Online Appendix

Debt Moratoria: Evidence from Student Loan Forbearance

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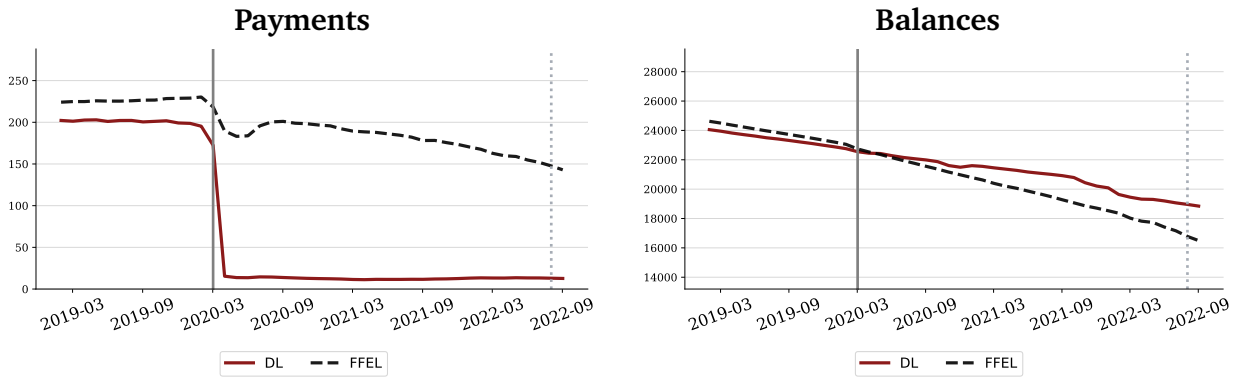
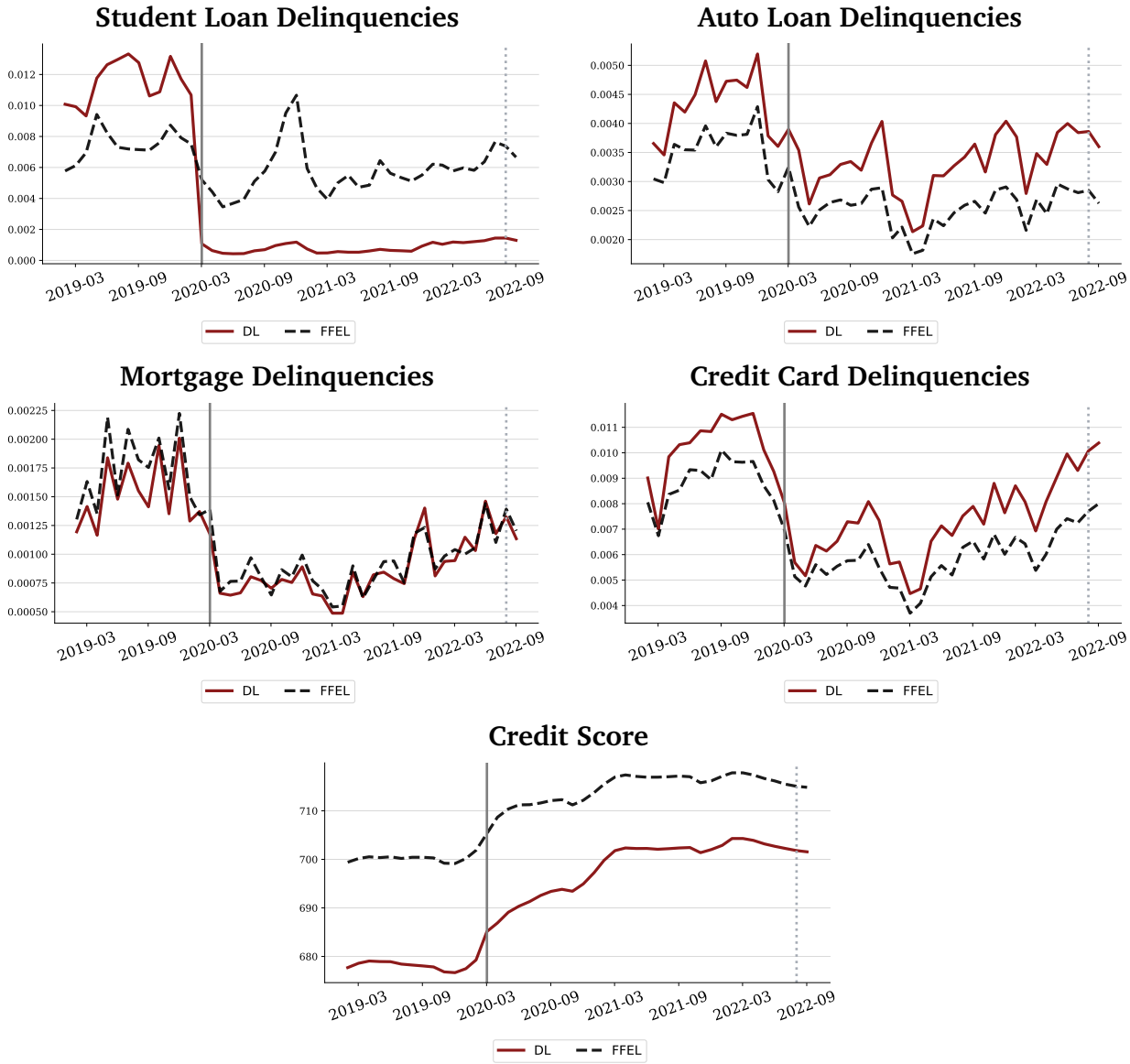
A Additional Tables and Figures

