The Effect of Student Debt on Consumption: A State-Level Analysis

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Abstract

Using state-level data for the 2003–2018 period, we show that changes in the state-level student debt-to-income ratio are associated with lower consumption growth over the next four years. We use exogenous increases in the annual limits for subsidized federal student loans and grants to identify a causal relationship between student loans and consumption. Our results are robust to controlling for mean reversion and using alternative lag structures.

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1 Introduction

According to data from the New York Fed Consumer Credit Panel, outstanding student debt is currently at $1.49 trillion, representing the second largest type of household credit after mortgage debt. As such, student loans constitute a critical component of households' budgets, especially since repayment starts soon after the completion of schooling, when earnings tend to be relatively low. Student debt assumes even more importance for young borrowers who are credit constrained and are forced to lower consumption when paying off student loans.
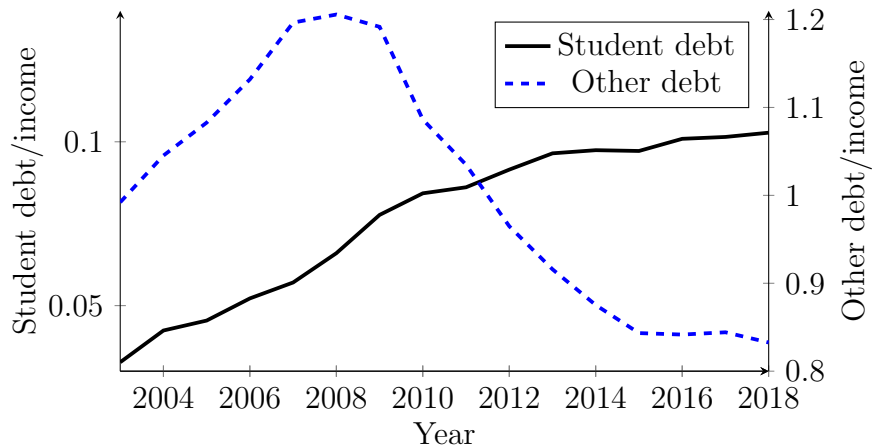
Using state-level data for the 2003–2018 period, we investigate the macroeconomic implications of the rise in outstanding student debt by studying the effects of student loans on aggregate consumption. Because the relationship between student debt and consumption is confounded by educational attainment, our empirical strategy uses the exogenous increase in annual limits for subsidized Stafford loans following the Higher Education Reconciliation Act of 2005 and several increases in the maximum Pell Grant to identify a causal impact.

The microeconomic literature has been uncovering statistically and economically significant relationships between student debt and household decisions such as marriage (Gicheva, 2016; Sieg and Wang, 2018) or homeownership (Cooper and Wang, 2014; Mezza, Ringo, Sherlund and Sommer, 2019). While this literature finds that student loans lead borrowers to postpone important life decisions that are closely tied to consumption choices, the link between student debt and household consumption has not been examined directly.

Macroeconomic studies have not examined the consequences of student loans but rather focus on total household credit or only on mortgage debt (Beck, Büyükkarabacak, Rioja and Valev, 2012; Schularick and Taylor, 2012; Mian, Sufi and Verner, 2017). Recent trends in the data underline the importance of studying student loans separately from mortgages and

other types of consumer credit. As Figure 1 shows, student loans have grown substantially since 2003, while the growth in other types of debt has been mostly negative since the Great Recession. As a result, student loans have become an increasingly important component of household credit with potentially unique consequences for consumption dynamics.

Figure 1: State-Level Student Debt and Other Household Debt As Fractions of Income

Weighted average student debt-to-income and other household debt-to-income ratios. Sources: Federal Reserve Bank of New York (debt) and Bureau of Economic Analysis (per-capita personal income).

