowers and nonborrowers of student loans. In the Moody's model, there is some capacity to break down the consumption function into groups related to income or wealth in order to account for differing propensities to consume, but our simulation does not account for which income or wealth cohort is benefiting from the debt cancellation. Instead, both models have a "household sector" that supplies labor, purchases consumption goods (also broken down into multiple categories in both models), and buys houses. In the Fair model, there are relative-sized age cohorts, and also gender effects for consumption and labor supply, but the model does not enable directly tying age and gender cohorts to the distribution of debt relief from the cancellation within the simulations. This all means that the simulated macroeconomic impacts for both models are "general" or "average" in the sense that they assume that the increase in net wealth and reduced debt service benefits the entire household sector, not specific components of the household sector. Depending upon how the benefits would actually be distributed—for instance, to younger individuals that might then be more likely to purchase a home—the macroeconomic impacts could be more significant than reported here.

Finally, as is explained below in the discussion of the impacts of the student debt cancellation on the government's budget position (and elaborated on in Appendix B), the presentation in Section 2 regarding the financial statement effects for the federal government of cancelling the ED's loans needs to be reconciled with the approach taken in the simulations. The baseline case for both models—inherent in the "assumptions for the simulated student cancellation" presented above—is a scenario in which no cancellation of student loans occurs and all the loans are paid back over the 10-year period. Consequently, the net budgetary impacts for the federal government in the simulations are presented as a change in comparison to this baseline, *not* in comparison to the government's current budgetary position. As explained in Section 2, the costs of funding the ED's loans have already been incurred; cancelling these loans merely requires continued servicing of the securities issued at that time. Although the foregone interest and principal payments on the ED's loans both affect the government's budget position in comparison to the counterfactual assumed in the simulations (a baseline of no cancellation and continued repayment), the impact on the actual government budget position and outstanding liabilities (that is, the national debt) would be far smaller compared to its current levels.

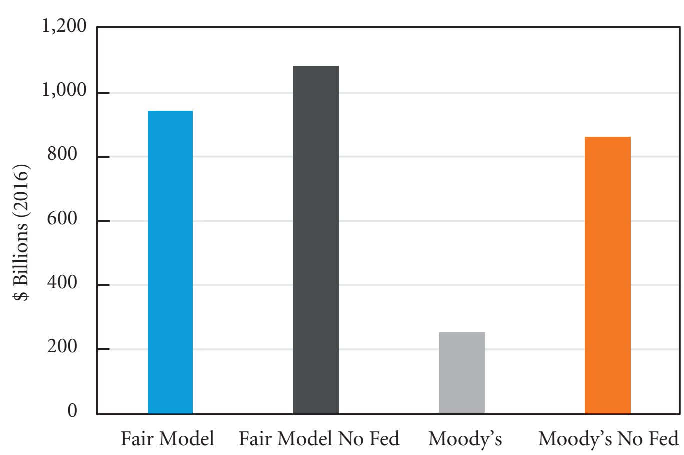
Simulation Results

Turning to the results of the simulations, the discussion here first covers the main macroeconomic variables (real GDP, employment, and inflation). Thereafter, other results of interest from the simulation are presented. All, or nearly all, of the related figures show simulated effects relative to the baseline levels noted above for the respective models, since those are the actual impacts of the debt cancellation within the simulations.

Figure 3.1 shows the total contribution of the cancellation to real GDP (in 2016 $ billions) over 10 years in all four simulations—the Fair model, the Fair model with the Fed's reaction function turned off (reported in this and subsequent figures as "no Fed" for both models), the Moody's model, and the Moody's model with no Fed reaction function. For the Fair model, the cancellation creates $943 billion in total inflation-adjusted GDP (or $94 billion per year, on average) "with the Fed," which rises to about $1,083 billion total (or $108 billion per year, on average) when the Fed is turned off. For the Moody's model, with the Fed the cancellation results in an additional $252 billion total inflation-adjusted GDP (just under $25 billion per year, on average), which rises to $861 billion total when the Fed is turned off (just under $86 billion per year, on average).[20, 21]

As can be seen in Figure 3.1, three of the simulation results are very similar, while the Moody's model with the Fed presents a significantly smaller total effect on real GDP. Figure 3.2 shows the models' results for each year of the simulation. Particularly interesting is that all four simulations are similar in magnitude and pattern through 2020, though the Fair model results without the Fed are about $45 billion above the other three simulations, on average. In all four simulations, the cancellation creates a significant increase in real GDP during 2017–20 that peaks in 2018. After 2021, the increases are smaller because (1) the initial wealth effect of the cancellation is decaying over time, and (2) the government-guaranteed student loans owned by the

Figure 3.1 Total Additional Real GDP Resulting from Student Loan Cancellation for 2017–26



Source: Authors' calculations

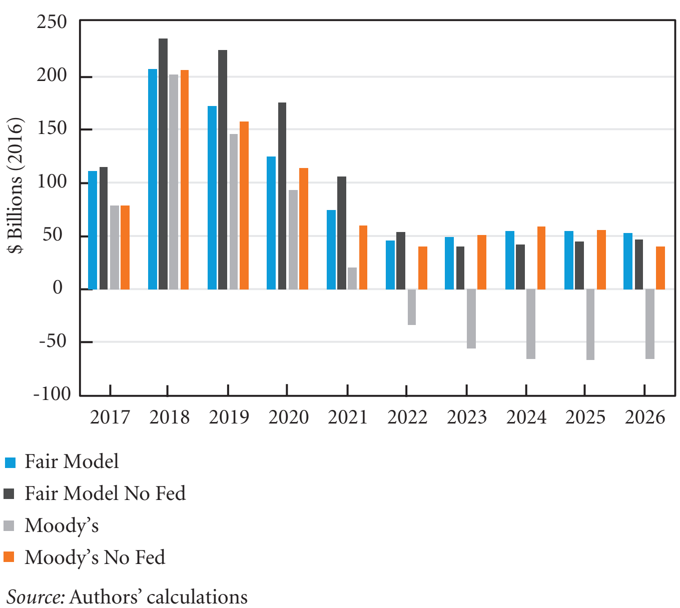
private sector are assumed to be paid off in 2020 in the absence of the cancellation (that is, the stimulus of additional income to borrowers ends in 2020, since without the cancellation the loans would have been paid off by then). For both models, the effect of turning off the Fed's reaction function is that the GDP increase is higher and tails off a bit more slowly, as the Fed's interest rate target does not rise above the baseline forecasts of the models.

Starting in 2021, the Moody's simulations with the Fed show a substantially smaller rise in GDP relative to the other three simulations, and even show a *subtraction* from real GDP during 2022–26. While the other three simulations stabilize in the range of an additional $40–60 billion in real GDP during 2022–26, clearly the Moody's model is very sensitive to changes in the Fed's interest rate policy. This is unlike the Fair model for these years, in which the simulation results with and without the Fed turn out quite similar to one another in pattern and magnitude. An important consideration for understanding and evaluating the simulation results and their implications for the cancellation, therefore, is whether or not such assumed changes in the Fed's target rate are warranted as a response to the macroeconomic effects of the cancellation policy. This relates specifically to the cancellation's effect on inflation in the figures and analysis below, since the Fed's stated long-run goal is low inflation rates that enable maximum sustainable growth in real GDP.

Figure 3.3 shows the average unemployment rates in the two models for the entire 10-year period. Recall from above that the baseline values for the models are not on their own significant—of actual interest are the differences between baseline values and simulation values. The simulations for the entire period show unemployment rates 0.22 percentage points and 0.25 percentage points below the baseline values for the Fair model simulations with and without the Fed, respectively. For the Moody's simulations, the cancellation reduces the unemployment rate by 0.13 percentage points with the Fed and 0.36 percentage points without the Fed.

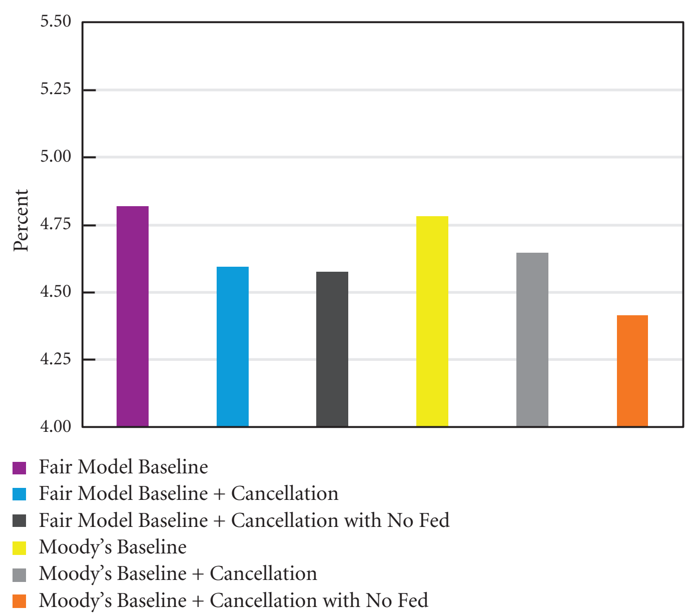
Figure 3.4 shows the reduction in unemployment rates from baseline values for each year of all four debt cancellation simulations. As with real GDP in Figure 3.2, the reduction in unemployment rates is greatest during 2017–20, with an average reduction of about 0.4 percentage points for the Fair model simulations (peaking at 0.48 percentage points and 0.55 percentage points for the with-Fed and without-Fed simulations, respectively) and 0.6 percentage points for the Moody's simulations (peaking at 0.87 and 0.88 percentage points, respectively). During 2022–26, the Moody's simulation with the Fed's target rate rule in place is once again an outlier, with unemployment

Figure 3.2 **Additional Real GDP Resulting from Student Loan Cancellation for Each Year of the Simulation**



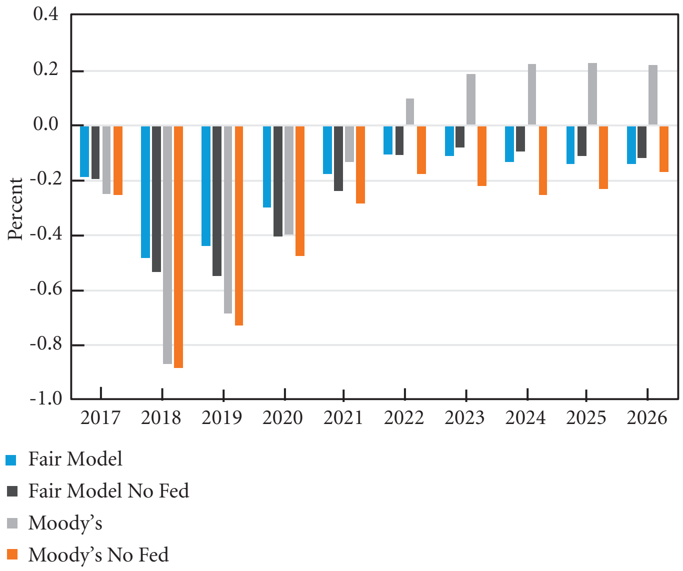
Source: Authors' calculations

Figure 3.3 **Average Unemployment Rate for Each Student Debt Cancellation Simulation**



