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Exploring the Relationship of Enrollment in IDR to Borrower Demographics and Financial Outcomes

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As federal policymakers consider changes to income-driven repayment (IDR) schemes, research examining the characteristics and financial behaviors of student loan borrowers participating in IDR is necessary. Using the nationally representative Survey of Consumer Finances, we examined the demographics of IDR enrollment. Counter to expectations, low-income borrowers, and borrowers with high debt-to-income ratios are less likely to enroll in IDR. Conditional on having a large amount of debt, married women of color are likely to enroll in IDR programs. Findings concerning IDR participation may be highly sensitive to how groups are defined and what covariates are in models. IDR participation does not predict engagement in other financial behaviors such as retirement savings or homeownership.

Keywords: *Income-Driven Repayment, Student Loan Debt, Survey of Consumer Finances, Higher Education Policy*

Until recently, policymakers have generally opposed economists' recommendations to link student loan repayment to income (e.g. Friedman, 1955), citing the complexity that an income-driven repayment (IDR) scheme would introduce to repayment and the concentration of IDR benefits among lower-earners (Shireman, 2017). Although mortgage-like repayment plans have been the norm for decades, of late political pressures have encouraged policymakers to open access to IDR programs. IDR is an increasingly popular repayment scheme as recent totals suggest that over 8 million borrowers are in an income-based repayment program (U.S. Department of Education, 2020).

Despite continued increases in IDR enrollment, we know very little about *who* enrolls in IDR and how enrollment in IDR may relate to financial outcomes like savings and homeownership. Rational Choice Theory (Becker, 1962) would suggest that those with high student loan debt and low incomes or other financial priorities would enroll in IDR. Yet, limited publicly available national datasets bound exploration of loan repayment behavior on an individual level (Hillman & Bruecker, 2018). Recently, Collier (2020) examined a non-nationally representative sample of borrowers, finding some elements of this rational choice as total student loan debt (over $60,000) and wages ($25,000-54,999) were correlated to IDR enrollment. Demographically, women were also positively linked with IDR enrollment – supporting beliefs that due to several well-known systemic disadvantages (like the wage gap), women find financial safety in IDR (Miller, 2017).

Problem Statement

Various policymakers have expressed interest in modifying IDR programs; for example, some have raised concerns over the budget and federal spending implications of widened access to IDR programs (Enzi & Alexander, 2018) while others have been concerned over the inability of IDR repayment to target the neediest borrowers (Thompson & Streeter, 2020). These calls

have been made despite while possessing a limited understanding of who may currently be enrolled in IDR and of the various financially-related outcomes that may exist due to enrollment. We used the *Survey of Consumer Finances* (SCF) database to test Collier's (2020) prior findings and bolster a general understanding of who has enrolled in IDR. When the tests inspired by Collier (2020) produced unexpected findings, we then took inspiration from Looney & Yannelis' (2018) recent analysis on borrowers with "high student loan debt"[1] balances ($50,000+) to further understand who may be enrolled in IDR. The SCF database is a publicly available, nationally representative database that matches individual profiles to enrollment in an IDR program – and has previously been used by researchers at the Urban Institute (Blagg, 2018), the Federal Reserve (Bricker, Volz, & Llanes, 2018), and in academic settings (Frost, 2019; Looney, 2019) to explore and answer questions surrounding student loan debt.[2] Our approach uniquely examines the following questions:

1. *How do demographics, loan debt, and wages correlate with enrollment in IDR?*
2. *Does IDR enrollment relate to financial outcomes such as savings and homeownership?*

Prior Literature

In conjunction with the 2008 Great Recession, the government loosened barriers to access IDR plans when revamping the student loan system to position the federal government as the direct lender of student loans (Shireman, 2017). Since the implementation of the Pay As You Earn (PAYE) and Revised Pay As You Earn (REPAYE) programs, enrollment in IDR has greatly expanded; this expansion has included increased enrollment for both undergraduate and graduate borrowers. In 2010, just 11% (600,000) of borrowers with only undergraduate debt and 6% (100,000) of those with a combination of graduate and undergraduate debt were enrolled in an IDR repayment plan. As of 2017, IDR repayment plans housed 4.6 million borrowers with only undergraduate debt and 1.8 million borrowers with a combination of undergraduate and graduate debt – which is 23% and 38% of total borrowers respectively (Congressional Budget Office, 2020). Any further changes to IDR policy should consider research on the characteristics of who – beyond debt load – participates in IDR, as a result of the great expansion during the 2010s.

As expected through the policy design of IDR, the limited available research suggests that IDR enrollment is correlated with the amount of student loan debt borrowers possess or income. Looney & Yannelis' (2018) research shows a dramatic increase in uptake in IDR around the time of the Great Recession – especially for individuals with balances of $100,000 or more. However, the authors concluded that, although those with very large balances were more likely to be in IDR plans (or other plans that extended repayment) since 2009 the gap between those with these large balances and individuals with lower balances "narrowed" (p. 22). Looney & Yannelis (2018) found that those with balances of $50,000 or more constituted a non-trivial percentage of those enrolled in IDR.[3] Collier's (2020) non-nationally representative analysis did not explicitly test for whether those with $50,000 or more were enrolled in IDR and instead used various bins supported by prior studies – and compared to borrowers with balances of <$20,000,

[1] Adults with student loan balances in excess of $50,000 represent around 20% of student loan borrowers. These borrowers have borrowed near or at the federal limit ($57,000) for federal student loans. As a result, we consider these borrowers to have "high student loan balances."

[2] We have also been working with representatives from think tanks and other research outfits to share our processes and teach them how to use this database.