Figure A.1: Student Loan Balances and Payment



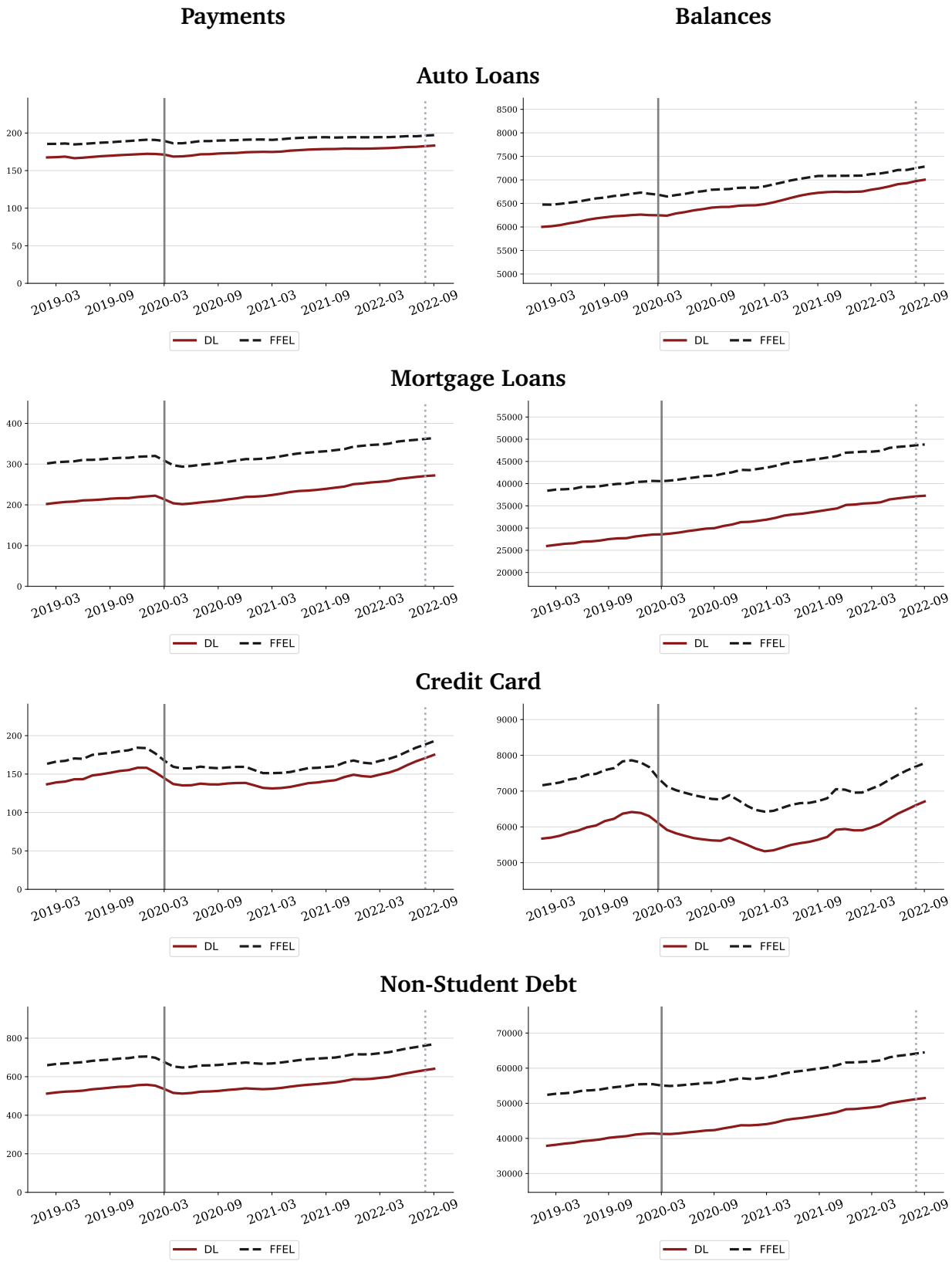
Notes: This figure shows mean student loan payments and balances for student loans, broken down by DL and FFEL borrowers. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Source: TransUnion.