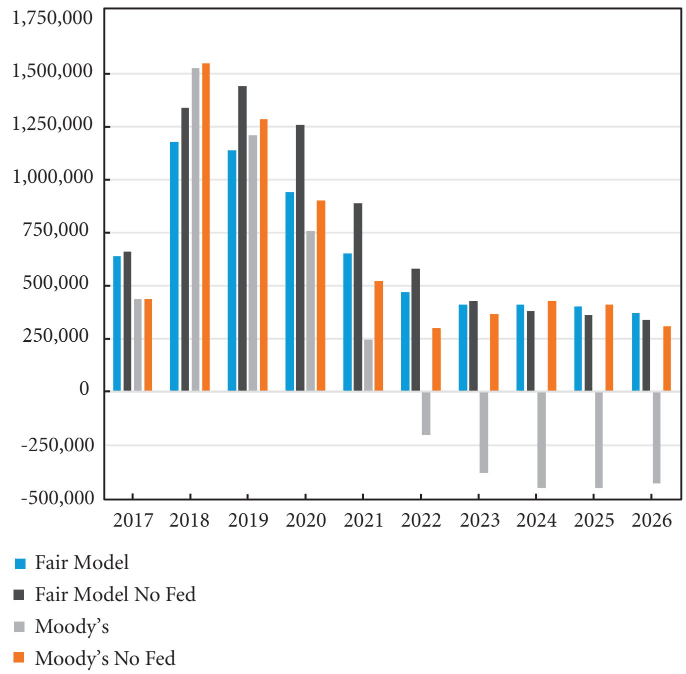
Source: Authors' calculations

Figure 3.4 Reduction in Unemployment Rate for Each Year of the Simulation



Source: Authors' calculations

Figure 3.5 Additional Private-Sector Jobs Resulting from Student Loan Cancellation



Source: Authors' calculations

rates actually modestly higher (0.19 percentage points higher, on average) than the baseline levels. The other three simulations, on the other hand, average fairly stable reductions during 2022–26 of 0.13 percentage points (Fair model with the Fed), 0.19 percentage points (Fair model without the Fed), and 0.21 percentage points (Moody's without the Fed).

Figure 3.5 presents the number of additional jobs created as a result of the cancellation in each year. The job creation results in the Fair model peak in 2018–20 at 1.18 million additional jobs per year with the Fed's interest rate rule in place and 1.44 million with the Fed's rule turned off. For the Moody's model, the job creation effects peak at about 1.53 million jobs with the Fed's reaction function, and 1.55 million without it. In all four simulations, job creation relative to the baseline tails off thereafter, but again the Moody's simulation with the Fed is an outlier. While the other three simulations show job creation stabilizing at 400,000 jobs above the respective baseline levels during 2022–26, the Moody's simulation with the Fed shows a worsening economy and thus job *reductions* during this period.

By way of comparison, job creation in the United States from 2010 to 2015 averaged 2.23 million per year. The simulations thus suggest that two years after inception, student debt cancellation alone might create 50 percent to 70 percent as many jobs in its peak year as the current economic expansion creates in an average year, and could continue to sustain about one-third of the job creation seen in the cancellation's peak years throughout the duration of the cancellation. As with the unemployment rates, the simulations also suggest that the Moody's model job creation projections are more sensitive to the state of the economy than are the Fair model's, as a greater increase in real GDP in the latter leads to about the same peak job creation as in the former. And yet again, there is significantly greater sensitivity to the Fed's interest rate reaction function in the Moody's model. Although the results for the Moody's simulation without the Fed are similar to those for both Fair model simulations, after the first four years the Moody's simulation with the Fed's reaction function produces very different results from the other three simulations.

Figure 3.6 presents results for inflation. In the Moody's model, the inflation measure is the Consumer Price Index (hereafter, CPI); for the Fair model, the measure is the model's own index for firm-sector pricing, which has historically been highly correlated with standard measures of consumer price inflation like the CPI and the Personal Consumption Expenditures

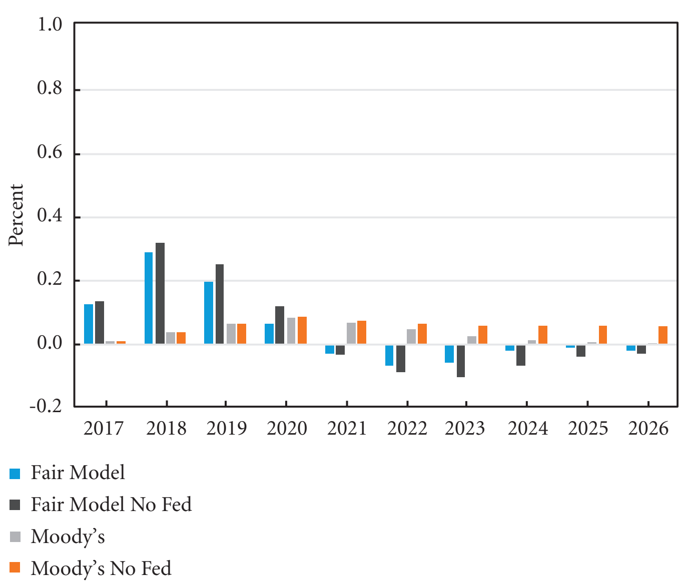
Price Index (PCEPI). In the Fair model, the inflationary effect of student debt cancellation is modest, peaking at just below 0.3 percentage points of additional inflation (that is, compared to the baseline) with the Fed's interest rate rule in place, and a bit above this level with the Fed's rule turned off. After 2020, consistent with the tailing off of real GDP contributions noted above, the inflationary impact is actually negative—that is, the cancellation reduces inflation in these years. For the Moody's model, the inflationary effects are even smaller—essentially at zero, given that they never rise above 0.09 percentage points.

Overall, because even the largest effect on inflation in a single year in either model (0.32 percentage points in 2018 in the Fair model simulation with no reaction from the Fed's interest rate rule) is of little macroeconomic significance, it is at least arguable that the Fed would not respond to the student debt cancellation by raising its interest rate target. Recall that this is the rationale for including simulations for both models in which the Fed's interest rate rule is turned off.[22] Stated differently, a case can be made that the Fed would not, or at least should not, react to the cancellation by raising interest rates given its stated goal of keeping inflation from rising above its target. If so, the Moody's simulation with the Fed's target rate reaction function included—the clear outlier in these simulations—is not as useful a guide to the cancellation's impacts as the other three simulations. Even the Fair model simulation with the Fed's target rate rule turned on might be of less interest, although (1) the simulations with and without the Fed's rule are not very dissimilar (that is, the Fair model is less sensitive to interest rate target changes than the Moody's model), and (2) the inflationary impacts of the cancellation, though small in terms of macroeconomic significance, were significantly greater in the early years of the Fair model simulation than in the Moody's model.

Figures 3.7 and 3.8 show the simulated effects of debt cancellation on nominal interest rates. Figure 3.7 presents the Fed's response to the cancellation in both models when its reaction function is turned on. In the Fair model, the Fed responds by increasing its target rate by around 0.5 percentage points above the baseline in 2018 and 2019; thereafter, the increases slowly taper off until the Fed's target rate settles at around 0.2 percentage points above the 2023–26 baseline.

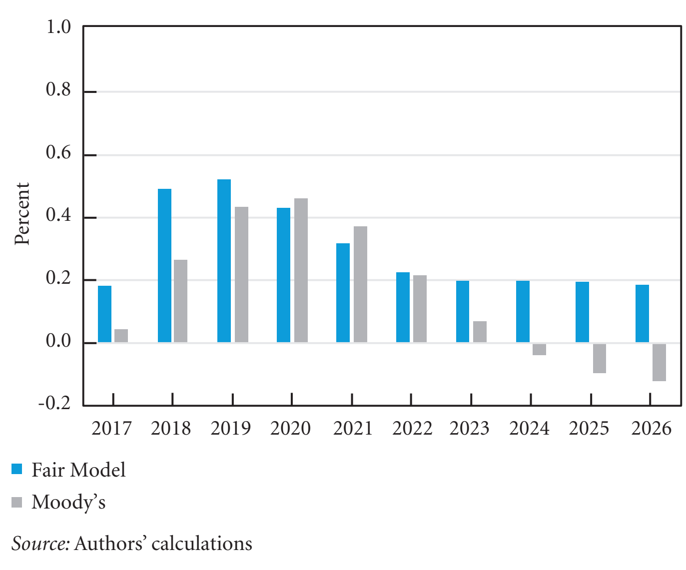
In the Moody's model, the Fed's reaction is very similar during the first six years of the simulation—the Fed raises its interest rate target by 0.4 to 0.46 percentage points during 2019–20, after which the effect of the cancellation tails off to almost nothing by the end of 2026. In fact, by 2024 the Fed is setting the interest rate slightly lower than the baseline level. In other words, the Fed's early interest rate hikes that peak at 0.46 percentage points in 2020 have a sizeable enough impact in slowing the economy that by the end of the simulation the Fed is reversing course to attempt mild stimulus. This is consistent

Figure 3.6 **Inflation Impacts of Student Debt Cancellation**



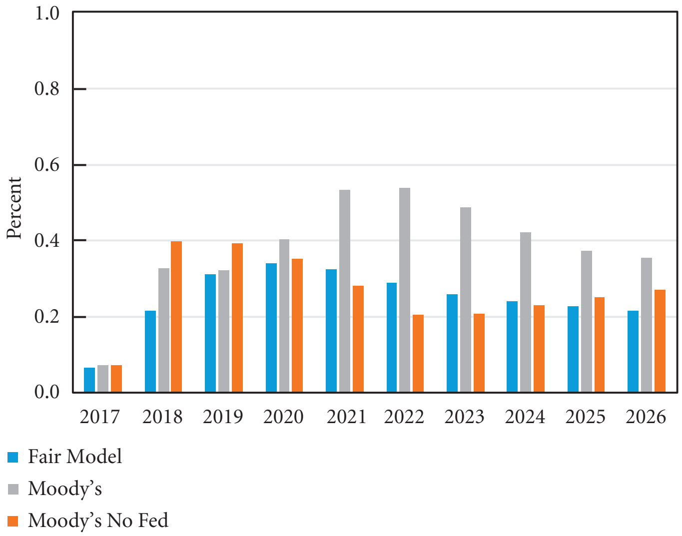
Source: Authors' calculations

Figure 3.7 **Effect of Student Debt Cancellation on the Federal Reserve's Interest Rate Target—Differences from Baseline Values**



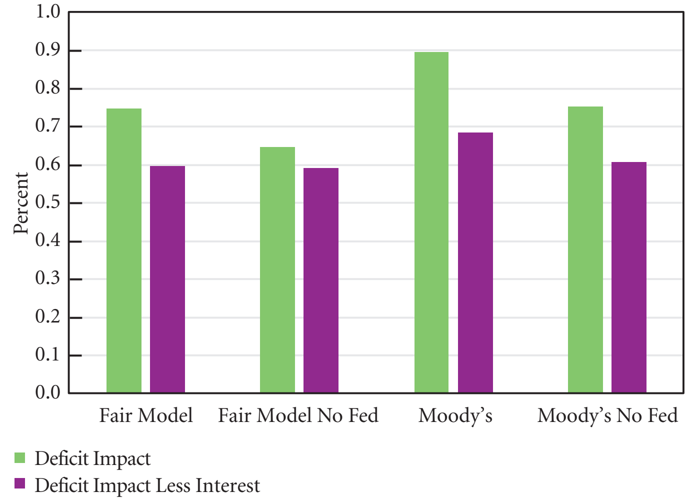
Source: Authors' calculations

Figure 3.8 Effect of Student Debt Cancellation on the 10-Year Treasury Rate—Differences from Baseline Values



Source: Authors' calculations

Figure 3.9 Average Annual Deficit Impacts of Student Debt Cancellation (percent of GDP)



Source: Authors' calculations

with the results for the Moody's model presented in the previous figures. Most importantly, this again suggests that the Moody's results with the Fed's target rule turned on are an outlier here. From Figure 3.6, there is little evidence that the Fed should raise interest rates, while from Figure 3.7, the Fed is only modestly raising interest rates. The Moody's model is clearly very sensitive to changes in the Fed's interest rate target, as a very modest 0.46 percentage point interest rate hike is sufficient to bring the stimulus effect of the student debt cancellation (an immediate $1.4 trillion increase in net financial wealth and a reduction in debt service on this amount over 10 years) to an effective standstill (or worse) by the end of 2021.