[3] Recent estimates from the Department of Education place this amount to be around 1 in 5 borrowers (Department of Education, 2021).

households with $20,000 to $59,999 were statistically as likely to be enrolled in IDR. However, those with balances of $60,000 to over $150,000 were between 41-percentage points and 59-percentage points more likely to be enrolled in IDR (when controlling for demographic information, education, earnings, and residency).

Related to income, IDR repayment seems to consist of a higher percentage of low-to-moderate earners (Blagg, 2018), despite prior assertions that higher earners may abuse IDR-related tax benefits (e.g. filing separate tax returns when married) and the promise of loan forgiveness in ways Congress did not intend (Delisle, 2013). Returning to Collier's (2020) multivariate analyses, compared to high earners ($100,000+) individuals earning between $25,000-$39,999 were 52-percentage points more likely to be enrolled in an IDR plan. These findings follow a similar trend as did Blagg's (2018) descriptive outcomes. Although Collier controlled for student loan debt and income, he did not explicitly test for outcomes of a debt-to-income ratio. In Blagg's (2018) descriptive analysis, there was no consistent pattern showing IDR borrowers to have higher starting student loan debt than traditional-repayment borrowers in the same income bracket. As such, it may be fair to suggest that borrowers enrolled in IDR plans are either considering only one of these factors – for example, total debt or earnings at the time of decision – or may not be considering these factors together as an explicit ratio when enrolling in IDR. Whereas a debt-to-income ratio may not be telling of who may be enrolled in IDR, arguably, IDR exists to ease financial strain for those who may not be able to afford traditional repayment (Shireman, 2017), which seems to hold across several descriptive studies (Blagg, 2018; Frotman & Gibbs, 2017). So too does the contention that IDR subsidizes borrowers with graduate and professional degrees (Brooks, 2018). Collier's (2020) recent study supports assertions that graduate (and maybe professional) degrees are positively correlated with IDR enrollment. However, high student loan debt balances and being a middle-earner produced larger point estimates than did possessing a graduate degree. These prior works helped inform how we appraise participation in IDR, but do not provide firm answers to guide policymakers. Looney and Yanellis did not look at finite debt loads; Collier's sample was not nationally representative; Blagg looks at household income in conjunction only with starting loan amount and no other demographic characteristics.

We know even less about which demographic factors correlate to enrollment in IDR. Some have theorized that because female (Becker, 2017) and minority (Scott-Clayton & Li, 2016) borrowers possess higher debt loads, that IDR may be critically important to these individuals (Miller, 2017). Furthermore, mothers of color are much more likely to be breadwinners and account for a greater percentage of family income (Glynn, 2016). Collier's (2020) findings support the assertion for female borrowers, but the small sample size of information collected for non-White persons was a limiting factor of the study – resulting in Collier condensing all non-White persons into a single category instead of into unique racial groups (e.g. Black/African American, Hispanic/Latinx, and so on). Moreover, some assume that married couples may enroll in IDR to take advantage of loopholes existing in prior IDR programs that consider only individual income and not the household when determining monthly repayments (see Delisle, 2013). On the other hand, Collier (2020) found that married couples were less likely to be enrolled in IDR, which may be due to a higher monthly federal repayment (+$200) or to the financial comfort a couple may experience.

Research to date provides better information on financial outcomes for those with student debt than for those enrolled in IDR. More widely, researchers have identified that higher student loan debt loads correlate with lower savings (Grinstein-Weiss, et al., 2015), retirement (Elliot et

al., 2013), and rates of homeownership for younger adults (Houle & Berger, 2015). Few researchers have examined the post-college financial situations of those in IDR or conducted comparisons between borrowers in traditionally-based repayment and IDR. The emergent research illustrates that when controlling for loan debt, wages, and demographic variables, being enrolled in IDR was only significantly correlated with binary participation in savings and not tied to homeownership or participation in retirement (Collier, 2020).

As policy changes for IDR enrollment remain a federal focus (Thompson & Streeter, 2020), decisions must be based on a better understanding of the factors correlated with enrollment and the financial outcomes of enrolling in IDR. Researchers highlighting the outliers enrolled in IDR lead to a limited understanding of the *usual* borrower in IDR (see Delisle, 2013). Therefore, sweeping changes to IDR based on these outliers may produce profoundly negative effects on those who may need the financial safety IDR intends to provide.

Guiding Framework

Our study is conceptually guided by Rational Choice Theory (RCT). Rational Choice Theory is used in social science research as a framing device to understand which factors are related to making decisions (see Becker, 1962; Hecther, Kanazawa, 1997; Levin & Milgrom, 2004; Perna, 2006) – in this case, the decision to enroll in IDR. Essentially, RCT suggests that individuals will make self-interested choices based on personally held beliefs, prior and current experiences, emotions, and restrictions in knowledge at the time of decision (Burns & Roszkowska, 2016; Hechter & Kanazawa, 1997; Levin & Milgrom, 2004). RCT is not overly concerned with how an "individual" makes decisions, instead, the focus is on the aggregate – therefore, unearthing trends in decision making (Burns & Roszkowska, 2016; Hechter & Kanazawa, 1997). RCT considers all decisions "rational" and encourages researchers to explain uncovered trends (DesJardins & Toutkoushian, 2005; Hechter & Kanazawa, 1997). Borrowers make decisions based on a state of "bounded rationality;" they do not have the sum total of all relevant information at their disposal and, therefore, make rational decisions based on the data available (Stiglitz, 2012). In step with Collier (2020), we use RCT to suggest that borrowers with increased debt loads and moderate earnings would be more likely to choose enrollment in IDR due to the financial protections that IDR schemes offer – as would-be borrowers who experience various socioeconomic disadvantages like female (e.g. Miller, 2017) and minority borrowers (e.g. Scott-Clayton & Li, 2016). The promise of lower payments should entice low-income earners to select IDR repayment plans. In sum, the choice of whether to enroll in an IDR repayment scheme is likely some function of a borrower's understanding of the terms and various benefits that IDR repayment programs provide, total student loan balances, income, and a calculation of variability of their income.