Figure A.2: Loan New Delinquencies



Notes: This figure shows mean delinquencies and credit scores, broken down by DL and FFEL borrowers. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Source: TransUnion.

Figure A.3: Student Loan Balances and Payments



Notes: This figure shows mean payments and balances for non-student loans, broken down by DL and FFEL borrowers. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Source: TransUnion.

Table A.1: Full Sample Summary Statistics

	All Active Borrowers		In Sample Borrowers	
	Mean	St. Dev.	Mean	St. Dev.
Panel A: Student Loans				
Current Balance Amount	35234.78	56765.44	21332.29	30707.40
Payments	136.16	283.77	139.05	189.39
Delinquency	0.00	0.06	0.01	0.07
Credit Score	706.50	82.05	702.19	91.82
Panel B: Mortgages				
Current Balance Amount	97106.48	178637.20	37989.60	98938.03
Payments	727.14	3014.29	281.10	706.27
Delinquency	0.00	0.04	0.00	0.03
Panel C: Auto Loans				
Current Balance Amount	11113.82	17005.34	6692.26	12073.25
Payments	301.96	2204.90	183.82	292.46
Delinquency	0.00	0.06	0.00	0.06
Panel D: Credit Cards				
Current Balance Amount	6595.15	11053.96	6571.84	10019.11
Payments	166.48	263.82	157.18	231.29
Delinquency	0.01	0.08	0.01	0.09
Panel E: Non-Student Debt				
Current Balance Amount	114815.45	184765.08	51650.16	104167.74
Payments	1195.59	3789.48	631.08	901.52
Delinquency	0.01	0.10	0.01	0.10
Observations	128,394,512		28,789,948	
Subjects	2,953,551		654,317	

Notes: This table shows summary statistics for the main analysis variables. All active borrowers refers to all student loan borrowers that are making payments as of December, 2019. In sample borrowers refers to the main sample of borrowers used in our analysis as described in Section 3. The data are averaged on all observations from March, 2019 to October, 2022. Source: TransUnion.

