Recession or not, here we come:
An investigation of the effect of the Great Recession on college attendance by family income

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Abstract

We use the Current Population Survey to study college enrollment trends by household income from 2001-2013. For students of traditional college-going age, we find that national trends in *whether* to enroll in college appear uninterrupted from 2001 to 2013. While 18 and 19 year-olds from high-income families enrolled in college full-time at a much higher rate before and after the Great Recession, we estimate that the enrollment differential attributable to income was declining at a similar rate before and during the recession. Although the predictive power of household income appears to be flat or decreasing (though still substantial) for this age group and outcome, we also show that enrollment rates could nevertheless remain similarly bifurcated in the coming years.

Introduction

Postsecondary education is of increasing importance in the economy. For the country, it supports global economic competitiveness. For individuals, it's seen as a prerequisite for middle- and upper-middle income jobs. Despite large increases in the enrollment of non-traditional[1] college students in the 21st century, recent high school graduates remain a key population of interest. They remain the archetypal college student in the minds of many, and they continue to earn the majority of four-year degrees (Bowen et al, 2009). As the financial burden of postsecondary education has been steadily shifting from governments to families[2] (College Board, 2012), concerns of rising inequality in household wealth (Duncan & Murnane, 2011) and the well-established associations among socioeconomic status and postsecondary education outcomes (Bailey & Dynarski, 2011) have been a focus of education research in recent years.

The Great Recession (GR) only heightened these concerns. Families faced rising mortgage rates, falling home values, depletion of home equity, and credit market constraints. And at the same time that families needed greater financial assistance, universities and state governments were in a worse position to offer any. Private college endowments, philanthropic support, and state appropriations all declined. The counter-cyclical demand for higher education compounds the problem, as each dollar that an additional enrolling student contributes through tuition is offset many times over by the increased marginal cost for educating the student (Winston, 1999). Overall, other than cutting costs—which they did (College Board, 2012)—governments and colleges have limited options for offsetting lost revenue: raising tuition, cutting enrollment at

[1] Non-traditional college students are typically defined by a combination of characteristics, such as part-time enrollment, being over the age of 24, having a full-time job, etc. See Taniguchi & Kaufman (2005) for details.

[2] For non-emancipated students under the age of 25, the federal government's Free Application for Federal Student Aid (FAFSA) focuses on the expected *family* contribution in assessing students' eligibility for financial aid.

more expensive kinds of colleges[3], and strategically enrolling students willing to pay more for the same slot[4] all potentially exacerbate socioeconomic stratification.

Overall, the effects of the recession on socioeconomic stratification in higher education could occur along many enrollment margins. It could differentially affect where students enroll, how much they pay, and if they persist to graduation.

A first-order concern is whether low-income students became relatively less likely to enroll in *postsecondary education at all*—and if they enrolled, whether they chose to enroll full-time or part-time. Barr and Turner (2013) show that the counter-cyclical enrollment response to the GR was stronger than in previous recessions—including among traditional college students—but they generally analyze full-time and part-time enrollment rates simultaneously, and they do not discuss differential effects by income. Long (2013) uses shows that the overall increase in enrollment during the GR was due to an increase in part-time enrollment and an increase in enrollments among students of color, but the analysis aggregates student enrollment across age groups, so the effect on enrollment among college students of traditional age is unidentified. The trichotomous outcome we investigate in this paper—not enrolled in college, enrolled part-time in college, or enrolled full-time in college—is a coarse but crucial measure of how postsecondary education enrollment was affected by the GR.

Our paper contributes two findings, which we discuss in Part I ("A Change in the Betas") and Part II (A Change in the X's). First, with respect to differential effects by income of the GR on

[3] Barr & Turner (2012) hypothesize that state governments constrain enrollments at four-year universities but allow them to expand at two-year colleges, which are typically less expensive to operate.

[4] At public universities, this could mean increasing non-resident enrollment relative to resident enrollment, since non-residents are typically charged substantially higher fees. For private universities, an example would be enrolling more students who do not qualify for need-based financial aid.

our trichotomous outcome, we find that the possibility of an effect of substantive magnitude is quite small. The GR may have affected college enrollment in many ways, but the relationship between household income and our enrollment outcome of interest did not appear to be affected substantively during the GR; it continued with remarkable steadiness on its pre-recession trend (where it was declining). The concern that family income became increasingly deterministic of educational outcomes during the GR is misplaced with respect to our outcome of interest.

Part II investigates the implications of our first finding in greater detail. We discuss how socioeconomic stratification with respect to our enrollment outcome could still plausibly be increasing, and what this suggests about its cause. Part II shows the importance of broader social trends—rather than institutional policy—in accounting for socioeconomic stratification in postsecondary enrollment.

Data & Methodology

All data come from the March results of the Current Population Survey (CPS) from 2001 to 2013, as made available by the Integrated Public Use Microdata Series (IPUMS). The CPS is a monthly survey conducted at the household level by the federal government, and its stratified random sampling approach allows for estimates of statistics at the national level. Among eligible households, its response rate averages around 90%[5]. Monthly surveys include supplementary questions, and income and demographics are a special emphasis of the March CPS. While much education research focuses on the October CPS, an advantage of the March CPS is the precision of its measurement of household income.

Since our focus is on students of traditional college-going age, we eliminated individuals

[5] https://www.census.gov/cps/about/faq.html

younger than 18 or older than 19. In this age group, our survey item of interest includes the following mutually exclusive response possibilities: "Not in Universe," "High School Full-Time," "High School Part-Time," "College or University Full-Time," "College or University Part-Time," and "Does Not Attend School, College, or University." We dropped individuals from the first three categories and kept individuals from the last three, leaving us with repeated cross-sections. The CPS includes inverse sampling probabilities at the person level, which allow us to estimate the national rates for these outcomes[6].