Methodology

Using a nationally representative sample, this study helps illuminate our baseline understandings of IDR. Our first set of regression analyses are based on the characteristics that prior research predict would relate to IDR participation (Collier, 2020). Our second set of regression analyses is inspired by Looney & Yannelis' (2018) work examining alternative categorizations of student loan debt and explorations of a variety of interaction terms. Finally, we shift from IDR as an outcome variable to a predictor of interest in regression analyses examining

important financial behaviors: having a savings account, amount saved, the amount in checking, homeownership, use of payday loans, saving for retirement, and amount of retirement savings (see Collier, 2020).

Sample Description

The overall sample for this study was *N*=1,022, of which 27% (*n*=276) were enrolled in an income-driven repayment plan. The SCF survey responses do not allow for us to identify which IDR plan respondents are enrolled in – however, combining the various IDR plans and examining enrollment and financially related outcomes are not uncommon in the limited literature base (see Blagg, 2018; Collier, 2020). Demographically, the sample was mostly male (81%), White (58%), with children (53%), and married (59%) – the average age was 37-years old. Regarding loan debt, the average balance was $40,233 and the average wages were $62,356. Finally, related to financial behaviors, 56% of respondents had savings with the average amount at $4,610, 38% had retirement-related savings with the average amount at $9,387, and 48% were homeowners. Please refer to Table 1 for more sample statistics.

Table 1. Sample Descriptive Table

	Respondents in IDR[a]	Respondents in Traditional Repayment	All Respondents with Debt
Demographics			
Female Head of Household	29%	29%	29%
Age	37.7	38.0	36.9
Racial Minority	46%	40%	42%
No children	46%	47%	47%
Not married or cohabiting	40%	42%	41%
Wage Income	$62,303	$62,376	$62,356
Loan Characteristics			
SLD	$43,106	$39,206	$40,233
Has private debt	15%	17%	16%
In IDR	100%	0%	27%
Educational Attainment			
Less than HS Degree	18%	19%	19%
Some College	19%	19%	19%
Associates	19%	18%	18%
Bachelors	26%	28%	27%
Masters	14%	13%	13%
Professional Degree or PhD	5%	3%	4%
Financial Outcome Measures			
Has Savings	56%	56%	56%
Average amount in savings (among those with any)	$4,599	$4,614	$4,610
Average amount in checking	$4,194	$3,697	$3,832
Home Ownership	45%	48%	48%
Uses payday loans	6%	5%	5%
Saves for retirement	38%	38%	38%
Amount saved for retirement	$7,883	$9,940	$9,387

Categorical Measures			
Loan Amount			
Under $20K	37%	39%	38%
$20,000-39,999	25%	29%	28%
$40,000-59,999	12%	12%	12%
$60,000-74,999	9%	7%	8%
$75,000-99,999	7%	5%	6%
$100,000+	11%	8%	9%
Loan Less than $30K	51%	55%	54%
Loan Over $50K	33%	24%	26%
Wage income:			
<$12,500	6%	22%	17%
$12,500-24,999	9%	7%	8%
$25,000-39,999	20%	15%	17%
$40,000-54,999	16%	12%	13%
$55,000-74,999	16%	12%	13%
$75,000-99,999	16%	12%	13%
$100,000+	15%	19%	18%
N	276	746	1,022

Analytic Approach

We conducted multivariate regression analyses of what characteristics are linked with greater participation in IDR. Coefficients from the linear probability model (LPM) both are typically easier for readers to interpret (Hellevik, 2009) and can be compared across models (Mood, 2009); the LPM also requires fewer assumptions than logit regression. Furthermore, because the share of borrowers in IDR is 27% and we do not predict probabilities, the primary potential drawbacks of LPM are not applicable to our analysis. Our first set of LPM analyses with IDR participation as the dependent variable focus on various ways of measuring income and debt load as covariates of interest, because of their prominence in literature and theory on IDR behavior.

We conducted a second set of LPM analyses which included some variables whose importance was confirmed in exploratory analyses (e.g. some college) and many interaction terms assessed in sequence. Note that we use "some college" to refer to borrowers who either earned an Associate's degree or who attended some semesters but did not earn a degree from a 4-year institution; we recognize that there are other valid operationalizations of this variable. We also took guidance from Looney & Yannelis' (2018) study and generated a high debt variable consisting of over $50K in student loans. Table 3, Model 1 introduces the new terms. Based on the importance of interaction terms (observed in Table A2 and elsewhere) we introduced interactions with high debt in Model 2 and with some college in Model 3. In Model 4, we trim back to a more parsimonious model emphasizing the cross-model importance of women in understanding IDR participation: we retain the new education and debt terms, and their interactions with being female. We conducted these analyses that are explicitly exploratory because we recognize how much there still is to learn about even the basics of correctly measuring participation in and results from IDR. Finally, we conducted multivariate OLS and LPM regression analyses to assess whether IDR participation predicts other financial outcomes and behaviors.

Guidance on using SCF

The complex structure of the SCF (see Federal Reserve, N.D.) requires accounting for both survey weights and multiple imputations. The SCF data are challenging to use; therefore, we have included guidance on how to conduct correct analyses to facilitate other researchers' use of these data to pursue questions in the economics of education using this valuable nationally representative resource. Households had differing probabilities of selection for inclusion in the SCF; the Federal Reserve provides replicate weights that allow variance estimates to be correctly adjusted while also retaining respondent anonymity. The Federal Reserve imputes five replacement values for all missing values. These five implicates need to be combined correctly to account for the uncertainty in the imputation process and to return the sample to its correct size - rather than inflated fivefold. Users will need to download the main dataset, download the replicate weight dataset, merge the two files, conduct data processing, and then use specialty packages that correct for both sampling and multiple imputations specific to SCF. We made use of the SCFCOMBO package for STATA (Pence, 2015) to produce both correct point estimates and correct standard errors to guide inferences. For guidance on using the SCFCOMBO package please refer to Nielson (2015).