Table A.2: Direct Loan vs FFEL Loan Summary Statistics

	Direct Loans		FFEL	
	Mean	St. Dev.	Mean	St. Dev.
Panel A: Student Loans				
Current Balance Amount	23462.71	31285.62	23996.86	30690.16
Payments	206.84	183.79	226.29	186.11
Delinquency	0.01	0.03	0.01	0.03
Credit Score	678.06	94.10	700.07	90.29
Open Year	2007	3.57	2005	2.90
Panel B: Mortgages				
Current Balance Amount	27547.93	76776.47	39430.98	97164.26
Payments	215.95	576.44	311.09	728.99
Delinquency	0.00	0.02	0.00	0.02
Panel C: Auto Loans				
Current Balance Amount	6166.54	10331.30	6589.07	11243.08
Payments	170.02	254.21	187.30	285.01
Delinquency	0.00	0.03	0.00	0.02
Panel D: Credit Cards				
Current Balance Amount	6075.87	9057.24	7496.17	10440.39
Payments	148.93	211.84	174.55	238.43
Delinquency	0.01	0.03	0.01	0.03
Panel E: Non-Student Debt				
Current Balance Amount	40031.24	81612.10	53923.32	102623.31
Payments	540.73	756.71	683.16	929.82
Delinquency	0.02	0.05	0.01	0.04
Observations	3,595,644		4,256,160	
Subjects	299,637		354,680	

Notes: This table shows summary statistics for the Direct Loan and FFEL groups. The data are averaged on observations prior to the policy (March, 2019 to March, 2020). Open years are rounded to the nearest whole year. Source: TransUnion.

Table A.3: Mortgage Forbearance by Direct Loan vs FFEL Borrowers

	(1)	(2)	(3)
DL	-0.000364	-0.000477	-0.000063
	(0.000440)	(0.000447)	(0.000405)
Constant	0.013477	0.013528	0.013339
	(0.000191)	(0.000198)	(0.000187)
State FE		✓	✓
Payment Group FE			✓
Observations	654317	654317	654317

Notes: This table shows the coefficients β from the OLS estimates of $y_i = \alpha + \beta Eligible_i + \epsilon_i$. An observation is a borrower in March, 2020. The outcome is whether the borrower had a large drop in mortgage required payments in March, 2020 when the CARES Act was passed. The regressions in the second and third columns successively add state and payment group fixed effects. Standard errors are in parentheses, and are clustered at the repayment cohort level. Source: TransUnion.

Table A.4: Main Results with Age-Month Fixed Effects

	Student Loans	Mortgage	Auto Loans	Credit Cards	Non Student Loans
	(1)	(2)	(3)	(4)	(5)
Balance	973.476	994.010	188.265	220.460	1407.974
	(154.702)	(234.498)	(37.301)	(36.542)	(264.639)
Payments	-137.703	7.497	4.351	6.003	17.786
	(4.551)	(1.576)	(0.804)	(0.851)	(2.890)
Delinquencies	-0.007	0.000	0.000	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Individual FE	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓
Age × Time FE	✓	✓	✓	✓	✓
Observations	66,963,148	66,963,148	66,963,148	66,963,148	66,963,148

Notes: This table shows the coefficients β_t from the OLS estimates of equation (1), $y_{it} = \beta Eligible_i Post_t + \mu_i + \tau_{at} + \epsilon_{it}$. Each row refers to a different regression. The outcome type is labelled above each column. τ_{at} are fixed effects for each age-month where age is measured in years. The sample includes borrowers who took out loans 2018 or earlier. Standard errors are in parentheses, and are clustered at the repayment cohort level. Source: TransUnion.