The effects on the 10-year Treasury rate in Figure 3.8 are also not large. The peaks in both models are not much different—0.34 percentage points in the Fair model and 0.54 percentage points in the Moody's model, both including the Fed's interest rate reaction function. The Moody's model peaks in 2022, two years after the Fair model's peak in 2020, following the pattern of the impacts on the federal funds rate in Figure 3.7. The difference between the student debt cancellation's average effects on the 10-year Treasury rate in the two models is even smaller—the rate averages being 0.25 percentage points higher than the baseline in the Fair model and 0.38 percentage points higher in the Moody's model.

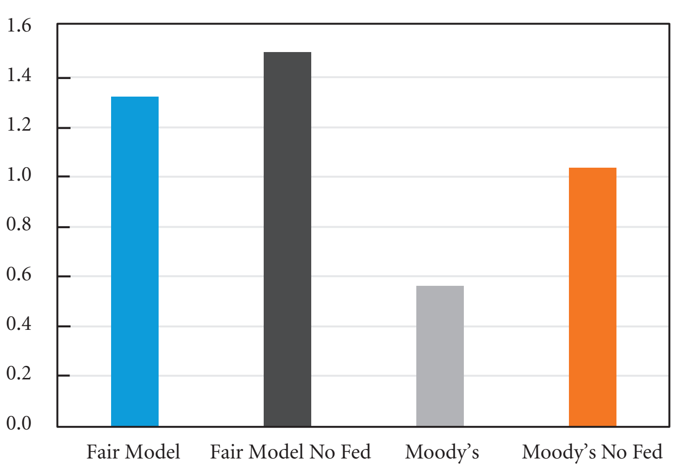
Figure 3.8 only presents results without the Fed's reaction function in the case of the Moody's model. Unlike in the Moody's model, the long-term interest rate in the Fair model showed a negligible change from its baseline value when the Fed's reaction was turned off. The reason for this difference is that while the Moody's model incorporates the government debt-to-GDP ratio as an explanatory variable for the 10-year Treasury note, the Fair model does not. This is one of the significant differences in the two models. The Fair model takes a more traditional Keynesian approach to explaining the 10-year rate's spread above the short-term rate: through lagged values of the spread and changes in both the short-term rate and in lagged values of the spread. The Moody's model incorporation of the national debt-to-GDP ratio, on the other hand, is consistent with its self-described "Classical" long-run structure.[23, 24] In the Moody's model simulations, the effects on the 10-year Treasury rate when the Fed's reaction function is turned off average a 0.27 percentage point increase above the baseline. In other words, the impact of changes in the government's budget position induced by the cancellation amount to a 0.11 percentage point increase in the 10-year Treasury rate (a 0.38 percentage point increase on average with the Fed's reaction function, minus 0.27 percentage points on average without the Fed's reaction function). If one considers the normal variation in longer-term Treasury rates, this 0.11 percentage point difference is within the realm of "statistical noise"; indeed, the increases in the longer-term rates shown here resulting from the debt cancellation are not of macroeconomic significance relative to historical changes.[25]

A large-scale debt cancellation can be expected to worsen the federal government's budget position absent extraordinarily strong feedback effects from the program's macroeconomic stimulus. Figure 3.9 presents two separate views for each of the simulations. First, the annual deficit impacts—that is, after the cancellation affects macroeconomic performance, which feeds back to the government's budget position—are between 0.65 percent and 0.75 percent of GDP in the Fair model simulations and 0.75 percent of GDP in the Moody's simulation without the Fed's rule in effect. This is consistent with the smaller macroeconomic impact in the latter scenario, which would thereby have a smaller positive feedback effect on the budget. In the Moody's simulation with the Fed's rule in effect, however, the net budget deficit increase (0.89 percent of GDP on average) is larger than the direct costs of the cancellation. This is due to the poorer macroeconomic performance of the economy in that scenario, which negatively affects the government's budget. Second, the simulations here assumed both that the government was already running a deficit (that is, the baseline for both models is that the federal government is in a deficit position at least through 2026) and that there were no budgetary offsets to the cancellation via spending cuts or revenue increases. As a result, the deficit effects include increased government debt service. However, in the event that the government begins in a surplus position or offsets the costs of the cancellation, this debt service would not exist or be less than estimated here. This would also be true if interest rates turn out to be significantly lower than is assumed in the models' baseline cases (these baselines assume interest rates in the later years of the simulations rise higher than what the Fed's policymakers have been forecasting). The columns in Figure 3.9 labeled "Deficit Impact Less Interest" show that the average noninterest deficit effects of the cancellation are about 0.6 percent of GDP in both Fair model simulations and also in the Moody's simulation without the Fed's rule in effect. With the Fed's rule in effect, the noninterest deficit effect is 0.69 percent of GDP for the Moody's model.

From the earlier discussion in this section of the two models' baseline forecasts, the deficit impacts presented in Figure 3.9 significantly overstate how the government's actual budget position and outstanding liabilities would be affected, relative to their current levels. Appendix B explains this in detail as it progresses through to an estimate of the more relevant average annual deficit impacts of the student debt cancellation: between 0.29 and 0.37 percent of GDP for the two Fair model simulations and the Moody's simulation without the Fed's rule in effect. These figures are not adjusted for debt service, and thus are adjustments to the larger amounts in Figure 3.9. Adjusting again for debt service would reduce these estimates still further.

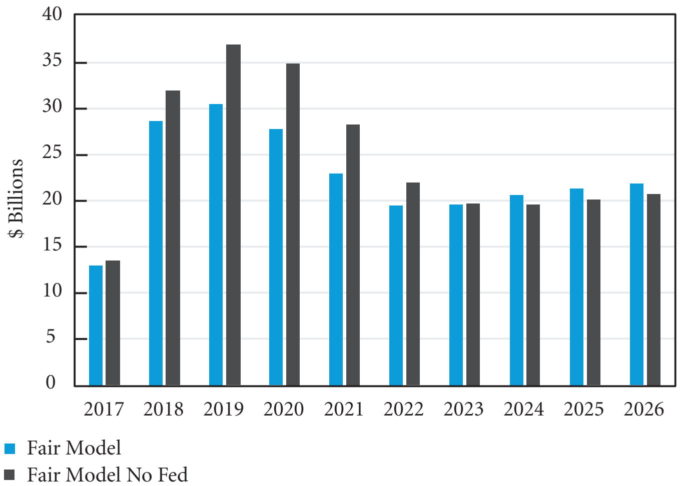
Figure 3.10 presents the average multiplier effects of student debt cancellation. The multiplier effect here is the total increase in nominal GDP during the full simulation period divided by the sum of the government's total revenue loss from foregone debt service and the spending increases on debt service paid to private investors during the full simulation period (in other words, the total direct costs of the cancellation). For the Fair model, the multiplier of 1.32 (with the Fed's reaction function in place) and 1.5 (without the Fed's reaction function) are at the higher end of—though still in line with—those found in other empirical studies, though less so when one considers that part of the stimulus is from the wealth effect of private debt cancellation (Eichengreen and O'Rourke 2012; Blanchard and Leigh 2013; Zandi 2008). The multipliers in the Moody's model are smaller. With the Fed's reaction function in place, the multiplier is 0.56, which is at the low end for most studies, particularly if one considers again the wealth effect at work in the simulation. Without the Fed's interest rate reaction function, the multiplier for the Moody's model is 1.04, which is in a typical range. Again, if the economy is less sensitive to the Fed's interest rate increases

Figure 3.10 **Average Multiplier Effects of Student Debt Cancellation**



Source: Authors' calculations

Figure 3.11 Average Improvement in State Budget Positions Resulting from Student Loan Cancellation



Source: Authors' calculations

than the Moody's model suggests, the weight of the evidence falls in the 1.04 to 1.50 range for the multiplier.

Ignoring for the moment the wealth effect of the debt cancellation, it is worth noting that the multiplier's path in these simulations is through one of the traditionally smaller multipliers, at least from a Keynesian perspective. The cancellation effectively raises borrowers' incomes, and therefore has a smaller multiplier effect than government stimulus via direct purchases in these models. In other words, those that believe direct increases in household income—as in a tax cut—will have larger multipliers than traditional Keynesian models suggest should also believe that multiplier effects of the debt cancellation will be at least as large as those reported here (if not larger).

Recalling that the analysis in Appendix B of the costs of student debt cancellation is more relevant for understanding the costs relative to the current level of the national debt, one can consider the multiplier effects of the cancellation from that perspective. In this case, the multiplier effects rise to 2.79 and 3.33 for the Fair model simulations with and without the Fed's rule in effect, respectively. For the Moody's model, the multipliers are 1.03 with the Fed's rule in place and 1.94 with the Fed's rule turned off.

Finally, in the Fair model the debt cancellation leads budget positions to improve at the state level as a result of the stronger macroeconomy, as shown in Figure 3.11 (in nominal terms). This is important because state budgets tend to be procyclical and exacerbate macroeconomic swings; improved state budget positions would reduce the need to raise taxes or cut spending in a recession. State budget position results were not available from the Moody's model. The dollar amounts shown in Figure 3.11 represent, on average, 0.11 percent of GDP for the simulation with the Fed's rule in place and 0.12 percent of GDP with the Fed's rule turned off. From a consolidated federal-plus-state budget position perspective, the improvement in state budgets offset by about one-fifth the net budgetary effects reported in Figure 3.9. If one uses the Fair model's estimates of effects on state budgets to proxy for the Moody's model simulations, then the net budgetary effect, on a consolidated basis, is an increase in the deficit-to-GDP ratio of 0.45–0.76 percentage points across all four simulations, with the most likely range being 0.45–0.6 percentage points.[26] For the lower bound estimate without debt service, the most likely range for the increase in the deficit-to-GDP ratio falls to 0.39–0.46 percentage points. From the analysis in Appendix B of the budgetary impacts relative to current levels, on a consolidated basis the deficit-to-GDP ratio increases by even less: within a range of 0.17 to 0.25 percentage points (this includes the federal government's debt service).

Conclusions from simulations

During the first five years, all four simulations are quite similar and consistent. The Moody's model with the Fed's interest rate target rule turned on only diverges from the other three simulations in the latter five years of the simulated period. Interestingly, the differences between the two models did not arise from the major theoretical difference between them—the "Classical" long run in the Moody's model that is not present in the Fair model. The core difference was that the Moody's model is significantly more sensitive to small changes in interest rates than the Fair model, as noted above several times. As the student debt cancellation stimulates the economy, the Fed raises interest rates by nearly the same amount in both the Fair model and the Moody's model; the effect in the Moody's model is to slow the economy significantly. However, given that both models show very little inflationary impact from the cancellation—both in absolute terms and in terms of macroeconomic significance—it should not be unreasonable to expect that the Fed would not react to the cancellation by raising rates, and therefore the Moody's simulations without the Fed's reaction function would be the more relevant ones. This is consistent with the fact that the results of the two Fair model simulations are very much in line with those of the Moody's model with the Fed's interest rate target rule turned off.