2   Empirical Methodology and Data

The model we are interested in estimating for state i in year t is:

$$[c_{it+3} - c_{it}] = \alpha_i + \beta[StudentLoans_{it-1} - StudentLoans_{it-4}] + \gamma \cdot [X_{it-1} - X_{it-4}] +$$
$$+ \sum_{\tau=1}^{3} (\nu_\tau[c_{it-\tau} - c_{it-\tau-1}]) + \varepsilon_{it}, \tag{1}$$

where c denotes the natural log of consumption; $StudentLoans$ measures the ratio of per-capita outstanding federal and private student loans to personal income; X_{it} is a vector of time-varying controls at the state level including changes in other household credit and the share of the state's population with some college and with a four-year degree; α_i is a state

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fixed effect; and ε_{it} is a random error term. Some of the models we estimate include lagged consumption growth to account for possible reversion toward the mean; previous studies such as Mian et al. (2017) use a similar approach. We allow for clustering of the errors at the state level.

An exogenous increase in borrowing is expected to boost aggregate demand and may hence have an immediate positive effect on consumption. Possible negative effects are expected to occur when borrowers start to service their debt. To capture this medium-run effect, we use the change in outstanding student loans from year $t-4$ to $t-1$ to predict changes in consumption between t and $t+3$.[1] The length of this lag structure also corresponds to the time it takes for a typical student to finish college and start paying off the debt.

Student debt may have a positive association with consumption through increased educational attainment and earnings potential. Unobserved heterogeneity also plays an important role, for example through the effects of family resources on both student borrowing and subsequent labor market outcomes. We rely on an instrumental variable (IV) approach, which uses the fact that the limit for subsidized Stafford loans increased from \$2,625 to \$3,500 for freshmen and from \$3,500 to \$4,500 for sophomores in the 2007–08 academic year,[2] and the maximum Pell grant, which we expect to have negative relationship with student debt, has been increasing by a different amount most years.[3] To isolate cross-state variation in outstanding student debt due to the above federal policy changes, we interact the increases in the federal loan and grant limits with, respectively, the state-specific share of undergraduate

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[1]The literature has used a three- to four-year horizon of private credit changes to examine the effect of credit expansions on macroeconomic outcomes; see Mian et al. (2017). Our results are robust to using two and four-year lags.

[2]We use an increase of \$875 in our empirical analysis.

[3]The limits for unsubsidized Stafford loans increased by \$2,000 for graduate students starting in the fall of 2007 and for undergraduate students in the following year. We verify that our results are robust to using this increase as an additional instrumental variable in the model, but its relationship with student debt is weaker so we omit it from our preferred specifications. These results are available on request.

students borrowing at the subsidized Stafford limit and the state-specific share of undergraduate students receiving any Pell grant in the 1999-2000 academic year, or prior to the start of the study period. The latter two variables serve the role of exposure measures, which predict how strongly changes in federal policies should affect state-level changes in the per-capita ratio of student loans to personal income. While an increase in the maximum Stafford loan is unlikely to affect students borrowing lower amounts, Pell limit increases tend to result in higher grant aid for all Pell recipients.[4] To account for the fact that policy changes likely take time to affect borrowing behavior and the amount of accumulated student debt, we use changes in loan and grant limits between years $t-5$ and $t-2$ to instrument for student loan changes between $t-4$ and $t-1$.

Annual state-level data on outstanding student debt and other household debt come from the New York Federal Reserve Bank's Consumer Credit Panel, which is constructed from a random sample of Equifax credit reports. We use per-capita consumption data from the Bureau of Economic Analysis. We construct average educational attainment at the state level using data from the American Community Survey. Finally, the shares of students in each state who borrowed the maximum subsidized Stafford loan or received any Pell Grant are based on data from the National Postsecondary Student Aid Study.

3 Results

We document the relationship between student loans and consumption in Table 1. Columns 2 through 4 present baseline results from OLS specifications with an increasing set of controls. In the most parsimonious specification, 1 percentage point (slightly more than a standard deviation) increase in the change in student debt to income ratio is associated with 0.9

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[4]Lucca, Nadauld and Shen (2018) use similar policy variations to study how postsecondary institutions change their prices in response to changes in student loan availability.

percentage point (less than a third of a standard deviation) decrease in the growth rate of consumption over the next three years. When we control for educational attainment, which is reasonable to assume to be positively correlated with both student debt and consumption growth, the coefficient estimate decreases to -1.3. Including lagged consumption growth allows us to control for state-level variations in macroeconomic conditions simultaneous with the changes in student debt; inclusion of these variables strengthens the negative relationship between student debt and consumption.