Measures

This section details the variables used in this analysis. The SCF database allows for respondents to provide multiple responses to many variables – most of our variables are calculated from each response (across all responses) to a question on a given topic. For transparency and replicability, Table 2 provides to readers the exact response codes used to calculate our variables.

Table 2. Study Variable Identification and Manipulations

Variable	Description	SCF Codes
Student Loan Debt	Self or spousal reported total student loan debt – included federal and private.	Step 1 – Loan Debt Balances: X7805, X7828, X7851, X7928, X7951 Step 2 – Self or Spousal: X7978, X7883, X7888, X7893, X7898, X7993
IDR Enrollment	Binary indicator that individuals were enrolled in an Income-Based Repayment Plan, Pay as you Earn Plan, or Income-Contingent Repayment Plan."	X9306-X9311
Wages	Wages were generated from reported household wages and salary only	X5702
Savings	Total reported savings and a binary outcome on whether respondent had savings >0.	X3730, X3736, X3742, X3748, X3754, X3760

Checking Account	Initially, we identified the amounts participants reported in checking-related accounts. Next, we only counted checking amount when respondents recorded a "5" response for variables in Step 2. Binary outcome on whether respondent had checking account balance >0.	Step 1 – Checking Account Balance: X3506, X3510, X3514, X3518, X3522, X3526 Step 2 – Traditional Checking Account Balance: X3507, X3511, X3515, X3519, X3523, X3527
Retirement Savings	First, we classified the retirement accounts via identifying response "22 – Retirement/old age" to variables in Step 1. Next, we summarized account balances in the identified retirement savings accounts. Last, we generated a binary outcome determined by retirement>0.	Step 1 – Identifying Retirement Accounts: X3006, X3007, X7513, X7514, X7515, X6848 Step 2 – Summarizing Balances: X6551, X6559, X6552, X6560, X6553, X6561, X6554, X6562, X6756, X6757
Payday Loans	Binary indicator of whether anyone in the household had made use of a payday loan.	X7063
Homeownership	Binary outcome of owning a home, mobile home, mobile home and land, farm, or ranch.	X604, X614, X623, X716, X513, X526

Student Loan Debt. The 2016 SCF allows respondents to report up to 6 student loans. Like with Blagg (2018), for this study student loan debt was summed across loans that respondents reported were self or spousal debt. Blagg's report only tabulated federal debt, we instead aligned with Collier's (2020) design and tabulated total student loan debt which significantly correlated with enrollment in IDR. Enrollment in income-driven repayment was determined via responses that reported whether loans were in one of the various IDR plans (ICR, IBR, PAYE).

Wages. Realigned with Blagg (2018), wage data were tabulated from reported household wages and salary only.

Savings. Savings was a summation of the amount of money respondents reported in various savings accounts. Our binary outcome of whether respondents had savings was determined if savings>0.

Checking Accounts. We also separately identified whether respondents had checking accounts. We identified the amounts participants reported in checking-related accounts, but only counted traditional checking accounts and not money market accounts that have some restrictions on the use of debt and check-related functions.

Retirement Savings. We also detected retirement-related accounts via a response flag used to differentiate savings of that type. The amount of money in respondents' retirement accounts was then calculated by summing across identified retirement savings accounts. Similarly, to savings, our binary outcome of whether respondents had retirement-related savings was determined by retirement amount>0.

Payday Loans. Payday loan usage was calculated from a single response.

Homeownership. The final variable requiring calculation was homeownership. We identified homeowners based upon whether respondents indicated a resale value for the variables highlighted in Table 2.

Findings

Correlates to IDR Enrollment

Replicating Collier's Models. We analyzed permutations of continuous and categorical approaches to measuring the theoretically central variables of student loan debt (SLD) and income. Because Collier (2020) that showed IDR was linked to balance and income measures - Table 3 unexpectedly shows that in a nationally representative sample, enrollment in IDR does not generally seem to be linked to such measures. We observed two exceptions to this lack of a systematic relationship.

First, households earning <$12,500 (*B*=-.23) were less likely to be enrolled in IDR than households earning between $40,000-54,999. Examining descriptive statistics in Table A1 emphasizes that even though 18% of respondents have wages <$12,500, only 6% of IDR participants have wages under $12,500. This finding aligns with prior research (Blagg, 2018; Collier, 2020) and illustrates that households with, likely, the most need for the financial protections that IDR plans would provide are the least likely to be enrolled. When thinking about the framework of rational choice theory; from a financial perspective, we would expect to see these households be more strongly represented in these programs as even low monthly payments would likely be quite burdensome. Given this is becoming an established trend, there seems to be some mechanism or preference that we cannot capture with this type of data that prevents an increased share of inclusion for these households. It is possible low-income households may not know about the availability of these plans. Alternatively, if they know about them, these individuals may have shied away from enrolling as in most cases their balances will increase over time or balances would never be paid down (U.S. Congressional Budget Office, 2020).[4] Why this trend of disproportionate under-enrollment by low earners exists across multiple studies should be a focus of future researchers interested in supporting IDR redesign.

Next, we found that the debt-to-income ratio (*B*=-.00) was negatively correlated with enrollment in IDR. Again, this complicates our understanding of who may be enrolled in these plans, as we would not expect a higher debt-to-income ratio to be related to a lower chance of IDR enrollment. This finding could suggest that widening access to IDR has helped advantage those in more "favorable" financial situations as those with lower debt-to-income ratios are now more likely to enroll. Again, relying on our framework – as IDR plans offer protections against personal and larger economic shocks (Shireman, 2017) – when access was loosened it would make sense to preventatively enroll in these plans, given that repayment will only be predicated on earnings. We do not wish to over-interpret this finding, though, since the magnitude of the coefficient is less than .005.