Simultaneous estimation of these outcomes' respective probabilities allows us to more precisely estimate enrollment dynamics by income level. We use multinomial logistic regression to estimate the probabilities of these outcomes: (0) not being enrolled in college, (1) being enrolled in college part-time, and (2) being enrolled in college full-time. Although we assign numbers to the outcomes, our model assumes no ordinal relationship among the outcomes. Throughout the paper, we use (0) as the baseline outcome to which we compare (1) and (2). The stochastic component of our model is:

$$Y_i \sim Y_{multinomial}(y_i \mid \omega_i, \gamma_i, \pi_i)$$

The systematic components of our model are:

$$Enolled\ PT\text{: } Pr(Y_i = 1 \mid X) = \gamma = \frac{\exp(\mathrm{X}\delta)}{1 + \exp(\mathrm{X}\beta) + \exp(\mathrm{X}\delta)}$$

$$Enrolled\ FT\text{: } P(Y_i = 2 \mid X) = \pi = \frac{\exp(\mathrm{X}\beta)}{1 + \exp(\mathrm{X}\beta) + \exp(\mathrm{X}\delta)}$$

$$P(Y_i = 0 \mid X) = \omega = 1 - \frac{\exp(\mathrm{X}\delta)}{1 + \exp(\mathrm{X}\beta) + \exp(\mathrm{X}\delta)} - \frac{\exp(\mathrm{X}\beta)}{1 + \exp(\mathrm{X}\beta) + \exp(\mathrm{X}\delta)},$$

where X is a vector of covariates that may include gender, race, and a measure of household

[6] Currently institutionalized individuals are excluded from the CPS. Members of the armed forces currently living in military barracks are excluded as well.

income. The income variable we use from the CPS is "FTOTVAL," or the total income for a survey respondent's family. We adjust all reported income to 2010 dollars using the Consumer Price Index. We use the natural log of income in our models. In Part I, our specifications include inverse sampling weights, an indicator variable for gender, and a set of indicators for race[7]. In Part II, we include models with and without race covariates and discuss the implications.

A limitation of our dataset is that a subset of each year's sample households—which we have yet to figure out how to identify—appear in the sample in *consecutive* years. That is, some individuals appear twice in the sample, once at age 18 and again at age 19. Neither the clustering of responses within individuals nor the clustering of individuals within households are correctly accounted for in the standard errors on our coefficient estimates. We report robust (Huber-White) standard errors unless otherwise indicated. We address concerns about our standard errors in several ways[8] (see Appendix Table 4).

Part I: ***A Change in the Betas***

Table 1 and Table 2 show the estimated probabilities of enrolling part-time and full-time in college—compared to not enrolling at all—from 2001 to 2013 for students from low-, middle-, and high-income households. In Table 1, we include the main effect of log income and interact dummy variables for each year with the log of income, which allows us to observe how the relationship between college enrollment outcomes and household income changed over time. Essentially, our motivation for the model in Table 1 is to let the data speak for itself.

[7] We recoded race for the sake of parsimony. Individuals identifying as multiracial or having a racial background uncommonly observed in the sample were recoded to "other."
[8] In addition to Appendix Table 3, which estimates magnitudes in the inflated precision of our standard error estimates, we also estimated separate models with only 18 year-olds and only 19 year-olds. The substantive findings are the same.

Specifically, we estimate the following equations, where the first equation estimates coefficients pertaining to the probability of part-time enrollment, and the second equation estimates coefficients pertaining to the probability of full-time enrollment:

$$X'\hat{\delta} = \hat{\delta}_0 + \hat{\delta}_1(Year) + \hat{\delta}_2(Log_{Inc}) + \hat{\delta}_3(Log_{Inc} * Year_{2002}) + \hat{\delta}_4(Log_{Inc} * Year_{2003}) + \cdots \hat{\delta}_{14}(Log_{Inc} * Year_{2013}) + \hat{\delta}_{15}(Female) + \hat{\delta}_{16}(Black) + \cdots + \hat{\delta}_{23}(Other\ Race/Recoded)$$

$$X'\hat{\beta} = \hat{\beta}_0 + \beta_1(Year) + \hat{\beta}_2(Log_{Inc}) + \hat{\beta}_3(Log_{Inc} * Year_{2002}) + \hat{\beta}_4(Log_{Inc} * Year_{2003}) + \cdots \hat{\beta}_{14}(Log_{Inc} * Year_{2013}) + \hat{\beta}_{15}(Female) + \hat{\beta}_{16}(Black) + \cdots + \hat{\beta}_{23}(Other\ Race/Recoded)$$

Socioeconomic disparities in postsecondary attainment are well established in the literature, and Table 1 reflects this disparity. In 2013, the estimated probability of enrollment for a student from a high-income household is .653, compared to .332 for an individual from a low-income family. Table 1 also shows that for each income group, the probability of full-time enrollment increased, and the largest gains—in both relative and absolute terms—occurred for lower-income families, whose estimated probability of full-time enrollment increased from .177 in 2001 to .322 in 2013. The probabilities of enrolling part-time also increased for low-income families, while the part-time enrollment probability remained approximately flat for middle-income families while declining for higher income families. The probability of not being enrolled decreased substantially across income levels, despite a substantial jump in the probability of non-enrollment in 2013. Since the probabilities in part-time enrollment changed little in absolute terms—and full-time enrollment rates are arguably a more important outcome of interest for 18 and 19 year-olds—the most important finding shown in Table I is that the gap in full-time enrollment rates between high-income and low-income students fell from 2001 to 2013. Looking

at the years from 2007 to 2010, it is also clear that the recession did not seem to have any noteworthy effect on enrollment probabilities. For both low-income and high-income students the enrollment probabilities appeared to continue with remarkable steadiness on their pre-2007 trajectories. Details pertaining to the models underlying Tables 1 and 2 are in Appendix Table 2[9].

Table 1

Probability of Enrollment Outcome By Year: Year Dummies Interacted With Log Income

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Household Income													
Not Enrolled	$22,026.00	0.781	0.787	0.752	0.729	0.714	0.692	0.696	0.675	0.671	0.651	0.605	0.581	0.622
	$59,874	0.565	0.580	0.536	0.510	0.501	0.481	0.493	0.475	0.479	0.465	0.419	0.402	0.456
	$162,755	0.317	0.336	0.302	0.283	0.284	0.273	0.290	0.279	0.290	0.284	0.251	0.243	0.296
	Household Income													
Enrolled Part-Time	$22,026.00	0.043	0.034	0.042	0.039	0.050	0.053	0.048	0.048	0.048	0.057	0.060	0.068	0.055
	$59,874	0.060	0.045	0.055	0.048	0.061	0.063	0.055	0.054	0.053	0.061	0.062	0.069	0.056
	$162,755	0.064	0.047	0.056	0.046	0.061	0.060	0.052	0.050	0.049	0.057	0.055	0.061	0.051
	Household Income													
Enrolled Full-Time	$22,026.00	0.177	0.180	0.206	0.232	0.236	0.255	0.257	0.277	0.281	0.293	0.335	0.351	0.322
	$59,874	0.375	0.375	0.409	0.442	0.438	0.457	0.452	0.471	0.468	0.474	0.519	0.529	0.487
	$162,755	0.619	0.617	0.642	0.670	0.655	0.667	0.658	0.670	0.661	0.658	0.694	0.696	0.653