The final two columns of Table 1 report results from the IV specifications, with first-stage results presented in the bottom panel. We find that both instruments are significant determinants of student loans with the expected signs. The results show that 1 percentage point increase in the change in student debt to income ratio is associated with 2.5 percentage point lower consumption growth rate during the subsequent three years in the specification without controls for lagged consumption changes, and 3.7 percentage point lower consumption growth with these controls. These effects are larger in magnitude than the OLS estimates, which is consistent with the expected bias driven by changes in educational attainment. Further, the magnitude of these results cannot be accounted for by a direct increase in education spending since data from the Consumer Expenditure Survey suggest that spending on education accounted for only 2.3% of aggregate expenditures in 2018.

4   Conclusion

Using state-level data for the 2003–2018 period, we show that an increase in the student debt-to-income ratio contributes to lower consumption growth in the medium run. A possible mechanism for the results is that credit constrained young borrowers, who start paying off student loans soon after they graduate when earnings are relatively low, are forced to lower

Table 1: Relationship Between Student Debt and Other Household Debt and Consumption Per Capita

	(1) Mean [sd]	(2) OLS	(3) OLS	(4) OLS	(5) IV	(6) IV
Dependent variable: $\Delta_3 \ln C_{t+3}$	0.033 [0.031]					
$\Delta_3(StudentDebt/Income)_{t-1}$	0.018 [0.008]	-0.914*** (0.231)	-1.288*** (0.260)	-1.770*** (0.248)	-2.480*** (0.327)	-3.684*** (0.411)
$\Delta_3(OtherDebt/Income)_{t-1}$	-0.033 [0.149]	-0.123*** (0.015)	-0.120*** (0.014)	-0.116*** (0.017)	-0.114*** (0.013)	-0.093*** (0.016)
$\Delta_3\%CollegeGrad_{t-1}$	0.008 [0.010]		0.467** (0.186)	0.115 (0.150)	0.503** (0.196)	0.051 (0.144)
$\Delta_3\%SomeCollege_{t-1}$	0.007 [0.014]		0.471*** (0.110)	-0.058 (0.107)	0.748*** (0.120)	0.145 (0.126)
$\Delta \ln C_{t-1}, \Delta \ln C_{t-2}, \Delta \ln C_{t-3}$		No	No	Yes	No	Yes

					First-Stage Results	
$\Delta_3 SubsidizedLimit_{t-2} \times Exposure$					0.043*** (0.006)	0.035*** (0.006)
$\Delta_3 PellLimit_{t-2} \times Exposure$					-0.08*** (0.004)	-0.008*** (0.003)
$\Delta_3 OtherDebt/Income_{t-1}$					0.004 (0.003)	0.008*** (0.003)
$\Delta_3\%CollegeGrad_{t-1}$					-0.030 (0.036)	-0.065** (0.029)
$\Delta_3\%SomeCollege_{t-1}$					0.128*** (0.027)	0.050 (0.032)
F stat of excluded instruments					27.4	20.8
Hansen J statistic					1.359	1.768
P-value of J statistic					0.244	0.184

Notes: * p<0.10, ** p<0.05, *** p<0.01. Time subscripts denote the end period and number of lags; for example, $\Delta_3 StudentDebt/GDP_{t-1}$ stands for $(StudentDebt/GDP)_{t-1} - (StudentDebt/GDP)_{t-4}$. The models include state fixed effects. The reported errors are clustered at the state level. N = 450.

their consumption, generating significant effects at the aggregate level. This mechanism is consistent with the findings of prior studies suggestive of student borrowers being credit constrained after graduation (e.g. Rothstein and Rouse, 2011) and underlines the importance of binding credit constraints for aggregate macroeconomic outcomes.

Our study is the first to combine the literature on the unintended consequences of student debt and the existing research on the macroeconomic effects of household debt. To our

knowledge, we are also the first to directly examine the link between student debt and consumption using an exogenous variation in student borrowing. Last but not least, our results are informative of the degree to which student loan debt can affect non-borrowers through its impact on macroeconomic conditions.

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