[4] The authors have recently spoken with a representative from various student loan services and the representative indicated that once individuals decide to enroll in IDR plans, enrollees generally remain enrolled in IDR plans. There is essentially little to no movement from IDR to traditional repayment plans. Potentially, households could feel that IDR plans lock them into a process with growing balances and leaving the plan could be a financial disadvantage. This could in-part explain why the lowest earning households are less engaged in IDR.

Contrary to Collier (2020), we found the level of education was not significantly linked to IDR enrollment when examined as five categories. Yet, across most models, we found that female borrowers[5], married borrowers, and racial minority borrowers were more likely to enroll in IDR (see Table 3). Our findings support narratives that IDR seems to be an important social safety net for female borrowers (Collier, 2020; Miller, 2017). With emergent research illustrating elevated debt loans of minority borrowers (Scott-Clayton & Li, 2016) and well-established systematic disadvantages, these groups have long faced in the US, the link between these individuals and enrollment in IDR is worth further investigation. Interaction terms illustrate that married women of color were more likely to enroll in IDR across a variety of models (*B*=.60-.67, see Appendix Table A1), but that pattern is itself dependent on other interaction terms.

Table 3. Enrollment in IDR, Collier Inspired Analyses (Linear Probability Models)

	(1) Collier (2020) Replication	(2) SLD Continuous	(3) SLD and Wage Continuous	(4) Debt to Income Ratio	(5) Wage Continuous
Demographics					
Female	0.07*	0.07*	0.08*	0.08*	0.07*
Age (centered)	-0.00	-0.00	-0.00	-0.00	-0.00
Racial Minority	0.05*	0.05*	0.05*	0.05**	0.05*
No children	0.02	0.02	0.01	0.02	0.01
Not married or cohabiting	-0.02	-0.03	-0.08*	-0.09**	-0.07*
Loan Characteristics					
SLD (centered)		0.00	0.00		
Has private debt	-0.03	-0.03	-0.03	-0.03	-0.04
Loan Amount, reference is <$20K					
$20K-40K	-0.04				-0.02
$40K-60K	-0.01				0.00
$60K-75K	0.05				0.07+
$75K-100K	0.06				0.06
$100,000+	0.05				0.07
Education, Reference is BA					
Less than HS	0.01	0.01	0.00	-0.01	0.01
Degree					
Some College	0.02	0.03	0.01	0.00	0.01
Associates Degree	0.05	0.04	0.03	0.03	0.04
Masters	0.02	0.04	0.03	0.04	0.01
Professional	0.07	0.10	0.11	0.12+	0.08

[5] This refers to SCF respondents that were female, even though (when applicable) we pool debt from multiple household members. The female respondents are frequently (94.6%) single, whereas only 18.9% of male SCF respondents were single. We do not use "female head of household" or a similar term because tax filing statuses have specific definitions.

Degree or PhD					
Income					
Wage Income			0.00		0.00
Income Squared			-0.00		-0.00
Wage income, reference is $40,000-54,999					
<$12,500	-0.23***	-0.23***			
$12,500-24,999	-0.02	-0.02			
$25,000-39,999	0.01	0.01			
$55,000-74,999	0.03	0.03			
$75,000-99,999	0.03	0.03			
$100,000+	-0.08	-0.08			
Debt to Income Ratio				-0.00**	
N	1,022	1,022	1,022	1,022	1,022
Adjusted R^2	0.03	0.03	0.00	0.00	0.00

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Data from public-use 2016 SCF file. The SCF is a self-reported survey and is subject to respondents incorrectly estimating salary and income.

Looney & Yannelis Inspired Models. As previously noted, given the uncertainty surrounding the findings related to the Collier (2020) models, we also took inspiration from Looney & Yannelis' (2018) recent work examining descriptive differences between those with "large" student loan balance and those without. Table 4 shows that the high debt category reliably, positively correlated to IDR enrollment (*B*=.10 to .30) as did log income (*B*=.02).[6] At this point, we remind readers that the Collier-inspired models generally did not show relationships between either loan balances or income (as bins) and IDR participation. Given that focal results – whether IDR participation relates to income and/or student loan balance – are not robust to alternative analyses and are instead sensitive to specification was counter to our expectations. If we attempted and reported the results in only one of Table 3 or 4, we might conclude that there either is or is not a consistent relationship – in recent, nationally representative data – between financial variables and IDR status, and neither narrative is necessarily correct given our full set of findings.

One consistent finding between these models and the Collier-inspired ones is that female borrowers were more likely to enroll in IDR (*B*=.09 to .13). As a reminder, in different ways, both models control for education, debt, and earnings; therefore, other gender-specific factors exist for why female borrowers would consistently be more likely to enroll in IDR plans. Miller (2017) has theorized that female borrowers could in part be responding to the well-established pay gap as well as various societal changes in gender norms surrounding college access and work. Although we control for household income, these consistent and robust findings may be a product of the sociopsychological calculations that women may be generating when choosing a repayment plan – in that rationally, many female borrowers may be more likely to enroll in IDR

[6] We recognize that there might be a point at which IDR enrollment is not beneficial to high earners. The log income specification does not allow us to discover that inflection point. Future research should seek to identify and build policy around that point.

due to known and expected financial and social inequities. Identifying whether these sociopsychological calculations exist and how they may manifest should be a focus of future studies. Yet, when linked to Collier (2020), we suggest this trend may be one of the stronger, more robust outcomes of this study and that any future proposals to modify IDR should include an understanding of how female borrowers would be affected.