Probabilities shown are for a white, male student.
Estimates modeled with linear trend in year, and an interaction between year dummies and the log of household income

Table 2

Probability of Enrollment Outcome By Year: Log Income Interacted With Linear Year Term

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Household Income													
Not Enrolled	$22,026.00	0.784	0.771	0.757	0.742	0.727	0.711	0.695	0.678	0.661	0.643	0.625	0.607	0.588
	$59,874	0.566	0.554	0.541	0.528	0.516	0.503	0.490	0.478	0.465	0.452	0.440	0.427	0.415
	$162,755	0.315	0.310	0.305	0.300	0.295	0.290	0.286	0.281	0.276	0.272	0.267	0.262	0.258
	Household Income													
Enrolled Part-Time	$22,026.00	0.032	0.033	0.035	0.036	0.038	0.040	0.041	0.043	0.045	0.047	0.048	0.050	0.052
	$59,874	0.043	0.044	0.045	0.046	0.046	0.047	0.048	0.048	0.049	0.049	0.050	0.051	0.051
	$162,755	0.046	0.046	0.046	0.046	0.046	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.044
	Household Income													
Enrolled Full-Time	$22,026.00	0.184	0.196	0.209	0.222	0.235	0.249	0.264	0.279	0.294	0.310	0.327	0.343	0.360
	$59,874	0.391	0.402	0.414	0.426	0.438	0.450	0.462	0.474	0.486	0.498	0.510	0.522	0.534
	$162,755	0.639	0.644	0.649	0.654	0.659	0.664	0.669	0.674	0.679	0.684	0.688	0.693	0.698

Probabilities shown are for a white, male student.
The estimates above include a linear trend in year, and an interaction between year and the log of household income

Table 2 probabilities are fit with a model that specifies a linear relationship between our

[9] Those household incomes under $8,103 ($e^9$) are omitted from the models above. Appendix Table 1 and Part II provide explanation. The findings from Part I are robust to this decision.

enrollment outcomes and the effects of income, year, and their interaction. Essentially, we fit a model that formally estimates the possible existence in an overall trend in the log income coefficient (our beta coefficient of interest) over time. Rather than using dummy variables for year, log income is interacted with a linear year term).

$$X'\hat{\delta} = \hat{\delta}_0 + \hat{\delta}_1(Year) + \hat{\delta}_2(Log_{Inc}) + \hat{\delta}_3(Log_{Inc} * Year) + \hat{\delta}_4(Female) + \hat{\delta}_5(Black) + \cdots + \hat{\delta}_{12}(Other\ Race/Recoded)$$

$$X'\hat{\beta} = \hat{\beta}_0 + \beta_1(Year) + \hat{\beta}_2(Log_{Inc}) + \hat{\beta}_3(Log_{Inc} * Year) + \hat{\beta}_4(Female) + \hat{\beta}_5(Black) + \cdots + \hat{\beta}_{12}(Other\ Race/Recoded)$$

Our model identifies a negative and statistically significant relationship ($p < .001$) between log income and a linear year term with respect to the probability of full-time college enrollment compared to non-enrollment. While the effect of household income remains strong, it has been diminishing. The substantive significance of the coefficient's magnitude is interpretable from the above tables.

Overall, firstly, we believe that Tables 1 and 2 are strong evidence against the possibility that income became a more important factor in the decision to enroll in college during the recession years, as it could have if credit markets ceased to operate efficiently and/or the postsecondary ecology as a whole responded to the recession in ways that displaced low-income students.

Second, we believe that the evidence presented in Tables 1 and 2 counters the hypothesis that the *relationship* between household income and post-secondary enrollment has been strengthening during the 21st century. It's worth reiterating that our outcome is only one postsecondary outcome among many, and we do not at all argue that this finding generalizes to other postsecondary outcomes. Our finding in no way contradicts the possibility that socioeconomic stratification in on the rise in the case of graduation rates, type of institution

attended, quality of institution attended, and myriad other important outcomes.

Nevertheless, concerns about the ability of low-income families to access postsecondary education (even in its most basic form, as is measured in our outcome) are not unfounded. While policy-makers might be relieved to see steadily increasing probabilities of postsecondary enrollment *conditional on the same level of real income and holding race constant*, a widening distribution of household income and changing population demographics could prevent such progress in accessing postsecondary education from being realized.

Part II: ***A Change in the X's***

In Table 3, we investigate the extent to which changing demographic composition of the U.S. could be confounding the findings from Part I. We begin with a look at changes in household income. Rising income inequality in the U.S. has been discussed previously (see Krueger, 2012), and we observe the same phenomenon in the CPS March data.

Following our approach from Part I, we exclude the very bottom of the income distribution before conducting our analysis. Table 3 shows that the trends in real household income (again in 2010 dollars) for households with earnings above $8,103. Duncan & Murnane (2012) suggest that extreme poverty may be different in kind at very low income levels with respect to education outcomes, and we may therefore be better off considering the relationship between income and attainment separately for those at the very bottom of the income distribution. Ultimately, excluding those reporting very low household income levels allow us to circumvent concerns that changes in demographics are attributable to growth in the number of citizens reporting extremely low levels of household income and not in a change occurring broadly across the income distribution.