Given this, the primary takeaways from the Fair model and Moody's simulations of the debt cancellation are the following (these exclude the "Moody's with Fed" results, except in the fifth bullet point summarizing interest rate changes):

- The most likely range for the total increase in real GDP (in 2016 dollars) is estimated to be between $861 billion and $1,083 billion for the entire 10-year period (or $86 billion to $108 billion per year, on average).
- Unemployment rates could fall by about 0.22 to 0.36 percentage points on average over the entire period.
- There could be significant macroeconomic improvements, with real GDP rising (particularly early on), and peak *additional* job creation about 50 percent to 70 percent as large as a typical year's overall job creation in the 2010–15 expansion. The Fair model suggests these effects peak about a year earlier on average than in the Moody's model.
- Inflationary effects appear to be small and macroeconomically insignificant.
- Interest rates rise modestly, if at all. The Fed raises rates 0.3–0.5 percentage points early on in step with the economy's improvement, and then the increase relative to the baseline values falls to 0.13 percentage points by the end of 2026. Increases in longer-term rates peak in the range of 0.25–0.4 percentage points, mostly in a manner consistent with the Fed's approach to shorter-term rates (although the Moody's model suggests 0.2 to 0.25 percentage points of this increase is due to government deficits). However, given that there is effectively no inflationary impact from the cancellation, it is highly questionable whether the Fed would or at least should raise interest rates in the first place.
- The cancellation's impact on the federal government's budget is, on average, modest, with a deficit impact of 0.65 to 0.75 percent of GDP, which falls to between 0.59 and 0.61 percent of GDP if the government is not in an overall deficit position (either because it begins with a surplus when the cancellation is implemented or the cost of the cancellation is offset) or interest rates remain very low. Furthermore, the calculations from Appendix B suggest that the more relevant estimate of the average annual rise in the deficit ratio, relative to current levels of the government's budget position and outstanding liabilities, is much smaller still: between 0.29 and 0.37 percent of GDP.
- The cancellation improves state budget positions such that, from the standpoint of a consolidated state-plus-federal budget, the net increase in the (consolidated) budget deficit is 0.10 to 0.12 percent of GDP lower than the increase for the federal government alone.

Of course, as discussed earlier, there are many potential benefits of debt cancellation that cannot be simulated in a macroeconometric model. These simulations should therefore be considered as providing estimates of a "subset" of these potential benefits. The following section presents and explains some of the benefits beyond the scope of these simulations.

Omitted Benefits and Costs of Student Debt Cancellation

The macroeconomic results presented in this report summarize the income and wealth effects of student debt cancellation but cannot capture all of the potential advantages and disadvantages of the program. Evidence supports a number of socioeconomic benefits that have been omitted from the models here. Despite their formal exclusion, this section provides context for the additional benefits of student debt cancellation, from increases in business formation, college attainment, household formation, and credit scores, to reduced economic vulnerability for some households. Additionally, the projected costs associated with changes in future attitudes toward borrowing are only partially incorporated into the model, in order to isolate the effects of the cancellation from other policy changes. The implications of a one-time student debt cancellation for moral hazard are also considered below.

Small business formation

Starting a business requires access to capital and an appetite for risk—two characteristics that may be inhibited by high student debt levels. Small businesses in particular tend to depend on financing from personal debt. Since student loan debt appears as negative net worth on household balance sheets, borrowers with high debt balances and monthly payments find it more difficult to accumulate startup capital through saving or borrowing. As a result, the growth of student loan debt is associated with reductions in small business formation.

Recent research from the Federal Reserve Bank of Philadelphia examined this relationship between the growth in student loan debt and small business formation. Philadelphia Federal Reserve researchers Ambrose, Cordell, and Ma (2015) show that student loan debt reduces an individual's ability to save startup capital or access alternative forms of credit for business formation. The authors estimate these trends at the county level over the period 2000–10, while accounting for county-level differences in demographic and risk factors. During the period of study, student debt as a share of total personal debt rose across all counties, with an average rise of 4.7 percentage points (from 2.8 percent of total debt in 1999 to 7.5 percent in 2009) and a standard deviation of 3.3 percent. The authors estimate a 14.4 percent decline in small business formation associated with an increase of one standard deviation of relative student debt (that is, relative to total personal debt). These effects are strongest among the smallest-sized category of business—those with one to four employees—where personal credit is presumed to be a larger portion of total business financing.

The negative relationship between student loan debt and entrepreneurship identified by Ambrose, Cordell, and Ma is supported by survey responses solicited by the Consumer Financial Protection Bureau (CFPB). In 2013, the CFPB published an analysis of detailed public comments on student loan affordability (CFPB 2013). Individuals, small business coalitions, and advocacy groups identified student loan debt as a barrier to accessing credit and debt payments as a diversion of business startup and expansion funds. According to the report, young entrepreneurs in particular are less able and less likely to form businesses due to the accumulation of student loan debt.

College degree attainment

One principal benefit of pursuing postsecondary education, and taking on student loans, is the education premium that accompanies an advanced degree. This premium is only realized if a degree is completed, but mounting debt makes degree attainment more difficult for students facing financial constraints. The relationship between debt and college completion is documented in several papers, with some consensus around the finding that high levels of student debt reduce college completion while access to grant funding promotes enrollment and persistence, leading to higher degree attainment.

Three articles drawing on the National Longitudinal Survey of Youth identify a positive correlation between student debt and college completion at lower levels of debt, turning negative at an inflection point around $10,000—well below the average debt level of borrowers. In the journal *Social Forces*, Dwyer, McCloud, and Hodson (2012) find that this relationship holds true across the income distribution but that the relationship is stronger for students from the bottom 75 percent of earnings. The same authors reproduce these findings in a 2013 article, and find that while high debt reduces the chances of graduating for both men and women, men are likely to drop out at lower levels of debt (Dwyer, McCloud, and Hodson 2013). In the *Journal of Sociology and Social Welfare*, Min Zhan (2014) shows that student loan debt above $10,000 reduces college graduation even after accounting for family assets.

Table 3.1 **Additional Benefits of Student Debt Cancellation**

Predicted Effect of Student Debt Cancellation	Description	Source
Increased small business formation	High student debt as a share of total debt reduces an individual's ability to access alternative forms of credit for business formation. Small business formation declines 14.4 percent with an increase of one standard deviation of relative student debt.	Ambrose, Cordell, and Ma (2015)
Increased college degree attainment	Grant funding increases college attendance and reduces college dropout rates. A $1,000 increase in Pell Grants is associated with a 1.2 percent to 8.6 percent decrease in students leaving college; $1000 in non-need-based grant aid increases college attendance by 3.6 percent.	Bettinger (2004) Dynarski (2003)
Increased household formation	A $1,000 increase in student debt is associated with a 2 percent decline in the likelihood of first marriage among female degree-holders.	Bozick and Estacion (2014) Addo (2014)
Higher credit scores	Student loan borrowers have lower credit scores, potentially leading to household credit constraints and reduced consumption.	Edmiston, Brooks, and Shepelwich (2013) Li (2013)
Reduced vulnerability to economic shocks	Households with student debt experienced greater reductions in net worth than households with no student debt during the most recent recession. A $1 increase in student loan debt in 2007 was associated with $0.87 less in net worth in 2009.	Elliott and Nam (2013)

For predicting changes in college completion associated with a student debt cancellation in the context of free or debt-free college, it may be most useful to look at the relationship between debt-free education financing and degree attainment. Here two studies support a relationship between grant funding and college completion. In a 2003 article in the *American Economic Review*, Susan Dynarski (2003) demonstrated that the elimination of grant aid reduced college attendance among the previously eligible population by more than one-third. Dynarski found that the availability of grant aid increases both attendance and completion, with an offer of $1,000 in funding increasing the chance of attendance by 3.6 percentage points. In a 2004 National Bureau of Economic Research study, author Eric Bettinger (2004) performs both panel and cross-sectional analysis on the relationship between need-based Pell Grants and college completion. The panel data shows a strong negative correlation between Pell Grant increases and drop-out rates, with a $1,000 increase in Pell Grants associated with 6.4 percent to 8.6 percent decreases in students leaving college. The cross-sectional analysis shows similar though smaller results, with 1.2 percent to 4 percent decreases in the likelihood of dropping out associated with a $1,000 Pell Grant increase.

The cancellation plan would reduce the current debt burden on those enrolled in school, and will likely increase the rate of completion. Over a longer time horizon, this increase in degree attainment will extend the positive effects of the cancellation by increasing the income and productivity of the US labor force.

Household formation

Entering marriage and beginning a household is associated with a range of socioeconomic benefits, including better health and higher income, while household public goods and risk pooling can be a means out of poverty (Schwartz 2005). Existing research suggests that debt, including student debt, is associated with a decreased probability of household formation. Recent studies isolating the relationship between student debt and marriage support this claim.

The impact of educational debt on decisions to marry is observed by Bozick and Estacion (2014) using data from the 1993 Baccalaureate and Beyond Longitudinal Study. Using a discrete-time hazard model, they find that the odds of first marriage decline by 2 percent with an increase of $1,000 in student loan borrowing among females in the first four years after attaining a college degree. In *Demography*, Addo (2014) produces similar results using the National Longitudinal Survey of Youth.

Credit scores

Student loan borrowers in general exhibit lower credit scores than the population overall (Edmiston, Brooks, and Shepelwich 2013). The New York Federal Reserve's Brown and Caldwell (2013) demonstrate that student loan borrowers ages 25 to 30 had Equifax risk scores 15 to 24 points below those of nonborrowers in the years between 2008 and 2013. Researchers disagree whether this divergence in credit ratings occurs due to higher delinquency and default rates associated with unmanageable student debt levels or due to increased lending to student borrowers who already had low credit scores after the reform of bankruptcy discharge laws that made it increasingly difficult for borrowers who cannot make their student loan payments to discharge the debt (Edmiston, Brooks, and Shepelwich 2013; Li 2013; Darolia and Ritter 2015). In either case, low credit scores may reduce access to other forms of credit despite the higher earning potential of college graduates.

Household vulnerability in business cycle downturns

Credit constraints, delayed household formation, lower net worth, and debt service obligations can all be sources of economic fragility associated with student debt. For these reasons, student loan debt can have negative financial consequences for individuals and families even when all payments are on time and up to date. In a 2013 publication from the Federal Reserve Bank of St. Louis, authors Elliot and Nam (2013) investigate the relationship between student debt and household economic security. They use the Survey of Consumer Finances to measure the relationship between student debt and net worth during periods of economic instability. Using the years 2007 and 2009 as reference points for the Great Recession, the authors find that households carrying student debt faced greater losses in net worth during the recession compared to similar households with no student debt. According to their research, each $1 increase in student loans for the median household in 2007 was associated with lower net worth of $0.87 in 2009. The negative relationship between student debt and net worth appeared consistently, regardless of net worth quintile, but the largest relative losses occurred among households at the bottom of the income distribution.

Moral hazard

The best context for student debt cancellation is one where a high-quality college education is available to all students who seek it without the need for debt financing. Without a change to our current system of increasingly private responsibility for funding higher education, households will continue to meet the growing cost of a college degree by taking on debt, diverting household resources from other types of investment and consumption. The primary theoretical criticism of debt cancellation plans focuses on the reaccumulation of debt following the cancellation, in particular the potential for problems of moral hazard to arise. From this perspective, debt relief today could change the incentives of future student debtors who may increase borrowing with the expectation that the loans will be forgiven, causing an even faster accumulation of debt and increasing the negative consequences at the household, local, and macroeconomic levels. The perverse incentives for unsustainable borrowing in this scenario are the result of inappropriate policy institutions that absolve borrowers of their debts while perpetuating the necessity of increasing debt. In order to avoid problems of moral hazard, any restructuring of student debt—including our debt cancellation proposal—should be accompanied by strong and appropriate policies that enforce the consequences of borrowing and address the market failures that lead to undesirable social costs. In combination with debt cancellation, publicly funded free or debt-free college would provide the institutional reform necessary to avert the problem of moral hazard.