Table A.5: Delinquency Status Summary Statistics

	Ever Delinquent		Never Delinquent	
	Mean	St. Dev.	Mean	St. Dev.
Panel A: Student Loans				
Current Balance Amount	26514.39	34048.98	20327.49	28984.16
Payments	127.88	146.14	141.22	149.53
Delinquency	0.03	0.02	0.00	0.00
Credit Score	591.49	66.08	723.65	70.24
Panel B: Mortgages				
Current Balance Amount	19509.26	60374.71	41572.90	93035.50
Payments	147.26	438.20	307.06	663.28
Delinquency	0.00	0.01	0.00	0.01
Panel C: Auto Loans				
Current Balance Amount	5941.78	9134.79	6837.78	10306.07
Payments	157.01	229.15	189.02	261.09
Delinquency	0.01	0.03	0.00	0.01
Panel D: Credit Cards				
Current Balance Amount	4141.66	6824.66	7043.05	9332.94
Payments	100.98	150.71	168.07	211.85
Delinquency	0.02	0.03	0.01	0.02
Panel E: Non-Student Debt				
Current Balance Amount	29775.12	64526.76	55891.69	98305.82
Payments	409.26	593.98	674.09	850.78
Delinquency	0.03	0.04	0.01	0.02
Observations	4,675,704		24,114,244	
Subjects	106,266		548,051	

Notes: This table shows summary statistics for the delinquency groups. The data is averaged over all observations (March, 2019 to October, 2022). Source: TransUnion.

Table A.6: Results on Loan Forgiveness Announcement

	(1)	(2)	(3)
Panel A: Mortgages			
Balance	67.296	82.167	49.815
	(115.353)	(118.103)	(123.685)
Payments	0.387	0.413	0.316
	(0.923)	(0.962)	(0.994)
Delinquency	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Panel B: Auto Loans			
Balance	27.525	24.073	32.955
	(12.144)	(12.369)	(13.363)
Payments	0.143	0.118	0.288
	(0.281)	(0.296)	(0.299)
Delinquency	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Panel C: Credit Cards			
Balance	-33.825	-36.026	-24.542
	(15.309)	(14.184)	(16.342)
Payments	-0.802	-0.883	-0.614
	(0.417)	(0.380)	(0.432)
Delinquency	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Panel D: Non-Student Debt			
Balance	45.658	53.999	43.774
	(126.051)	(130.493)	(135.634)
Payments	-0.964	-1.064	-0.633
	(1.087)	(1.119)	(1.185)
Delinquency	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Individual FE	✓	✓	✓
Time FE	✓	✓	✓
State × Time FE		✓	✓
Payment Group × Time FE			✓
Observations	28,789,948	28,789,948	28,789,948

Notes: This table shows the coefficients β_1 from the OLS estimates of equation (3),$y_{it} = \beta Eligible_i Post_t + \gamma Eligible_i MonthsPost_t + \pi Eligible_i PostForgiveness_t + \mu_i + \tau_t + \epsilon_{it}$, where $Post_t$ is an indicator for being after the payment pause, $MonthsPost_t$ is the number of months since the start of the payment pause, and $PostForgiveness_t$ is an indicator for being after the student loan forgiveness announcement. The outcome, y_{it}, is labelled above each panel, and the inclusion of fixed effects is noted at the bottom of the table. Standard errors are in parentheses, and are clustered at the repayment cohort level. Source: TransUnion.

B Sample Construction

B.I Main Sample

The main data set is constructed from the Booth TransUnion Consumer Credit Panel, which is a 10% panel sample of the full US population with credit reports. We begin by considering all individuals with open student loans in 2018. There are approximately 5.2 million such individuals. We first remove individuals whose information has not been updated beyond 2018, duplicate accounts, and borrowers with loans originating outside the continental United States. Of the remaining borrowers we filter out subjects with missing birthdays and borrowers possessing student loans that have co-signers attached as both conditions indicate possible parent borrowers, or private student loans which typically require a co-signer.

Because FFEL was discontinued in 2010 and we wish to compare relatively similar cohorts, we do not include borrowers with student loans originating after 2010. We additionally restrict to accounts that have made at least 3 positive payments between June, 2018 and March, 2020. Lastly, we remove borrowers that have more than one month of $0 payments concurrent with a positive loan balance. This eliminates any borrowers who may have been in forbearance prior to the policy announcement. This results in a set of 654,317 borrowers.