Table 3

Income Quantiles by Year

	5th	10th	25th	50th	75th	90th	95th
2001	$17,501	$24,835	$46,630	$80,017	$118,184	$169,397	$206,902
2002	$15,522	$23,389	$44,356	$80,017	$121,783	$171,099	$235,626
2003	$14,618	$23,624	$44,356	$76,880	$119,372	$172,819	$217,510
2004	$11,614	$20,952	$44,356	$79,221	$123,007	$172,819	$215,346
2005	$9,605	$20,333	$43,478	$76,115	$118,184	$171,099	$213,203
2006	$9,321	$17,501	$38,561	$75,358	$117,008	$172,819	$219,696
2007	$8,267	$17,327	$38,949	$75,358	$123,007	$183,506	$230,960
2008	$10,097	$18,958	$42,617	$76,115	$119,372	$171,099	$219,696
2009	$9,136	$19,341	$39,735	$73,865	$115,844	$171,099	$221,904
2010	$7,708	$16,155	$35,596	$68,872	$113,550	$162,755	$215,346
2011	$5,943	$14,472	$33,190	$64,861	$106,938	$157,945	$202,805
2012	$8,103	$15,367	$33,860	$64,861	$109,098	$169,397	$213,203
2013	$8,691	$16,984	$38,561	$67,508	$112,420	$174,556	$215,346

Calcuated Using Inverse Sampling Weights
Households with below $8103 are excluded
Calculated on the Log Scale

At the 5th, 10th, 25th, and 50th quantiles of the household income distribution, the trend is clearly downward, with an especially strong relative decrease at lower quantiles. If the return to income is decreasing, but shifting demographics place more individuals at the lower end of the income distribution, the net effect on postsecondary education outcomes depends on the relative magnitude of the changes. While the model may predict correctly over time, the change in the model inputs could lead to an output contrary to what the findings from Part I suggest on first blush.

However, another concern is the possibility that changing variance over time could be mechanically attenuating the coefficient on income. To address the concern of changing variance over time, we re-estimate our first model (whose results are shown in Table 1), replacing log-income with the Z-scores of log-income in 2010 dollars. The results follow in Table 4.

Table 4

Probability of Enrollment Outcome By Year: Log Income Z-Score Interacted With Dummy Year

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Household Income													
Not Enrolled	$22,026.00	0.768	0.778	0.747	0.722	0.729	0.714	0.701	0.676	0.662	0.667	0.601	0.589	0.595
	$59,874	0.559	0.552	0.537	0.523	0.516	0.503	0.491	0.478	0.467	0.458	0.438	0.428	0.419
	$162,755	0.324	0.299	0.309	0.313	0.287	0.286	0.282	0.283	0.275	0.260	0.284	0.275	0.261
	Household Income													
Enrolled Part-Time	$22,026.00	0.036	0.038	0.040	0.044	0.054	0.051	0.043	0.052	0.061	0.052	0.061	0.067	0.052
	$59,874	0.051	0.052	0.053	0.054	0.057	0.057	0.056	0.058	0.060	0.059	0.060	0.062	0.060
	$162,755	0.058	0.056	0.057	0.056	0.047	0.051	0.059	0.054	0.049	0.055	0.054	0.051	0.061
	Household Income													
Enrolled Full-Time	$22,026.00	0.196	0.185	0.212	0.234	0.217	0.235	0.255	0.272	0.277	0.281	0.338	0.344	0.354
	$59,874	0.390	0.395	0.410	0.423	0.427	0.440	0.453	0.464	0.474	0.483	0.502	0.511	0.521
	$162,755	0.618	0.645	0.634	0.631	0.665	0.663	0.659	0.663	0.676	0.685	0.662	0.674	0.678

Probabilities shown are for a white, male student.
The estimates above include a linear trend in year, and an interaction between year dummies and z-scored log income.

The similarity between the results in Table 4 and Table 1 suggest that our findings from Part I are not attributable to a change in the variance in household income over time.[10]

Also, while including covariates for race better allows us to identify the association between income and college attendance separate from the potential effects of race, such a model masks the importance of demographic shifts in the U.S. If demographic groups grow who tend to have below-average household incomes and on average enroll in college at lower rates than other groups, trending attenuation in the coefficient on income could be offset by such changing demographics, which are not merely a hypothetical possibility (Shrestha, 2011).

Conclusion

Overall, our main finding is that the relationship between household income and the decision whether to enroll in college did not appear to change during the Great Recession. Concerns that tightened credit markets and changing institutional behavior could systematically displace low-

[10] The authors continue to disagree among themselves whether this truly holds and looks forward to feedback from readers. The authors also agree that modeling the changing variance directly seems like a promising improvement over the current approach.

income students from postsecondary education seem unfounded for traditional age students. Similarly, we observed to major shift toward or away from part-time enrollment for the same group of students, suggesting that the growth in part-time enrollment must be concentrated among older students.

Second, the findings from Part I and Part II suggest that concerns about socioeconomic stratification in whether to attend college –due to a change in the relationship between household income and attendance—seems unlikely, though additional investigation into the changing variance of household income is necessary, and more attention should be paid to students coming from the lowest-income families. Nevertheless, it's important to keep in mind that widespread demographic changes could affect the college enrollment trends of the U.S. population despite a possible decline in the predictive power of income. Understanding the difference between a change in the betas and a change in the x's is crucial for understanding social stratification of postsecondary education in the U.S. While institutions may play a key role in promoting enrollment growth among traditionally undeserved groups, broader social supports seem necessary to ensuring future growth in postsecondary attainment.