Although complementary reform of higher education financing should accompany a student debt cancellation, this research is focused on the specific question of the impact of total cancellation of current debts. It is not an attempt to study the institutions necessary to frame a debt cancellation. Each model in this report isolates the effects of debt cancellation. In Moody's structural macroeconomic model, the cancellation is evaluated in the context of the Clinton Compact, a policy making debt-free public college attainable for more than 80 percent of households and largely eliminating the need for future debt associated with a four-year college degree. The difference between the modeled effects of debt-free college alone and debt-free college in conjunction with a program of student debt cancellation is the positive impact of debt cancellation in the absence of moral hazard. In the Fair model scenario, student debt reaccumulates beginning in the first quarter following the cancellation. No complementary policy is incorporated into the simulation. Each model imposes an institutional context in which moral hazard problems do not arise in order to focus the analysis on student debt cancellation.

Conclusion

This report examines the context, implementation, and outcomes of a program of complete student debt cancellation. We find that student debt cancellation produces positive feedback effects that improve several macroeconomic variables, including GDP and job growth, while imposing only moderate increases on the federal deficit and interest rates and no significant inflationary pressure. These results support the continued inclusion of bold proposals such as student debt cancellation in public policy deliberations surrounding the future of higher education in the United States. Our findings offer an essential contribution to this debate.

In Section 1, we review the trends in higher education costs, public financing, and student debt. The increasing need for a college degree to attain financial security drew more students into higher education at the same time that public support for education declined, prompting the growth of student debt to record levels. Today, student loan debt presents a significantly higher burden on household finances than ever before, with implications for the entire economy. Many borrowers struggle to make payments, while others forego important investment opportunities such as homeownership and business formation. These limitations translate into lower consumption and investment spending in the aggregate, leading to slower growth, greater vulnerability to economic shocks, and the potential for a higher education market failure. Complete cancellation of outstanding student loans could reverse many of these negative effects.

The possibility of enacting student debt cancellation is the subject of Section 2, where we examine the current mechanics of student lending and the balance sheet effects of a program of debt cancellation. There are two key takeaways. First, the *new* budgetary costs of cancelling the loans issued by the Department of Education (ED) do not come in the form of forgone principal and interest payments on those loans—the sole costs would be the continuation of debt service on the securities originally issued by the Treasury to fund the ED loans. Second, whether the cancellation is carried out by the federal government or the Fed, the outcome is the same in terms of the financial positions of borrowers and the federal budget. There is no budgetary "free lunch" in having the Fed carry out the cancellation. Under the Fed-initiated debt cancellation, however, there are two possible options to reduce the effects on the government balance sheet. One option is for the Fed to accommodate the losses by purchasing new financial assets; the other option is for the Fed to isolate losses from cancelling student loans from the rest of its operating profits. Both options are quite controversial, but would shield the federal government from the balance sheet effects of enacting the cancellation.

Finally, in Section 3 we forecast the effects of debt cancellation over a 10-year horizon using two macroeconomic models, the Fair model and Moody's model. The results of these simulations take into account the feedback effects of greater household consumption and investment that are not captured in the balance sheet analysis in Section 2.

Our simulations show that student debt cancellation results in an increase in GDP, a decrease in the average unemployment rate, and little to no inflationary pressure over the 10-year horizon, while interest rates increase only modestly. (Results reported here are from the two Fair model simulations and the Moody's simulation with the Fed's interest rate reaction function turned off.) Estimates for new GDP range from $861 billion to $1,083 billion over the entire period, or on average between $86 billion and $108 billion per year. This increase is accompanied by new job creation that peaks at 1.18 to 1.55 million additional new jobs per year, or 50 to 70 percent of the entire job creation for a typical year in the 2010–15 economic expansion. Average unemployment rates over the period are reduced by between 0.22 and 0.36 percentage points. The predicted effects of the cancellation on inflation are negligible, with a peak of 0.3 percentage points of additional inflation in the Fair model and negative pressure on inflation in later years, and no more than 0.09 percentage points of additional inflation in the Moody's model over the entire period. The simulations suggest that the Federal Reserve raises target rates modestly in the early years of the cancellation, adding 0.3 to 0.5 percentage points to the rate, with lower effects in later years. The effect on longer-term interest rates peaks at 0.25 to 0.4 percent. Finally, government spending to repay privately held loans and the loss of interest income from ED loans results in a larger budget deficit for the federal government. The average effect of the cancellation on the federal government's net budget position ranges between –0.65 and –0.75 percent of GDP per annum. However, those figures assume all the foregone revenues from cancelling the Department of Education's loans are incurred anew (see Appendix B). The more relevant estimate of these impacts—relative to current levels of deficits and the national debt—is a range of –0.29 to –0.37 percent of GDP. Finally, the Fair model shows an improvement in state budget positions (these effects were not available in the Moody's simulations).

Our analysis suggests that debt cancellation is a feasible program that would increase economic activity in the short run with moderate consequences on the federal deficit. These consequences should be balanced against the important social gains available from greater investment in higher education and the relief of debt as educators, advocates, borrowers, and policymakers continue to debate the path forward for US higher education.

Appendix A: Simulation Data Series

The macroeconomic simulations generate a $1.406 trillion one-time increase in net wealth of the household sector in the first quarter of 2017. The 10-year horizon for the government's reduction in revenues, payments to private investors, and debt service payments for the Department of Education (ED) and privately owned loans are presented in Appendix Tables A.1, A.2, A.3, and A.4. Table A.1 shows the estimated principal reduction of the different types of loans in the absence of debt cancellation for the purposes of determining (1) the amount of revenue the government does not receive but would have without the cancellation and (2) the debt service payments to private investors that the federal government subsequently bears. Table A.2 presents the estimated debt service for loans owned by the ED. These are calculated as the pay down in principal each quarter (the change in the respective rows in Table A.1) plus interest (interest rate multiplied by principal owed at the end of

Table A.1 Assumed Pay Down of Student Loan Debt in the Absence of Student Debt Cancellation ($ billions)

	Owned by ED	Privately Owned, Government-Guaranteed	Privately Owned, Not Government-Guaranteed
	Counterfactual for Debt Owed at End of Quarter	Counterfactual for Debt Owed at End of Quarter	Counterfactual for Debt Owed at End of Quarter
End of 2016	1024.61	276.95	105.44
2017Q1	998.64	260.66	102.87
2017Q2	973.68	244.37	100.30
2017Q3	948.71	228.08	97.72
2017Q4	923.74	211.79	95.15
2018Q1	898.78	195.50	92.58
2018Q2	873.81	179.20	90.01
2018Q3	848.85	162.91	87.44
2018Q4	823.88	146.62	84.87
2019Q1	798.91	130.33	82.29
2019Q2	773.95	114.04	79.72
2019Q3	748.98	97.75	77.15
2019Q4	724.02	81.46	74.58
2020Q1	699.05	65.17	72.01
2020Q2	674.08	48.87	69.44
2020Q3	649.12	32.58	66.86
2020Q4	624.15	16.29	64.29
2021Q1	599.18	0.00	61.72
2021Q2	574.22	0.00	59.15
2021Q3	549.25	0.00	56.58
2021Q4	524.29	0.00	54.01
2022Q1	499.32	0.00	51.43
2022Q2	474.35	0.00	48.86
2022Q3	449.39	0.00	46.29
2022Q4	424.42	0.00	43.72
2023Q1	399.46	0.00	41.15
2023Q2	374.49	0.00	38.58
2023Q3	349.52	0.00	36.00
2023Q4	324.56	0.00	33.43
2024Q1	299.59	0.00	30.86
2024Q2	274.63	0.00	28.29
2024Q3	249.66	0.00	25.72
2024Q4	224.69	0.00	23.15
2025Q1	199.73	0.00	20.57
2025Q2	174.76	0.00	18.00
2025Q3	149.80	0.00	15.43
2025Q4	124.83	0.00	12.86
2026Q1	99.86	0.00	10.29
2026Q2	74.90	0.00	7.72
2026Q3	49.93	0.00	5.14
2026Q4	24.97	0.00	2.57

Source: Authors' calculations

the previous quarter). The debt service for the ED-owned loans is the estimated reduction in government revenue as a result of the cancellation. Table A.3 is similar to Table A.2, but instead shows debt service for student loans owned by the private sector without government insurance; this is an assumed outlay in the simulations, as the government takes on these payments. Table A.4 is the debt service for the privately owned, government-guaranteed loans, which are also borne by the government in the cancellation but are assumed to be paid down completely by the end of 2020. Interest on these loans is calculated as the outstanding principal from the previous quarter multiplied by the short-term rate from the previous quarter plus the markup (currently 2.3 percent), and then divided by four for quarterly compounding. As noted above, the short-term interest rate is determined within the simulations. As an example only, Table A.4 uses the baseline level of the T-Bill rate from the Fair model forecasts (that is, the simulated model *without* the debt cancellation incorporated).

Table A.2 Assumed Debt Service Payments Not Received after Cancellation of Student Loans Owned by the Department of Education ($ billions)

	Government Owned Interest Rate = 4.6% Counterfactual Debt Service ($ billions)
2017Q1	36.74
2017Q2	36.16
2017Q3	35.88
2017Q4	35.59
2018Q1	35.30
2018Q2	35.01
2018Q3	34.73
2018Q4	34.44
2019Q1	34.15
2019Q2	33.87
2019Q3	33.58
2019Q4	33.29
2020Q1	33.01
2020Q2	32.72
2020Q3	32.43
2020Q4	32.14
2021Q1	31.86
2021Q2	31.57
2021Q3	31.28
2021Q4	31.00
2022Q1	30.71
2022Q2	30.42
2022Q3	30.13
2022Q4	29.85
2023Q1	29.56
2023Q2	29.27
2023Q3	28.99
2023Q4	28.70
2024Q1	28.41
2024Q2	28.12
2024Q3	27.84
2024Q4	27.55
2025Q1	27.26
2025Q2	26.98
2025Q3	26.69
2025Q4	26.40
2026Q1	26.11
2026Q2	25.83
2026Q3	25.54
2026Q4	25.25

Source: Authors' calculations

Table A.3 Assumed Debt Service Payment Outlays for the Government after Cancellation of Student Loans Owned by the Private Sector and Not Government-Guaranteed ($ billions)

	Privately Owned, No Government Insurance Interest Rate = 10% Counterfactual Debt Service ($ billions)
2017Q1	5.21
2017Q2	5.14
2017Q3	5.08
2017Q4	5.01
2018Q1	4.95
2018Q2	4.89
2018Q3	4.82
2018Q4	4.76
2019Q1	4.69
2019Q2	4.63
2019Q3	4.56
2019Q4	4.50
2020Q1	4.44
2020Q2	4.37
2020Q3	4.31
2020Q4	4.24
2021Q1	4.18
2021Q2	4.11
2021Q3	4.05
2021Q4	3.99
2022Q1	3.92
2022Q2	3.86
2022Q3	3.79
2022Q4	3.73
2023Q1	3.66
2023Q2	3.60
2023Q3	3.54
2023Q4	3.47
2024Q1	3.41
2024Q2	3.34
2024Q3	3.28
2024Q4	3.21
2025Q1	3.15
2025Q2	3.09
2025Q3	3.02
2025Q4	2.96
2026Q1	2.89
2026Q2	2.83
2026Q3	2.76
2026Q4	2.70