With the introduction of the high debt and some college measures, minority status was not a reliable predictor of IDR enrollment in Table 4 (as it was in Table 3). This inconsistent set of results indicates that whether this demographic characteristic shows a relationship with IDR participation (and even whether the estimate of the coefficient is positive or negative) is contingent on what other variables are in the model. Different results in Tables 3 and 4 illustrate the overall complexity of IDR enrollment and emphasize that the *approach researchers take may produce different findings* and that multiple specifications are absolutely necessary.

Table 4. Enrollment in IDR, Looney & Yannelis Inspired and Exploratory Analyses (Linear Probability Models with Interaction Terms)

	(1) Alternative Debt and Education Coding	(2) Interactions with High Debt	(3) Adding Interaction with Some College	(4) Promising Model
Demographics				
Female	0.03	0.09^{+}	0.13*	0.09*
Racial Minority	0.02	0.06	-0.02	0.02
Married	-0.02	-0.00	-0.00	-0.02
Interaction Terms				
Minority X Female	0.00	-0.04	0.01	0.00
Married X Female	0.08	0.17	0.13	0.06
Minority X Married	0.02	0.03	0.10	0.02
F X Min. X Married	0.33	0.33	0.31	0.36
Income and Debt Measures				
Log Income	0.02***	0.02***	0.02***	0.02***
Debt to Income Ratio	0.00	0.00	0.00	0.00
SLD <$30K	0.04	0.03	0.04	0.04
SLD >$50K	0.10**	0.30**	0.30**	0.14***
Private SLD	-0.03	-0.03	-0.03	-0.03
Educational Attainment				
No College	0.03	0.02	0.02	0.03
Some College	0.05^{+}	0.05^{+}	0.04	0.10**
Advanced Degree	0.02	0.02	0.03	0.03
Exploratory Interactions				
F High debt		-0.27*	-0.30*	-0.13*
Min High debt		-0.18	-0.16	
Marr High debt		-0.14	-0.13	
F x Min High debt		0.20	0.20	
F x Marr High debt		-0.38	-0.35	
Min x Marr High debt		0.03	0.01	
FRM High debt		0.25	0.13	
F Some College			-0.15	-0.16**
Min Some College			0.26^{+}	
Marr Some College			0.02	
F x Min Some College			-0.16	

F x Marr Some College			-0.39	
Min x Marr Some College			-0.22	
FRM Some College			-0.25	
Some College x High Debt			0.02	
FRM x Some College x High Debt			1.28*	
N	1,022	1,022	1,022	1,022
Adj R^2	0.03	0.03	0.03	0.03

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note. F = Female, Min. = Minority, Marr = Married, FRM = Female, Racial minority, Married

Financial Outcomes

Enrollment in IDR was not significantly correlated with *any* of the financial outcomes we examined – see Table 4. Null findings related to participation in retirement and homeownership align with Collier (2020) but null findings on participation in savings did not. These null findings could be suggestive that IDR may be providing enrolled borrowers – who normally have higher loan balances - financial (or psychological) protection that allows for statistically equalized outcomes to those who are in traditional repayment. Prior studies have identified higher loan balances have been related to these various financial outcomes (see - Elliot et al., 2013; Grinstein-Weiss, et al., 2015; Houle & Berger, 2015). That our models show no effect on the financial outcomes from student debt load leads us to believe that including whether borrowers were in IDR or not may moderate the financial (or psychological) effects of student loan debt on these outcomes. Instead, we may be observing borrowers basing decisions on whether and how to engage in other financial activities/outcomes on income alone, without being constrained by student loan debt in the way that they are in the absence of IDR.

Table 5. Financial Outcomes: Savings, Homeownership, and Retirement

	(1) Have Savings, (Y/N)[a]	(2) Savings Amount[b]	(3) Checking Amount	(4) Homeowner	(6) Payday Loan Use	(7) Saving for retirement (Y/N)[f]	(8) Retirement Savings Amount[g]
Student Loan Characteristics							
In IDR	-0.01	250	454	-0.04	0.01	0.01	-5,960
SLD (centered)	-0.00	-0.01	0.01	-0.00	-0.00	0.00	0.01
Has private debt	-0.05	2,862	437	0.01	0.02	-0.00	-3,076
Demographics							
Female	0.04	-2,217	-541^{+}	0.06*	0.01	-0.11**	-2819
Age (centered)	-0.00***	199*	77*	0.01***	0.00	0.01***	1531**
Racial Minority	-0.01	-1,148	-807^{+}	-0.11***	0.04***	-0.14***	-16862***
Not married or cohabiting	-0.07^{+}	2,200	-403	-0.19***	0.03^{+}	0.03	-781
No children	0.03	1,663	926	-0.05*	-0.01	0.05*	15,757
Education, Reference is BA							
Less than HS Degree	-0.13***	1,849	-2,497**	-0.01	0.02^{+}	-0.08^{+}	-11,730^{+}
Some College	-0.04	-2,412*	-2,277***	-0.08**	0.06***	-0.10**	-8,878
Associates Degree	-0.07^{+}	-2,166^{+}	-2,642***	0.01	0.06***	-0.08*	-17,236**
Masters	0.02	2,001	-1,546	0.04	0.00	0.10**	11,476
Professional Degree or PhD	-0.04	5,023	355	-0.06	0.01	0.04	-924
Wage Income Measures							
Wage Income	0.00***	0.10*	0.06***	0.00***	0.00	0.00***	0.33*
Income Squared	-0.00^{+}	0.00	-0.00	-0.00^{+}	-0.00	-0.00*	-0.00
N	1,022	562	1,022	1,022	1,022	389	1,022
Adj R^2	0.03	0.12	0.07	0.28	0.02	0.15	0.06