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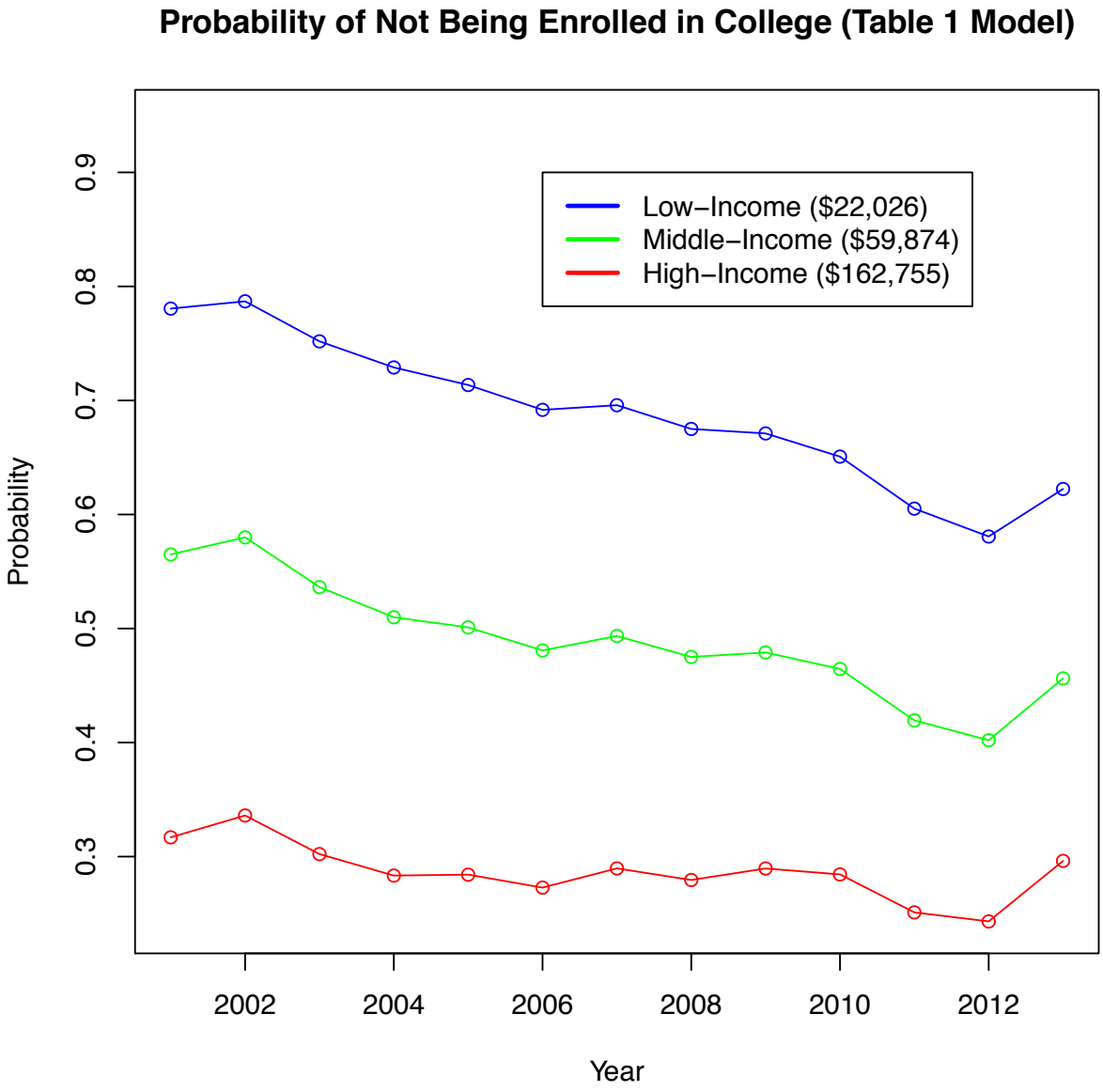