Source: Authors' calculations

Table A.4 **Assumed Debt Service Payment Outlays for the Government after Cancellation of Government-Guaranteed Student Loans Owned by the Private Sector ($ billions)**

	Privately Owned, Government-Guaranteed Interest Rate = Previous Quarter's Fed Funds Rate + 2.3%			
	Principal Remaining at End of Previous Quarter ($ billions)	(Example) Fair Model Base T-Bill Rate from Previous Quarter (%)	Interest Rate Markup (%)	Counterfactual Debt Service ($ billions)
2017Q1	260.66	0.31	2.30	18.10
2017Q2	244.37	0.25	2.30	17.95
2017Q3	228.08	0.27	2.30	17.86
2017Q4	211.79	0.33	2.30	17.79
2018Q1	195.50	0.40	2.30	17.72
2018Q2	179.20	0.48	2.30	17.65
2018Q3	162.91	0.59	2.30	17.59
2018Q4	146.62	0.72	2.30	17.52
2019Q1	130.33	0.85	2.30	17.45
2019Q2	114.04	0.98	2.30	17.36
2019Q3	97.75	1.12	2.30	17.27
2019Q4	81.46	1.25	2.30	17.16
2020Q1	65.17	1.39	2.30	17.04
2020Q2	48.87	1.53	2.30	16.92
2020Q3	32.58	1.67	2.30	16.78
2020Q4	16.29	1.81	2.30	16.63
2021Q1	0.00	1.95	2.30	24.33

Source: Authors' calculations

Appendix B: Department of Education Loans and the Budget Deficit

Macroeconometric simulations by nature compare a policy or change in one or more variables to a "baseline case." The simulations presented in this report likewise compare the student debt cancellation to the baseline case of no student debt cancellation. However, in Section 2 of the report, it is shown that for the cancellation of the Department of Education's (ED's) loans there is a difference between comparing the change in government liabilities relative to no cancellation and the actual increase in liabilities that would occur. This is because the ED's loans were previously funded via issuance of government securities; as a result, only the interest due on these securities is financed by new increases in government securities outstanding. There is no increase in government liabilities from cancellation of the principal on the ED's loans. Rather, the principal amount of the loans, funded originally by previously issued securities, is rolled over.

The fundamental difference is that the baseline case in the simulations assumes the ED's loans are paid down, which would in theory enable retiring the securities previously issued to fund the ED's loans. *Relative to this assumed baseline*, student debt cancellation raises the government deficit and increases the amount of government securities issued by the combined amount of the principal and interest on the ED's loans. This larger deficit is then compounded as it further raises future debt service on the national debt, raising future deficits as well. While the simulation results reported are "correct" in the sense that they report changes from the baseline, they also significantly overstate the actual, absolute increases in the national debt—and thus also the actual, annual deficits—that would result from student debt cancellation *relative to their current levels*. The purpose of this section is to provide some understanding of the size of this overstatement.

To generate an estimate of the actual deficit impact of student debt cancellation relative to current levels, the first step is to estimate the effect of the cancellation of the ED's loans. Table B.1 presents the Federal Reserve's interest rate targets in the three core simulations: the Fair model, the Fair model

Table B.1 Federal Reserve's Interest Rate Target in the Student Debt Cancellation Simulations

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	0.49%	0.31%	2.03%
2018	1.15%	0.66%	3.69%
2019	1.71%	1.18%	3.87%
2020	2.17%	1.74%	3.75%
2021	2.61%	2.29%	3.78%
2022	3.07%	2.85%	3.85%
2023	3.60%	3.40%	3.85%
2024	4.17%	3.97%	3.81%
2025	4.76%	4.57%	3.78%
2026	5.33%	5.14%	3.78%

Source: Authors' calculations

Table B.2 Annual Interest Cost for Securities Issued to Fund Department of Education Loans in the Student Debt Cancellation Simulations ($ billions)

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	5.05	3.20	20.77
2018	11.84	6.79	38.52
2019	17.75	12.24	41.87
2020	22.94	18.17	42.18
2021	28.21	24.38	44.08
2022	34.06	30.98	46.67
2023	41.15	38.06	48.40
2024	49.36	45.95	49.72
2025	58.74	54.94	51.27
2026	68.88	64.70	53.18
Total	**337.99**	**299.40**	**436.66**

Source: Authors' calculations

Table B.3 Data Series Estimates from Simulations for Department of Education Loans and Total Debt Cancellation ($ billions)

	Foregone Principal and Interest on ED's Loans (A)	Total Direct Spending Increases/Revenue Losses Due to Cancellation of All Student Loans (B)	(A) / (B)
2017	146.79	243.70	60.24%
2018	141.79	236.90	59.85%
2019	137.08	229.38	59.76%
2020	132.37	221.05	59.88%
2021	127.66	144.14	88.57%
2022	122.96	138.38	88.86%
2023	118.25	132.61	89.17%
2024	113.54	126.85	89.51%
2025	108.83	121.09	89.88%
2026	104.12	115.32	90.29%
Totals	**1253.45**	**1709.48**	**73.32%**

Source: Authors' calculations

without the Fed's rule in effect, and the Moody's model without the Fed's rule in effect. These interest rates would be applied to the rolling over of the securities previously issued to fund the ED's loans. As Section 2 of this report explains, this debt service cost is the actual cost to the government of cancelling the ED's loans relative to current spending levels. To estimate this cost, the interest rates in Table B.1 can be applied to the value of the outstanding ED loans at the beginning of the simulations ($1.024 trillion) that will subsequently be cancelled. As the debt is rolled over each period and the interest rates also rise throughout the simulation's duration, the cost rises. Table B.2 presents these annual costs for each simulation, which would be estimates of the direct costs to the government of the cancellation of the ED's loans, relative to current levels. The final row sums up each column.

Because the simulations instead presented a counterfactual, the full revenue loss from foregone interest and principal payments were assumed to be the direct costs of cancelling the ED's loans. From the data series estimates of the debt cancellation used in the simulations, the principal and interest foregone on the ED loans make up roughly 60 percent of the total direct spending/direct revenue loss from the cancellation during the 2017–20 period (i.e., the first four years), and roughly 90 percent during the 2021–26 period. The figures used in the simulation are shown in Table B.3. The first column is estimated foregone principal and interest from cancelling the ED's loans. The second column is the total estimated direct spending increases and revenue losses from the cancellation of all student loans. The third column is the first column divided by the second column.

If one makes the (admittedly fairly crude but not altogether unreasonable) assumption that the relative size of the direct revenue/spending effect from cancelling the ED's loans with respect to the total for cancelling all student loans is equal to its contribution to the annual deficit, then an alternative deficit estimate can be made that is more appropriate as a change from current levels. Note that the more similar the multiplier effects from cancelling the different types of student loans are, the more reasonable this assumption is. Since all of the cancellations are ultimately affecting the economy via the household sector, multiplier effects, at least within these models, would seem fairly consistent across different loan types. Table B.4 presents the increases in annual budget deficits from baseline forecast results in each simulation. Table B.5 multiplies the entries in Table B.4 by the third column of Table B.3. In other words, Table B.5 can serve as an estimate of how much the assumed loss of revenues from cancelling the ED's loans affected the government's budget in the simulations.

To calculate an estimate of the actual effect of cancelling the ED's loans on the deficit, relative to current levels, subtract the entries in Table B.5 from the entries in Table B.4, then add the entries in Table B.2. This simply replaces the effect of the ED's loans on the deficit in Table B.4 with the estimates of debt service on the securities issued to fund the ED's loans in Table B.2 in calculating the deficit. If anything, this would be an overestimate, because there are no feedback effects assumed from the spending in Table B.2 that might reduce the deficit. Though the multiplier effects of government debt service on the economy are likely small, there are some offsets to the spending's effect on

Table B.4 Increases in Annual Budget Deficits from Baseline Forecasts in the Student Debt Cancellation Simulations ($ billions)

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	212.84	210.63	227.67
2018	189.19	175.16	169.88
2019	198.77	171.47	187.42
2020	210.54	176.97	212.11
2021	156.39	123.08	158.74
2022	162.08	132.56	165.56
2023	158.91	132.66	160.26
2024	155.14	129.53	157.13
2025	153.11	126.37	158.88
2026	152.71	124.32	164.16
Totals	**1749.69**	**1502.76**	**1761.86**
Average	**174.97**	**150.28**	**176.19**

Source: Authors' calculations

Table B.5 Estimated Deficit Impact of Cancellation of Department of Education Loans in the Student Debt Cancellation Simulations ($ billions)

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	128.20	126.87	137.13
2018	113.23	104.83	101.67
2019	118.78	102.47	112.01
2020	126.08	105.97	127.02
2021	138.51	109.01	140.59
2022	144.01	117.78	147.11
2023	141.69	118.28	142.90
2024	138.86	115.93	140.64
2025	137.61	113.58	142.80
2026	137.87	112.24	148.21
Totals	**1324.89**	**1127.02**	**1340.14**

Source: Authors' calculations

the deficit, at the very least through taxation of interest in certain cases. Table B.6 presents the new estimates of government deficits from student debt cancellation.

The differences between Table B.4 (from the simulation) and Table B.6 (the new, adjusted deficits) are significant. From the totals for each, the average annual deficit in the simulations relative to baseline levels in Table B.4 ranges from $150 billion to $176 billion. For the adjusted deficits in Table B.6, the annual average ranges from $68 billion to $86 billion, or about one-half as large. Tables B.7 and B.8 present the same data as a percent of nominal GDP generated in the respective simulations. Here again, the difference is significant, with simulation deficit impacts ranging between 0.65 and 0.75 percent of GDP, and deficit impacts relative to current levels ranging between 0.29 and 0.37 percent of GDP.

Which of the two sets of estimates is "correct"? They both are. For the purpose of a counterfactual, as is standard for macroeconometric simulations, the larger deficit impacts in Tables B.5 and B.7 are the "correct" estimates of differences from "baseline levels" that assume no cancellation. But for the purpose of estimating *actual* deficit and national debt impacts relative to their current levels, the smaller estimates in Tables B.6 and B.8 are "correct." In other words, in the event of a student debt cancellation similar to the one simulated in this report, if one assumes the results from these three simulations are reasonable estimates, the range of increases in total government deficits over the next 10 years should be expected to be $675 billion to $858 billion, *not* $1,127 billion to $1,340 billion.

A final reason for considering the smaller estimates in Tables B.6 and B.8 as the more relevant ones is that the baseline case in the simulations assumes that the loans are paid down in a timely manner in the absence of the cancellation. But it is well-known that student loans have a high rate of repayment difficulties relative to many other types of loans, and that there are significant costs to recouping past-due payments. For the purposes here, the degree to which student loans become increasingly problematic for borrowers to service in the future reduces the relative cost of student loan cancellation now. That is, as more difficulties are encountered in the future collecting student loan payments, the baseline assumption that loans are repaid should be revised to reflect this, and the cost of cancellation relative to this baseline would thereby decline.