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Data from public-use 2016 SCF file. To improve readability, coefficients over 1 in columns 2, 3, and 8 were rounded.

a. Have Savings was coded as 1 if our calculation of Savings Amount>0; Saving for Retirement was coded as 1 if our calculation of Retirement Savings>0.

b. Savings was tabulated by summing X3730, X3736, X3742, X3748, X3754, X3760

c. Checking: sum of (X3506 if X3507=5) (X3510 if X3511=5) (X3514 if X3515=5) (X3518 if X3519=5) (X3522 if X3523=5) (X3526 if X3527=5)

d. Home Ownership was set equal to one if the respondent indicated a positive resale value for property they owned (X604, X614, X623, X716, X513, X526)

e. Payday loan use is via a question specific to that topic: X7063.

f. Whether the respondent saves for retirement is based on values of 22 for X3006, X3007, X7513, X7514, X7515, X6848

Retirement savings amount calculated as a sum of X6551, X6559, X6552, X6560, X6553, X6561, X6554, X6562, X6756, X6757

Limitations and Future Research

This study is just another *small* step towards understanding who may be enrolled in an income-driven repayment scheme. The most noticeable drawback about using the SCF 2016 dataset is that it may not include strong participation in the Obama-era REPAYE scheme. REPAYE was enacted around the time this data would have been collected and since the creation of REPAYE access to and enrollment in IDR repayment has significantly increased (U.S. Congressional Budget Office, 2020) – Collier (2020) had a similar issue.

We believe this research remains valuable for three reasons. First, again, beyond observable trends of the loan balance and wages (like Blagg, 2018) there remains limited research controls for other demographic factors when examining IDR enrollment – and part of the void of research is that there are limited publicly available datasets that allow for such. At the moment, this is simply one of a few publicly available resources that allow us to examine the questions we presented. Second, we uncovered several trends that align with prior research – specifically that higher balance borrowers are more likely to be enrolled as are female borrowers and that enrollment in IDR does not seem to correlate with financially-related outcomes (which we believe is a signal of the intended financial safety net). These connections to the emergent body of literature on IDR are important moving forward and more immediately to policymakers intending to modify the terms of IDR. Third, when the SCF 2019 dataset is publicly released, this study could be used as a baseline to test against and test for the effects associated with REPAYE. Finally, we believe that transparency in how we calculated each variable and our guidance on how to use the SCF dataset allows researchers to make different decisions and test for changes.

Implications and Recommendations

Given policymakers' interests in reforming IDR, researchers must provide stakeholders with rigorous analyses detailing who exactly enrolls in IDR schemes. Lawmakers interested in evidence-based policymaking concerning IDR reforms may consult this work to better understand the repayment patterns of borrowers. To our knowledge, this study is one of the first to apply regressions to the nationally representative SCF database as part of an examination of IDR enrollment. However, the models for IDR enrollment have quite low explanatory power, suggesting that either enrollment in IDR is more *chance* than we previously imagined, or that additional variables not included in our regressions (or this public dataset) could add more explanatory power, such as residency urbanicity (see Collier, 2020). Although the decision to enroll in IDR is also driven by factors not measured in SCF, our models illustrate that borrowers over $50K in loan debt, female borrowers, and perhaps minority borrowers were linked with increased enrollment. As we are unable to reliably predict who enrolls in IDR based upon finances, as prior research would lead us to believe, generating policy from the current understanding seems premature and at risk of being ineffective.

Additionally, our work has direct implications for institutional financial aid and related practitioners. Given that the lowest earners are less likely than middle-earners to be enrolled in IDR, it could be beneficial to identify students who have previously stopped out, graduate, and alums to educate them on the financial protection that IDR could offer – especially given that even low monthly payments are likely harmful to these households. After enrolling in IDR some may have a zero-dollar monthly repayment. Additionally, considering that we found no

difference in financially related outcomes between those enrolled in IDR and those in traditional repayment, practitioners could use this information to ease any potential distress over enrolling IDR and feeling of being "left behind" financially – at least in the long run. Finally, the findings here could justify links for researchers and practitioners to jointly flesh out the various questions our paper raises. For example, although female borrowers are more likely than male borrowers to be enrolled in IDR, the question as to "why" cannot be answered in this study or using this data. Future alliances between researchers and financial aid practitioners may help the field (and policymakers) better understand some missing details that available datasets do not allow us to comprehend or model – which should provide additional layers to our understanding of in what ways borrowers' decisions to enroll (or not) were rational and consistently tied to loan debt or earnings.

While our study may not bring much clarity regarding loan debt, wages, and IDR enrollment, our null findings themselves bring value to the policy conversation. First, we did not find that high-earning borrowers are driving IDR enrollment, a finding that stands opposed to prior narratives (Delisle, 2013). Next, our findings suggest that IDR may be helping enrollees remain statistically similar to those in traditional-based repayment regarding homeownership and multiple types of savings.

Due to our conflicting research findings concerning IDR enrollment, we urge policymakers to consider the volatility related to our findings. We also call for greater access to more public and non-public databases to help clarify who may be enrolled in these repayment schemes. Engagement with the soon-to-be-released SCF 2019 database may bring much-needed clarity to this conversation – the 2019 data will reveal any changes in IDR enrollment since 2016, as stronger participation in the REPAYE plan may be included. As IDR modifications remain a focus for the Biden Administration and several Senators, like Sen. Warren (Minsky, 2021a; 2021b), despite a lack of clarity regarding the demographics of IDR participation, we hope that policymakers will consider that any chances may most affect female borrowers – and possibly minority borrowers. Given the breadwinner status many women (especially women of color) hold, changes in IDR could severely impact families' financial security (Glynn, 2016). We also encourage policymakers to consider how changes may relate to borrowers' abilities to save and become homeowners, as our findings generally support those in Collier (2020) and together suggest that current policies may be producing a level of equalization for those enrolled in IDR. Finally, given the negative correlation between IDR enrollment and the lowest earners, targeting IDR reforms to the borrowers who could most benefit seems a practical strategy. Potentially, automatic IDR enrollment for the lowest earners may be a beneficial strategy. However, without a better understanding of who the *average* enrollee is and how IDR participation relates to financial outcomes, modifying IDR could have unintended consequences. In this respect, current information does not provide policymakers a clearer picture of who may be (dis)advantaged by IDR modification.