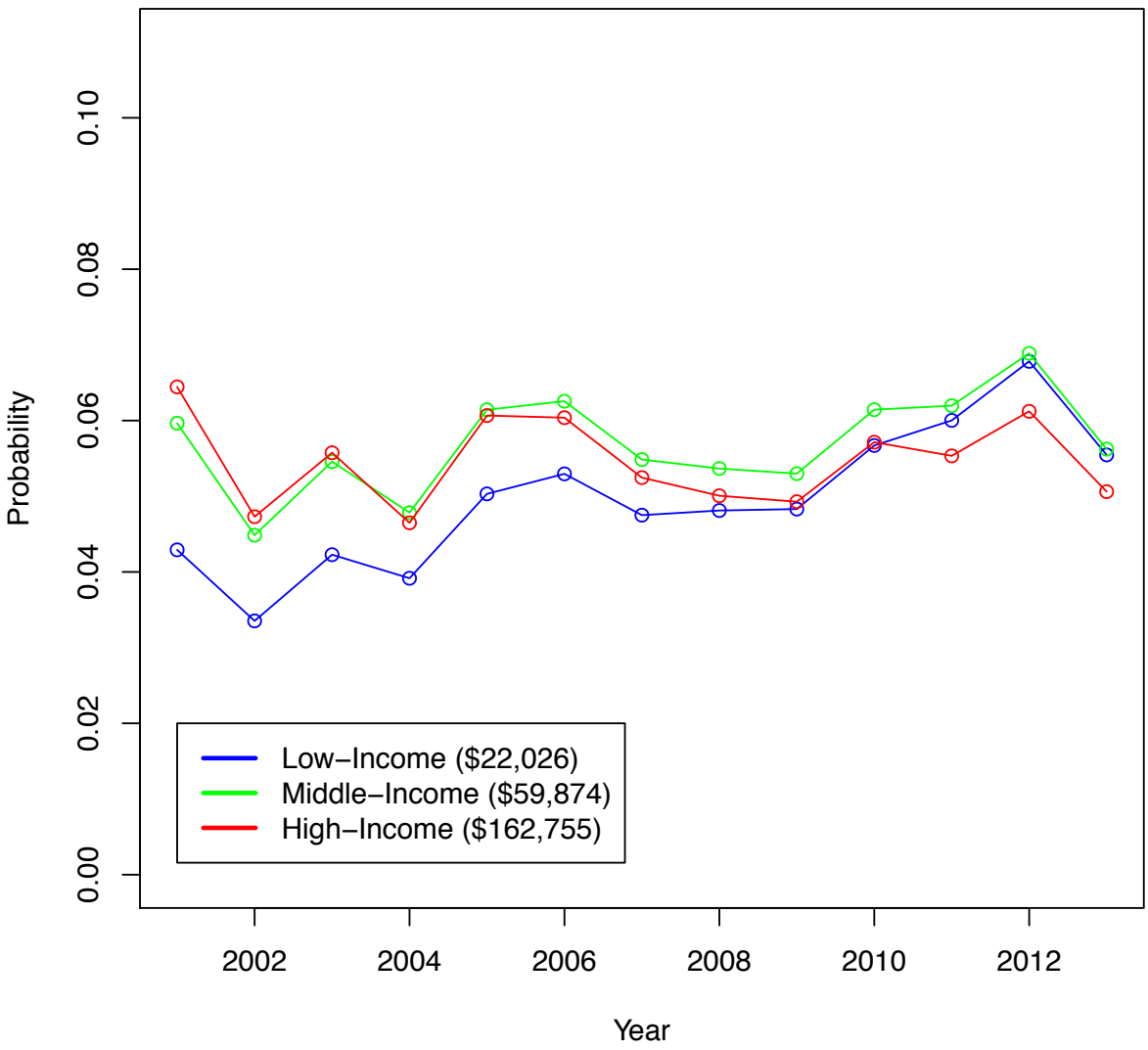
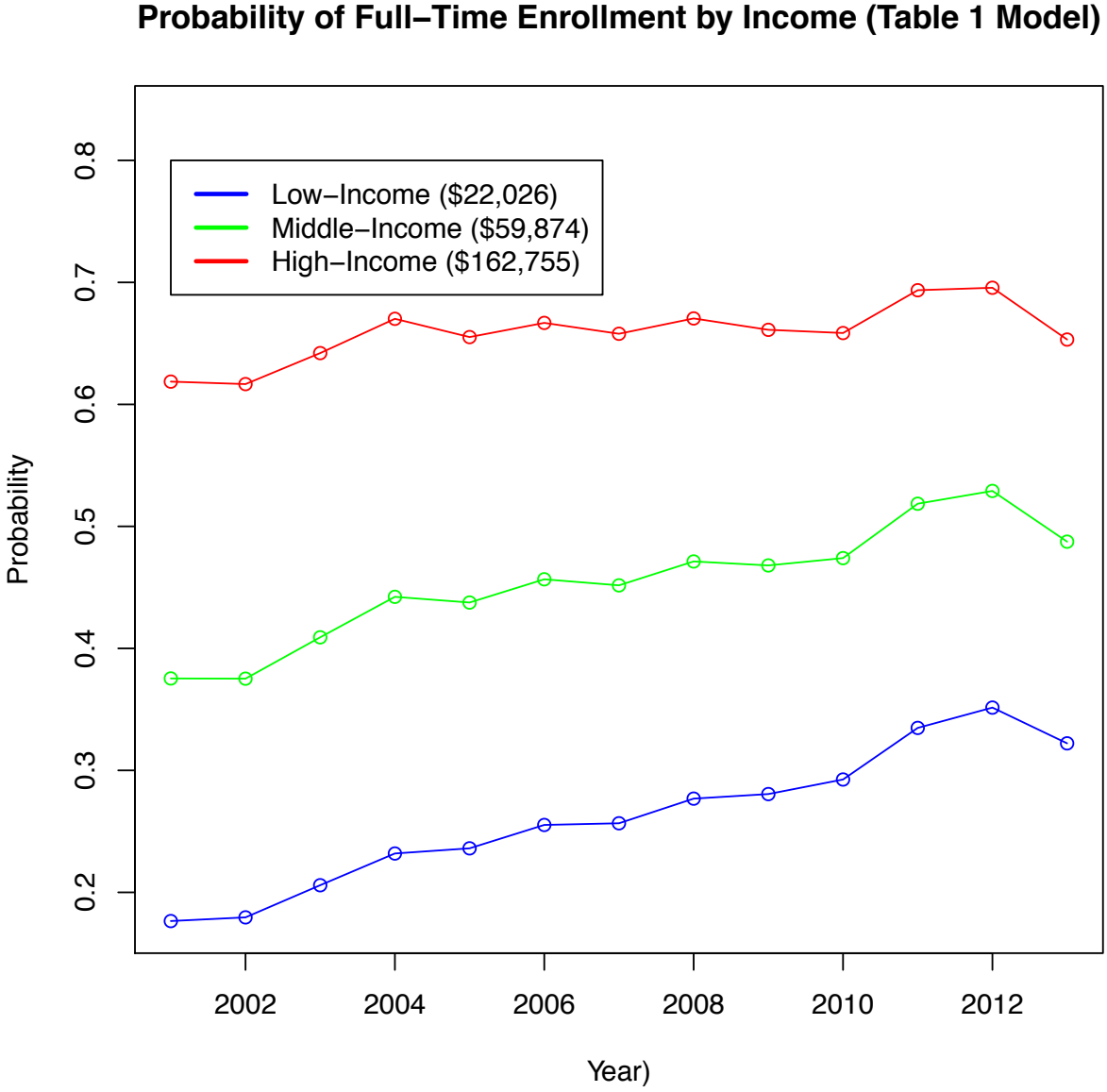
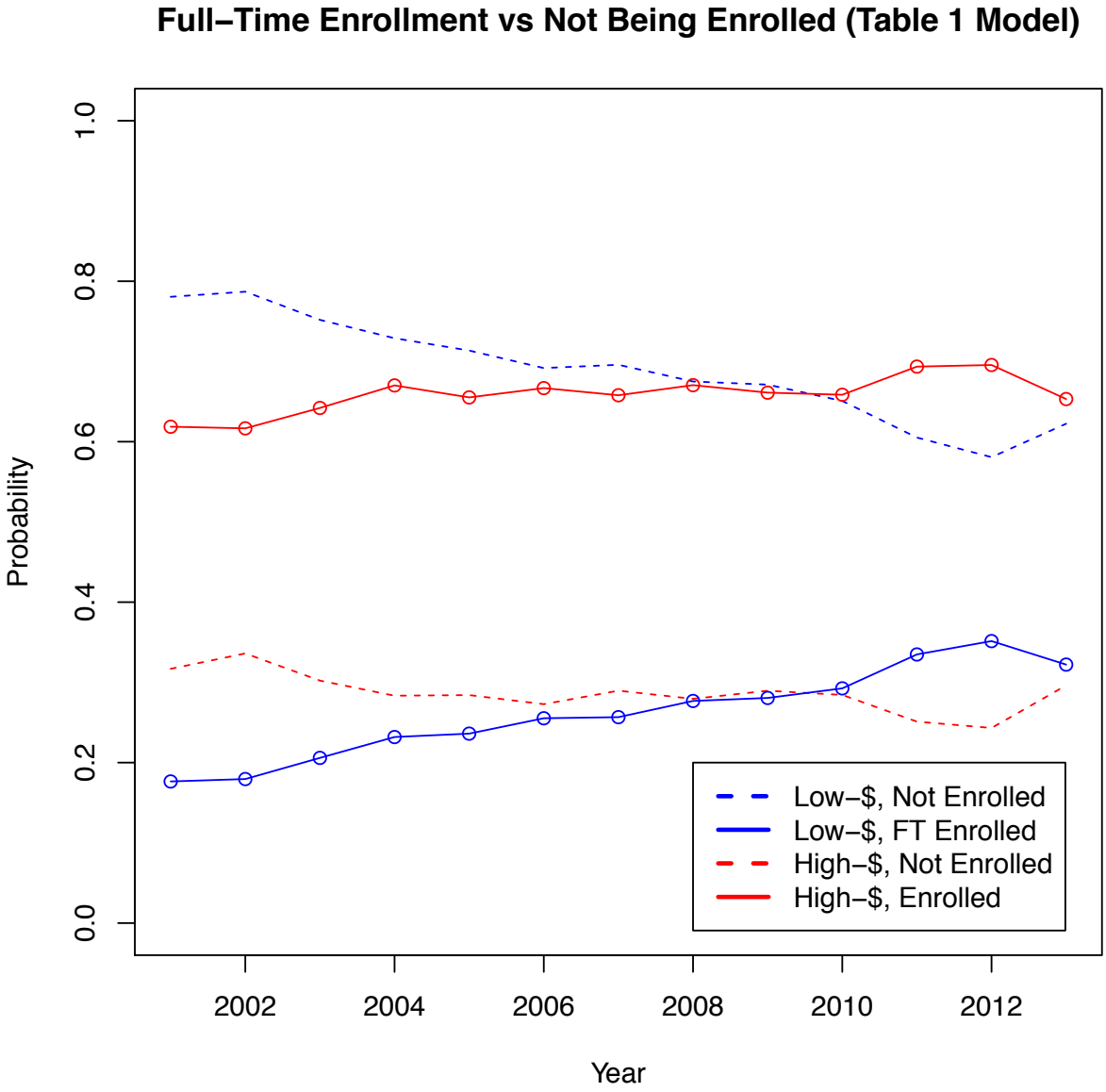
Figures