Table B.6 Estimated Deficit Impact of Student Debt Cancellation Relative to Current Levels ($ billions)

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	89.69	86.95	111.30
2018	87.80	77.11	106.73
2019	97.73	81.24	117.29
2020	107.40	89.16	127.27
2021	46.08	38.44	62.22
2022	52.12	45.75	65.12
2023	58.36	52.43	65.76
2024	65.64	59.54	66.21
2025	74.24	67.74	67.35
2026	83.71	76.78	69.13
Totals	**762.78**	**675.13**	**858.37**
Average	**76.28**	**67.51**	**85.84**

Source: Authors' calculations

Table B.7 Increases in Annual Budget Deficits from Baseline Forecasts in the Student Debt Cancellation Simulations as a Percent of GDP

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	1.11%	1.09%	1.16%
2018	0.93%	0.86%	0.82%
2019	0.94%	0.80%	0.86%
2020	0.95%	0.79%	0.94%
2021	0.67%	0.53%	0.68%
2022	0.66%	0.54%	0.68%
2023	0.62%	0.52%	0.63%
2024	0.57%	0.48%	0.60%
2025	0.53%	0.44%	0.58%
2026	0.50%	0.41%	0.58%
Average	**0.75%**	**0.65%**	**0.75%**

Source: Authors' calculations

Table B.8 Estimated Deficit Impact of Student Debt Cancellation Relative to Current Levels as a Percent of GDP

	Fair Model	Fair Model No Fed	Moody's No Fed
2017	0.47%	0.45%	0.57%
2018	0.43%	0.38%	0.51%
2019	0.46%	0.38%	0.54%
2020	0.48%	0.40%	0.57%
2021	0.20%	0.16%	0.27%
2022	0.21%	0.19%	0.27%
2023	0.23%	0.20%	0.26%
2024	0.24%	0.22%	0.25%
2025	0.26%	0.24%	0.25%
2026	0.28%	0.25%	0.24%
Average	**0.33%**	**0.29%**	**0.37%**

Source: Authors' calculations

Appendix C: Digression on the Fed's Operations

The Fed targets the federal funds rate in the federal funds market. In the federal funds market, (mostly) banks borrow and lend reserve balances held in their accounts at the Fed. Individual banks use reserve balances to settle payments and to meet reserve requirements, and their demand for reserve balances is known to be quite interest-insensitive—banks short of reserve balances need them and banks with unwanted excess have little use for them. Because reserve balances in the aggregate are a liability of the Fed, banks in the aggregate cannot affect the quantity circulating with their trading in the federal funds market, which simply moves balances from one bank to another. In order to achieve its target rate, the Fed traditionally adjusted reserve balances on a daily basis—to offset a deficiency or surplus relative to banks' demand for them at the Fed's target rate—through repurchase agreements (short-term, securitized loans to securities dealers, where the collateral was usually a Treasury-issued security). The Fed's operations were thus "accommodative" to banks' demand for reserve balances.

A simple model of the federal funds market under "normal" conditions is built in the next few figures.[27] Figure C.1 shows a standard demand curve for reserve balances in the federal funds market. The vertical axis is the federal funds rate and the horizontal axis is for reserve balances. There are three interest rates—the federal funds rate target the Fed attempts to achieve in the federal funds market ($i_{fedfunds}$*), the penalty rate the Fed charges banks to borrow from their regional Fed bank rather than from other banks in the federal funds market ($i_{penalty}$), and the rate the Fed pays banks for reserve balances held overnight (i_{IOR}). The demand curve for reserve balances (D_{RB}) is nearly vertical, with a bit of a downward slope, but becomes horizontal at i_{IOR}. The nearly vertical portion of D_{RB} is because banks have a particular amount of reserve balances they desire to hold in order to settle payments and meet reserve requirements, and they have little interest in holding much more or less than this amount.[28] The horizontal portion is because i_{IOR} becomes a price floor for the federal funds rate if the Fed provides reserve balances beyond the amount banks reasonably would hold to meet reserve requirements and settle payments.

Figure C.2 shows a general model of the federal funds market with both D_{RB} from Figure C.1 and a supply curve for reserve balances (S_{RB}). The S_{RB} schedule is vertical and then kinks to become horizontal at $i_{penalty}$. The vertical region represents the fact that it is the Fed that adjusts the aggregate quantity of reserve balances—while banks can borrow/lend reserve balances among themselves, or send/receive payments in reserve balances, these shift reserve balances around but do not change the aggregate quantity. As all reserve accounts lie on the Fed's balance sheet, only an offsetting change to the Fed's balance sheet (such as a purchase of securities or a loan to a bank) can alter the aggregate quantity of reserve balances. The horizontal region of S_{RB} represents the Fed's standing facility, also called the "discount window" at the regional Federal Reserve Banks. At the discount window, the Fed will lend to banks at $i_{penalty}$,

Figure C.1 **Demand for Reserve Balances in the Federal Funds Market**

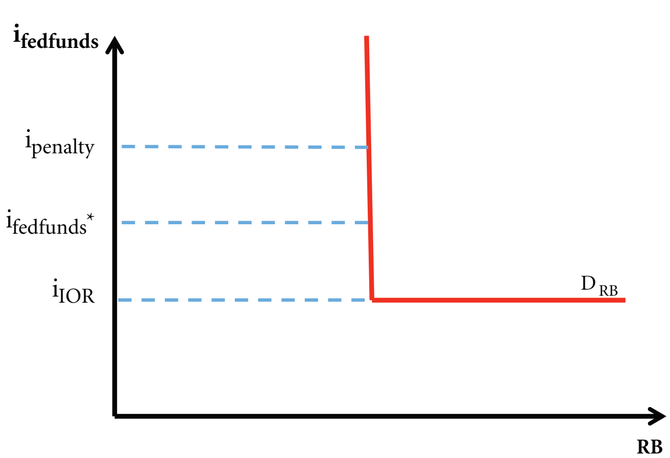
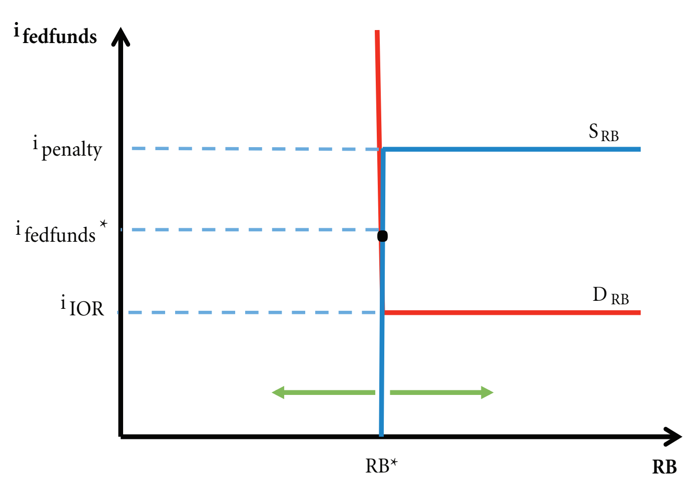


Figure C.2 **Supply and Demand for Reserve Balances in the "Normal" Federal Funds Market**



which effectively places a ceiling on how high $i_{fedfunds}$ can rise.[29] From Figure C.2, the combination of D_{RB} and S_{RB} presents a general picture of the federal funds market where $i_{penalty}$ and i_{IOR} set a ceiling and a floor, respectively, on how high or low $i_{fedfunds}$ can move. The difference between these two rates is frequently referred to as a "corridor" within which $i_{fedfunds}*$ would be expected to settle (in "normal" times) as the Fed shifted the vertical portion of S_{RB} to intersect the nearly vertical portion of D_{RB} at its target rate.

It is clear from Figure C.2 that if the Fed grows reserve balances much beyond RB*, the federal funds rate will fall to i_{IOR}. This would mean that the Fed had set a de facto interest rate target at i_{IOR}. Similarly, if the Fed were to reduce reserve balances, the federal funds rate would rather quickly rise to $i_{penalty}$, at which point the Fed would provide the reserve balances through its standing facilities at the regional Fed banks until the total quantity of reserve balances circulating equaled the quantity banks desired to hold at $i_{penalty}$. The Fed would then have set a de facto target rate equal to $i_{penalty}$.[30] The importance of this reality—which is essentially basic supply and demand analysis—comes from coupling it with an understanding of the Fed's balance sheet. Changes to the Fed's balance sheet that are not directly under the Fed's control—changes in the balance of the Treasury's account or banks purchasing vault cash from the Fed using balances in their reserve accounts, for instance—alter the quantity of reserve balances circulating. Given the fairly vertical slope of D_{RB} between $i_{penalty}$ and i_{IOR}, the Fed must offset these changes in order to achieve its target rate. In other words, the Fed's operations under "normal" circumstances are "accommodative" (altering the quantity of reserve balances to accommodate shifts in D_{RB} at the target federal funds rate) and "offsetting" (offsetting changes to the Fed's balance sheet inconsistent with the quantity of reserve balances banks desire at the Fed's target federal funds rate).

Since Fall 2008, the Fed has left the quantity of reserve balances well beyond any level that would be consistent with the downward sloping portion of D_{RB}, rising from around \$20 billion prior to the financial crisis to about \$800 billion later in 2008, and then rising again through successive rounds of quantitative easing to its current level of around \$2.5 trillion. Essentially, this leaves the quantity of reserve balances in the lower horizontal portion of D_{RB} consistent with i_{IOR}. Consequently, the Fed has set its target rate roughly equal to i_{IOR} since late 2008, as discussed above. Figure C.3 provides a simple illustration of the post-2008 federal funds market, where the Fed has pushed reserve balances well beyond RB* (from Figure C.2) out to RB_{QE}, thereby setting its target rate equal to i_{IOR}, as noted above. Again, this is basic supply and demand analysis—pushing a supply curve well beyond a demand curve reduces the price either to zero or to a price floor set to keep the price from falling to zero.

It is well-known that the Fed's target rate since late 2008 has actually been below i_{IOR} because some nonbank entities with reserve accounts do not earn interest—such as the Federal Home Loan Banks, for instance—and must search for an interest-bearing opportunity to invest their reserve balances. Given the large quantity of excess reserve balances circulating, and thus the dearth of competition among banks to borrow more of them, these nonbank entities regularly find opportunities to invest their reserve balances at banks only at rates below i_{IOR}. Consequently, prior to December 2015, while the Fed had i_{IOR}

Figure C.3 **Simple Model of the Federal Funds Market with a Large Excess of Reserve Balances as a Result of Quantitative Easing**

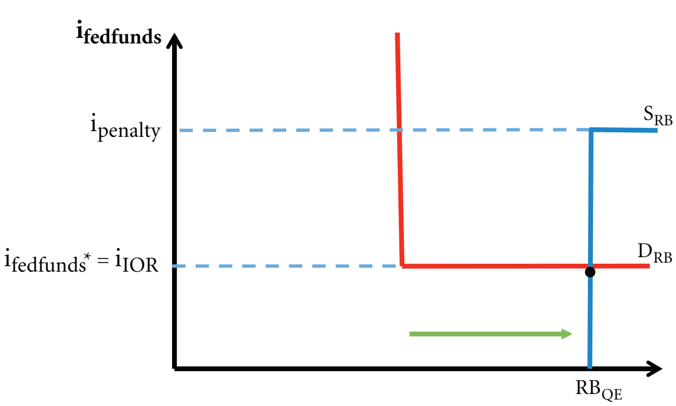
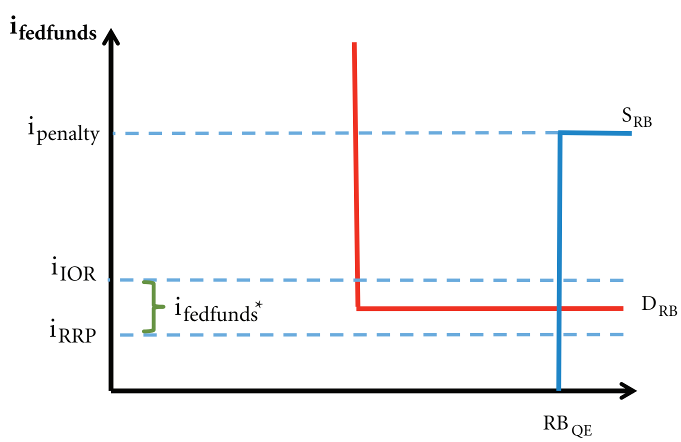