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Appendix Table A1.

Showing "Female X Married X Racial Minority" Interaction Term is Significant, But Contingent on "Has Children" Interaction Terms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Demographics								
Female	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.03
Racial Minority	-0.00	0.01	0.01	0.01	0.01	0.00	0.03	0.04
Married	0.05	0.04	0.01	-0.00	-0.00	0.04	0.04	0.01
Has Kids	0.02	0.03	0.07	0.06	0.06	0.02	0.10	0.13
Interaction Terms								
Minority X Female	0.06	0.05	0.06	0.06	0.07	0.06	0.00	-0.00
Married X Female	-0.28	-0.30^{+}	-0.29^{+}	-0.28	-0.28	-0.28	0.12	0.07
Minority X Married	0.06	0.06	0.04	0.04	0.05	0.06	0.03	0.04
Female X Kids	0.02	0.02	0.01	0.02	0.01	0.02	-0.07	-0.07
Minority X Kids	0.44	0.45	0.35	0.35	0.35	0.45	-0.02	-0.03
Married X Kids	-0.04	-0.05	-0.10	-0.08	-0.08	-0.04	-0.11	-0.14
F X Min. X Married	0.62**	0.64**	0.67***	0.64***	0.63**	0.60**	0.26	0.36
F X Minority X Kids	-0.51^{+}	-0.51^{+}	-0.45	-0.45	-0.45	-0.52^{+}	-	-
Minority X Married X Kids	-0.45	-0.46	-0.36	-0.35	-0.35	-0.47^{+}	-	-
F X Kids X Married	0.67^{+}	0.68^{+}	0.68^{+}	0.71^{+}	0.74^{+}	0.73^{+}	-	-
F X Married X Min. X Kids	-0.22	-0.23	-0.26	-0.28	-0.32	-0.26	-	-
Income and Debt Measures								
Log SLD		0.02^{+}	0.01					-0.02
Wage Income						-0.00	-0.00	
Log Wage Income			0.02***	0.03	0.03			-0.01
SLD < $30,000				0.03	0.03	0.02	0.02	
High Debt (>$50,000)				0.11**	0.11**	0.10**	0.10**	
Log Inc X Log SLD				-0.00	-0.00			0.00
Educational Attainment, Reference is 4-Year Degree								
No College					0.03	0.01	0.00	
Some College or Associates					0.05^{+}	0.03	0.03	
Advanced Degree					0.03	0.03	0.03	
N	1,022	1,022	1,022	1,022	1,022	1,022	1,022	1,022
Adj R^2	0.00	0.01	0.02	0.02	0.03	0.01	0.02	0.02

Note: Data from public-use 2016 SCF file

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2. Alternative Approaches to High Levels of Debt

DV IDR Enrollment	(1)	(2)	(3)	(4)	(5)	(6)
Demographics						
Female	0.09^{+}	0.09^{+}	0.09^{+}	0.13***	0.09^{+}	0.13***
Racial Minority	0.01	0.01	0.01	0.05*	0.02	0.05*
Married	-0.04	-0.03	-0.03	0.02	-0.03	0.02
Debt/Income Chars						
Has private debt	-0.04	-0.04	-0.04	-0.04	-0.03	-0.03
LogInc2	0.03***	0.03***	0.03***	0.03***	0.03***	0.03***
DebtToInc2	0.00^{+}	0.00^{+}	0.00^{+}	0.00^{+}	0.00	0.00^{+}
SLD Magnitude						
SLD_Under_30	0.04	0.04	0.04	0.04	0.04	0.04
$50,000-79,999	0.14**	0.14**	0.14***	0.14***		
$80,000-89,999	-0.02	-0.03	-0.02	-0.03		
$90,000-119,999	0.25***	0.25***	0.25***	0.24***		
$120,000-139,999	0.00	0.00	0.00	-0.01		
$140,000-159,999	0.29*	0.29*	0.29*	0.29*		
$160,000-179,999	-0.05					
$180,000-199,999	-0.21*					
$200,000-249,999	-0.07					
$250,000-299,999	0.16					
SLD Over $300k	-0.02					
Over $160k		-0.06	-0.14^{+}	-0.15*	-0.05	-0.14^{+}
Bin $50-160k					0.15***	0.15***
Educational Attainment						
Low Ed	0.02	0.02	0.02	0.02	0.02	0.03
Some College	0.10**	0.10**	0.10**	0.10**	0.10**	0.10**
High Ed	0.04	0.04	0.03	0.04	0.04	0.03
Interaction Terms						
Min x Fem	0.01	0.01	0.01		0.01	
Marr x Fem	0.06	0.06	0.06		0.06	
Min x Marr	0.04	0.04	0.03		0.03	
F x Marr x Min	0.35	0.35	0.35		0.36	
High x Female	-0.11*	-0.11^{+}	-0.11^{+}	-0.10^{+}	-0.13*	-0.12*
F x Some Coll	-0.16**	-0.16**	-0.16**	-0.17**	-0.16**	-0.17**
High Ed X $160k Debt			0.11	0.12		0.13
N	1,022	1,022	1,022	1,022	1,022	1,022
Adj R^2	0.04	0.04	0.04	0.04	0.04	0.03

Note: Data from public-use 2016 SCF file

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$