Probability of Not Being Enrolled in College (Table 1 Model)
Low−Income ($22,026)
Middle−Income ($59,874)
High−Income ($162,755)
Probability
0.3
0.4
0.5
0.6
0.7
0.8
0.9
2002
2004
2006
2008
2010
2012
Year


Probability of Part–Time Enrollment by Income (Table 1 Model)
Probability
0.00
0.02
0.04
0.06
0.08
0.10
2002
2004
2006
2008
2010
2012
Year
Low–Income ($22,026)
Middle–Income ($59,874)
High–Income ($162,755)


Probability of Full−Time Enrollment by Income (Table 1 Model)
Low−Income ($22,026)
Middle−Income ($59,874)
High−Income ($162,755)
Probability
0.2
0.3
0.4
0.5
0.6
0.7
0.8
2002
2004
2006
2008
2010
2012
Year)


Full–Time Enrollment vs Not Being Enrolled (Table 1 Model)
Probability
1.0
0.8
0.6
0.4
0.2
0.0
2002
2004
2006
2008
2010
2012
Year
Low–$, Not Enrolled
Low–$, FT Enrolled
High–$, Not Enrolled
High–$, Enrolled

Appendix

Appendix Table 1

Comparing Log-Odds of Part-Time and Full-Time Enrollment to Non-Enrollment

	All Income	Income > $0	Income > $8,103
Enrolled Part-Time			
year	0.268***	0.349***	0.321**
	(.073)	(.091)	(.106)
log_inc	0.399***	0.579***	0.643***
	(.062)	(.066)	(.072)
log_inc x year	-0.021**	-0.028**	-0.0256**
	(0.007)	(0.008)	(0.009)
_cons	-6.726***	-8.741***	-9.461***
	(.699)	(.743)	(.814)
Race/Sex Dummies‘	Yes	Yes	Yes
Enrolled Full-Time			
year	0.406***	0.354***	0.360***
	(.075)	(.059)	(.058)
log_inc	.759***	.956***	1.078***
	(.055)	(.040)	(.038)
log_inc x year	-0.033***	-0.028***	-0.028***
	(.007)	(.005)	(.005)
_cons	-8.607***	-10.845***	-12.229***
	(.622)	(.455)	(.430)
McFadden R2	0.068	0.078	0.079
N	39358	38826	37803

Robust standard errors in parentheses.
Household Income in 2010 Dollars
Year is recentered such that the year 2001 is zero.
Coefficients on gender and race dummy variables are omitted.
**p <0.05, **p<.01, ***p<.001*

Appendix Table 2

Comparing Log-Odds of Part-Time and Full-Time Enrollment to Non-Enrollment

	Year Dummies	Linear Year	Log Income	Log Inc x Year	Log Inc x (Linear) Year
Enrolled Part-Time					
_cons	-2.125* (0.010)	-2.263*** (0.061)	-7.693*** (0.410)	-9.456*** (0.814)	-9.461*** (0.814)
year		0.030*** (0.007)	0.039*** (0.008)	0.314** (0.105)	0.321** (0.106)
2002	-0.327 (0.141)				
2003	-0.069 (0.136)				
2004	-0.15 (0.143)				
2005	0.127 (0.136)				
2006	0.148 (0.133)				
2007	-0.013 (0.139)				
2008	0.011 (0.139)				
2009	-0.012 (0.138)				
2010	0.135 (0.133)				
2011	0.232 (0.137)				
2012	0.376* (0.135)				
2013	0.06 (0.138)				
log_inc			0.483*** (.036)	0.655*** (.072)	0.643*** (.072)
log_inc x year					-0.026** (.009)
log_inc x 2002				-0.057*** (.016)	
log_inc x 2003				-0.061** (.022)	
log_inc x 2004				-0.097** (.031)	
log_inc x 2005				-0.101** (.039)	
log_inc x 2006				-0.124** (.048)	
log_inc x 2007				-0.167** (.057)	
log_inc x 2008				-0.194** (.066)	
log_inc x 2009				-0.224** (.076)	
log_inc x 2010				-0.237** (.085)	
log_inc x 2011				-0.255** (.094)	
log_inc x 2012				-0.270** (.104)	
log_inc x 2013				-0.329** (.114)	

Appendix Table 2 (continuted)

Comparing Log-Odds of Part-Time and Full-Time Enrollment to Non-Enrollment

	Year Dummies	Linear Year	Log Income	Log Inc x Year	Log Inc x (Linear) Year
Enrolled Full-Time					
_cons	-0.092 (0.010)	-0.053 (.027)	-10.260*** (0.224)	-12.273*** (0.431)	-12.229*** (0.430)
year		0.032*** (.003)	0.047*** (0.004)	0.364*** (0.058)	0.360*** (0.058)
2002	-0.034 (0.063)				
2003	0.101 (0.064)				
2004	0.231*** (0.065)				
2005	0.222** (0.066)				
2006	0.253*** (0.065)				
2007	0.237*** (0.065)				
2008	0.308*** (0.065)				
2009	0.271*** (0.064)				
2010	0.267*** (0.065)				
2011	0.42*** (0.067)				
2012	0.475*** (0.067)				
2013	0.304*** (0.066)				
log_inc			0.901*** (.020)	1.079*** (.058)	1.078*** (.038)
log_inc x year					-0.028*** (.005)
log_inc x 2002				-0.035*** (.008)	
log_inc x 2003				-0.054*** (.012)	
log_inc x 2004				-0.075*** (.017)	
log_inc x 2005				-0.107*** (.021)	
log_inc x 2006				-0.133*** (.026)	
log_inc x 2007				-0.169*** (.032)	
log_inc x 2008				-0.195*** (.037)	
log_inc x 2009				-0.230*** (.042)	
log_inc x 2010				-0.258*** (.047)	
log_inc x 2011				-0.274*** (.052)	
log_inc x 2012				-0.301*** (.058)	
log_inc x 2013				-0.353*** (.063)	
Log-Likelihood	-31350	-30570	-29631	532	
Degrees of Freedom	26	0.078	37803	532	