Figure C.4 **Corridor of Interest on Reserve Balances and Reverse Repurchase Agreement Rates**



set at 0.25 percent, the actual level of $i_{fedfunds}$ and thus $i_{fedfunds}*$ fluctuated between zero and 0.25 percent, usually settling near the midpoint between the two. When the Fed raised i_{IOR} to 0.5 percent in late 2015 (from the earlier level of 0.25 percent), it also instituted a reverse repurchase agreement (RRP) opportunity. The opportunity was made available to a number of nonbank financial institutions at 0.25 percent—including, but not limited to, those with reserve accounts not earning interest on reserve balances—in order to ensure that the federal funds rate did not fall below that level. In other words, there is *another* corridor, which exists between i_{IOR} and i_{RRP} (the rate the Fed pays to nonbanks investing in its RRPs). Figure C.4 shows the federal funds market with the lower corridor between i_{IOR} and i_{RRP}, the range (instead of a specific rate) the Fed has targeted for $i_{fedfunds}*$. The horizontal region of D_{RB} has dipped below i_{IOR} (since banks have so many excess reserve balances they will not offer i_{IOR} to nonbank entities investing their reserve balances) but remains above i_{RRP} (since nonbank entities can now earn i_{RRP} from the Fed if banks do not offer at least that much).[31] As the Fed continues to raise the federal funds rate target thereafter, it does so by simply announcing increases in both i_{IOR} and i_{RRP}. Overall, the earlier analysis applies: if the Fed is going to oversupply the banking system with large quantities of excess reserve balances beyond the levels banks would desire to hold at $i_{fedfunds}*$, it will have to pay interest on reserve balances, interest on RRPs, or interest on some other liability it might issue (such as issuing its own securities or time deposits) in order to achieve a positive $i_{fedfunds}*$.

Notes

1. The authors wish to express their appreciation to Joseph Ballegeer for research assistance and to Mark Zandi, Chris Lafakis, and Moody's for generously sharing their time and expertise with the Moody's US Macroeconomic Model. We also wish to thank Mary Green Swig and Steven L. Swig for generous research support.
2. The simulation results summarized here incorporate two Fair model simulations (with and without the Federal Reserve's interest rate target rule in effect) and one Moody's model simulation (without the Federal Reserve's interest rate target rule in effect). The exception is in the discussion of the effect on interest rates, in which the largest effects reported are from the Moody's simulation with the Federal Reserve's interest rate target in effect. The simulation section of this report (Section 3) discusses the rationale for viewing these three as the most representative of the simulation results.
3. For racial wealth and income gaps, see Emmons and Neoth (2015).
4. The authors adjust household income and labor earnings quintiles for the age distribution of student loan borrowers.
5. This calculation is based on the reported thresholds for the quintiles. The greater the degree of inequality within the top quintile, the more the 50 percent estimate from thresholds underestimates the true income share of the top quintile. Note that the World Wealth and Incomes Database (WWID) computes that the income share of the top decile was approximately 50 percent in 2015. The universe of all tax units reported in WWID is richer than just the age-adjusted sample used by Looney and Yannelis, since those with student debt tend to be younger than the population as a whole, but nonetheless, it is likely that the top quintile of households even in the Looney and Yannelis data earns more than 50 percent of total income.
6 For an overview, see Goldin and Katz (2010).
7. Accessed on July 20, 2016 from https://studentaid.ed.gov/sa/about/data-center/student/portfolio
8. See, for instance, GAO (2014, 2001).
9. The Fed annually credits its profits to the Treasury's account after paying dividends on member banks' investment into Federal Reserve capital ("paid-in capital") and any investments into its own "surplus" capital account. As of December 2015, the Fed now pays a dividend of 6 percent to those member institutions with less than $10 billion in consolidated assets and the lesser of 6 percent or the high yield from the most recent 10-year Treasury note auction, all as prescribed in the Fixing America's Surface Transportation Act (FAST Act). Prior to the FAST Act, the Fed paid a 6 percent dividend on invested capital to all member institutions based on their investment. Member institutions' investments are required by the Federal Reserve Act; a member bank's investment is based upon the size of its own capital, and thus is regularly increased or decreased in kind. Prior to the FAST Act, the Fed's surplus capital (that is, retained earnings) was maintained at a level equal to its paid-in capital from member banks. However, the FAST Act limited the Fed's paid-in capital to $10 billion. This resulted in a transfer from the Fed's capital account to the Treasury's account of $19.3 billion in December 2015 in order to reduce its surplus capital to the legally mandated level. See Board of Governors of the Federal Reserve System (2016). For more on the Fed's surplus capital, see Goodfriend (2014).
10. See Board of Governors of the Federal Reserve System (2016) for more information on the Fed's remittances to the Treasury, which, according to the press release, have totaled $679.4 billion since 2006.
11. As with the earlier analysis of the federal government purchasing the private loans, the analysis changes very little if it is assumed the Fed pays a higher market price such that the investors receive a capital gain, but there are additional steps for explaining that scenario that unnecessarily complicate an already detailed discussion.
12. The analysis in this section relies on the insights of a forthcoming working paper by Raúl Carrillo, Rohan Grey, Robert Hockett, and Nathan Tankus. The draft version is entitled "The Legality of Student Loan Purchase and Forgiveness by the Federal Reserve."
13. Simulations using the Moody's model were facilitated by Chris Lafakis and Mark Zandi at Moody's.
14. Ray Fair's website is https://fairmodel.econ.yale.edu. See also Fair (2015, 2013, 2004).
15. See Fair (2004, 2013) for a full description of statistical tests applied to the Fair model.

16. See Fair (2000). A draft version was published earlier on his website, along with an interactive page that enabled the user to determine how overvalued the market was.
17. As the sections on the mechanics of the student debt cancellation demonstrate using T-accounts, there is no double counting involved in incorporating both an instantaneous net wealth effect from cancellation and an income effect over the following 10 years from cancelled debt service. Both would actually occur.
18. The 10 percent assumption is an assumed average from figures shown on pp. 12–14 in CFPB (2012).
19. The baseline used for the Moody's model is a bit more complicated. As noted above, the Moody's model was used for simulating the economic proposals of the two candidates for US President in 2016. For the simulation of Secretary Clinton's proposals, this included her "College Compact" proposal for reduced college tuition expenses. For the Moody's simulations in this report, the baseline reported is the normal baseline forecast for the Moody's model during 2017–26 with Secretary Clinton's "College Compact" proposal added to it. In other words, one might consider the standard Moody's baseline forecast as a "baseline 1" and a "baseline 2," which is equal to "baseline 1" plus the Clinton "Campus Compact" proposal. The Moody's simulations in this report use "baseline 2" as their baseline. Because the Moody's model is structural, there is no difference between simulating the student debt cancellation starting from "baseline 1" or "baseline 2." The differences between either baseline and the subsequent addition of the student debt cancellation will be the same. Consequently, the appropriate interpretation of the results from either model is the macroeconomic impact of an initial increase in household net financial wealth that falls slowly over time, as in Table A.1, combined with reduced revenue and increased outlays by the federal government shown in Tables A.2, A.3, and A.4. (Secretary Clinton's proposed "College Compact" is explained here: https://www.hillaryclinton.com/briefing/factsheets/2015/08/10/college-compact-costs/)
20. Both models currently use 2009 as the base year for inflation calculations—the year in which nominal and real GDP are equal, and thus the price level using the GDP deflator is set to 1. Using 2016 as the base year is more intuitive here, particularly given simulations through 2026. The method for converting a 2009 base year to a 2016 base year is straightforward: divide the GDP deflator in each year of the simulation period (2017–26) by the respective model's GDP deflator in 2016. The GDP deflator at the end of 2016 is now 1; the GDP deflator for years 2017–26 is now computed for a 2016 base year. Then, divide nominal GDP for all simulations by the respective GDP deflator with a 2016 base year.
21. The nominal GDP figures for the 2017–26 simulation period are $2,214 billion for the Fair model, $2,516 for the Fair model without the Fed, $940 billion for the Moody's model, and $1,735 billion for the Moody's model without the Fed.
22. Both models also have separate indexes for housing prices. Results for housing price inflation were not included in the discussion because the impact of the student debt cancellation on housing prices was essentially negligible in both models.
23. Zandi et al. (2016) report that the less-positive macroeconomic results from their simulation of Mr. Trump's economic proposals are strongly affected by the fact that the national debt-to-GDP ratio rises substantially, thus raising long-term interest rates and slowing the economy. Interestingly, Peter Navarro, an economics professor at the University of California-Irvine criticized Moody's report as "Keynesian" (see Cox 2016) even though the national debt-to-GDP ratio effects on interest rates are not part of traditional Keynesian economics but rather part of the "Classical" long-run "core" of the Moody's model.
24. In terms of the econometrics, Moody's reports an R-squared of 0.98 for its estimation of the 10-year Treasury note that includes the national debt-to-GDP ratio (Zandi et al. 2016, 11), whereas Fair obtains an essentially identical fit (R-square = 0.97) *without* including the national debt-to-GDP ratio as an explanatory variable.
25. The authors offer their thanks to one of the reviewers for pointing this out.
26. The authors wish to thank a reviewer for pointing out the offsetting effect of improving state budgets on the consolidated federal- and state-level budget positions.
27. "Normal" here is taken to mean a corridor system as depicted in Figure C.2, which has become a standard approach to modeling central bank operations in interbank markets in the literatures published by central banks and in academic journals. In reality, the Fed did not have

the authority to pay interest on reserve balances until after the failure of Lehman in the fall of 2008. In that case, the demand for reserve balances in Figure C.2 would not have a flat portion at the interest on reserve balances and would instead continue downward to the horizontal axis. The Fed's plan, though, is that eventually there will be a return to "normal" that will look like the graph in Figure C.2, which is also illustrative of the approach of many other central banks prior to 2008.

28. Reserve requirements are typically represented via a more horizontal portion of the demand for reserve balances at RB*. Because banks can meet reserve requirements over a two-week maintenance period, they can trade off balances held across days and on any given day do not necessarily have a vertical demand curve at the target rate. By the end of the maintenance period, however, a more vertical curve like that in Figure C.1 is more applicable, since at that point banks have far less ability to offset surpluses or excesses in meeting reserve requirements.
29. In practice, due to a number of factors beyond the scope of the analysis here, it is possible for $i_{fedfunds}$ to rise above $i_{penalty}$ before banks turn to the discount window to relieve a deficiency in reserve balances.
30. The Fed's abilities to reduce reserve balances are limited by the need to support the payments system and reserve requirements—consistent with the text, not providing sufficient reserve balances for both sources of demand simply results in a de facto interest rate target equal to $i_{penalty}$ as the necessary reserve balances are supplied at that rate as banks borrow from their regional Fed banks.
31. Figure C.4 is consistent with publications by Federal Reserve researchers. See, for instance, Ihrig, Meade, and Weinbach (2015).

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