Robust standard errors in parentheses.
Households with Income < $8,103 excluded
Household Income in 2010 Dollars
Year is recentered such that the year 2001 is zero.
Coefficients on gender and race dummy variables are omitted.
**p <0.05, **p<.01, ***p<.001*

Appendix Table 3

Comparing Log-Odds of Part-Time and Full-Time Enrollment to Non-Enrollment

	Log Inc x Year Dummies	Z-Score Log Inc	Z-Score Log Inc x (Linear) Year
Enrolled Part-Time			
_cons	-9.456*** (0.814)	-2.270*** (0.052)	-2.266*** (0.052)
year	0.314** (0.105)	0.034** (0.105)	0.034*** (0.006)
log_inc	0.655*** (.072)	.520*** (.093)	.493*** (.048)
log_inc x year			-0.020** (.007)
log_inc x 2002	-0.057*** (.016)	-0.001 (0.13)	
log_inc x 2003	-0.061** (.022)	-0.044 (0.131)	
log_inc x 2004	-0.097** (.031)	-0.105 (0.13)	
log_inc x 2005	-0.101** (.039)	-0.214 (0.131)	
log_inc x 2006	-0.124** (.048)	-0.165 (0.128)	
log_inc x 2007	-0.167** (.057)	-0.05 (0.127)	
log_inc x 2008	-0.194** (.066)	-0.162 (0.128)	
log_inc x 2009	-0.224** (.076)	-0.263* (0.125)	
log_inc x 2010	-0.237** (.085)	-0.138 (0.126)	
log_inc x 2011	-0.255** (.094)	-0.280* (0.126)	
log_inc x 2012	-0.270** (.104)	-0.333** (0.123)	
log_inc x 2013	-0.330** (.114)	-0.135 (0.126)	
Enrolled Full-Time			
_cons	-12.273*** (0.431)	-0.177*** (0.025)	-0.179*** (0.025)
year	0.364*** (0.058)	0.044** (0.003)	0.045*** (0.003)
log_inc	1.079*** (.058)	0.772*** (.047)	0.826*** (.025)
log_inc x year			-0.022*** (.003)
log_inc x 2002	-0.035*** (.008)	0.076 (0.067)	
log_inc x 2003	-0.054*** (.012)	-0.012 (0.066)	
log_inc x 2004	-0.075*** (.017)	-0.071 (0.065)	
log_inc x 2005	-0.107*** (.021)	0.016 (0.067)	
log_inc x 2006	-0.133*** (.026)	-0.024 (0.065)	
log_inc x 2007	-0.169*** (.032)	-0.06 (0.065)	
log_inc x 2008	-0.195*** (.037)	-0.097 (0.065)	
log_inc x 2009	-0.230*** (.042)	-0.093 (0.064)	
log_inc x 2010	-0.258*** (.047)	-0.067 (0.064)	
log_inc x 2011	-0.274*** (.052)	-0.227*** (0.064)	
log_inc x 2012	-0.301*** (.058)	-0.222*** (0.064)	
log_inc x 2013	-0.353*** (.063)	-0.205** (0.064)	
N	37803	37803	

Robust standard errors in parentheses, except for Z-score model, where ordinary standard errors are reported.
Household Income in 2010 Dollars
Z scores are calculated across--i.e. not within--years, which would defeat the purpose.
Year is recentered such that the year 2001 is zero.
All models above include gender and race dummy variables.
**p <0.05, **p<.01, ***p<.001*

Appendix Table 4

Comparing Log-Odds of Part-Time and Full-Time Enrollment to Non-Enrollment

	Linear Year Interaction	No Dummies	]No weights	No Dummies or Weights	Household Clustering (30,764)
Enrolled Part-Time					
_cons	-9.461*** (0.814)	-8.925*** (0.798)	-10.001*** (0.721)	-9.512*** (0.712)	-9.461*** (0.821)
year	0.321** (0.106)	0.303** (0.105)	0.385*** (0.097)	0.376*** (0.063)	0.321** (0.107)
log_inc	0.643*** (.072)	0.618*** (.071)	0.684*** (.064)	0.662*** (.063)	0.643*** (.073)
log_inc x year	-0.026** (.009)	-0.025** (.009)	-0.031*** (.009)	-0.031*** (.009)	-0.026** (.010)
Race/Sex Dummies?	Yes	No	Yes	No	Yes
Inv. Samp. Weights	Yes	Yes	No	No	Yes
Standard Errors	Sandwich	Sandwich	Ordinary	Ordinary	Robust, Household-Level
Enrolled Full-Time					
_cons	-12.229*** (0.430)	-11.449*** (0.415)	-11.855*** (0.358)	-11.135*** (0.347)	-12.229*** (0.437)
year	0.360*** (0.058)	0.336*** (0.057)	0.302*** (0.049)	0.287*** (0.048)	0.360*** (0.059)
log_inc	1.078*** (.038)	1.041*** (.037)	1.040*** (.032)	1.008*** (.031)	1.078*** (.039)
log_inc x year	-0.028*** (.005)	-0.026*** (.005)	-0.023*** (.004)	-0.022*** (.004)	-0.028*** (.005)
Race/Sex Dummies?	Yes	No	Yes	No	Yes
Inv. Samp. Weights	Yes	Yes	No	No	Yes
Standard Errors	Sandwich	Sandwich	Ordinary	Ordinary	Robust, Household-Level
N	37803	37803	37803	37803	37803

Households with Income < $8,103 excluded
Household Income in 2010 Dollars
Year is recentered such that the year 2001 is zero.
Coefficients on gender and race dummy variables are omitted.
**p <0.05, **p<.01, ***p<.001*