To classify DL and FFEL we consider changes in scheduled student loan payments before and after the forbearance policy for loans aggregated at the borrower-month level. We define the pre-period to be June, 2018 to March, 2020 and the post-period to be March, 2020 to January, 2022. Individuals with a sum total of $0 scheduled student loan payments in the post-period are classified as direct loan borrowers. Additionally, individuals who experienced greater than a 50% decrease in average monthly pre-period payments to average monthly post-period payments are classified as direct loan borrowers. Those with less than a 50% decline in pre-period to post-period payments are classified as FFEL borrowers.

For each individual in the sample of DL and FFEL borrowers we aggregate the balances, payments, and delinquencies of their mortgages, credit cards, and auto loans at the month level. We assume a balance, payment, and delinquency of zero for those with no reported debt in a given credit line. Finally, we calculate total debt as the sum of mortgage, credit card, and auto loan balances, payments, and delinquencies. We winsorize all balance and payment

outcomes at the 1% level.

B.II Alternative Sample Construction

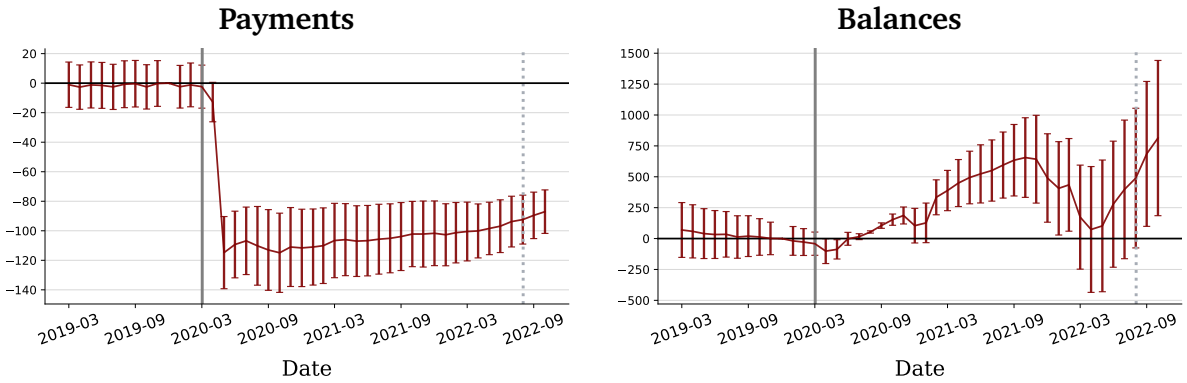
A potential concern with our construction is that it may induce measurement error, if payments drop to zero due to discretionary forbearance or other mechanisms to defer payments. To confirm our results and classification method we use an alternative method for identifying DL and FFEL borrowers using lender IDs. The Booth TransUnion Consumer Credit Panel masks the specific identifies of lenders but does provide a unique ID for each lender. Additionally, the Booth TransUnion Consumer Credit Panel provides industry codes for each lender. We can determine whether loans originated prior to 2010 were under the DL program, as these all used one particular large servicer. This information enables us to estimate lenders as either FFEL, DL, or private loan lenders.

To identify FFEL lenders we begin by considering lenders with industry codes in banking, personal finance, education, and government. Because FFEL loans are distributed by private banks but backed by the federal government it is plausible for credit bureaus to report FFEL lenders as either private or government entities. Among this subset of lenders we consider only lenders who stopped lending after 2010 since this was the year the FFEL program was discontinued and no FFEL loans should exist post 2010. All lenders with the previously mentioned industry codes and no record of lending post 2010 are considered FFEL lenders. Loans from lenders who have industry codes in banking and personal finance but are not classified as FFEL loans are considered private loans as long as more than 70% of the lender's student loans have a co-signer attached. Any lender that is not classified as a FFEL or private loan lender is considered a DL lender.

Comparing this classification method to our main classification method we find that approximately 72% of loans are identified as the same type with both methods. Of the loans whose main classification does not match the alternative classification, 90% are classified as FFEL in the main classification and DL in the alternative classification. This is likely because our alternative classification method assumes that all FFEL lenders stopped lending in any form after 2010. In reality some lenders may have shifted over to private loans or, in the case of government lenders, direct loans. Thus the alternative method runs the risk of over classifying

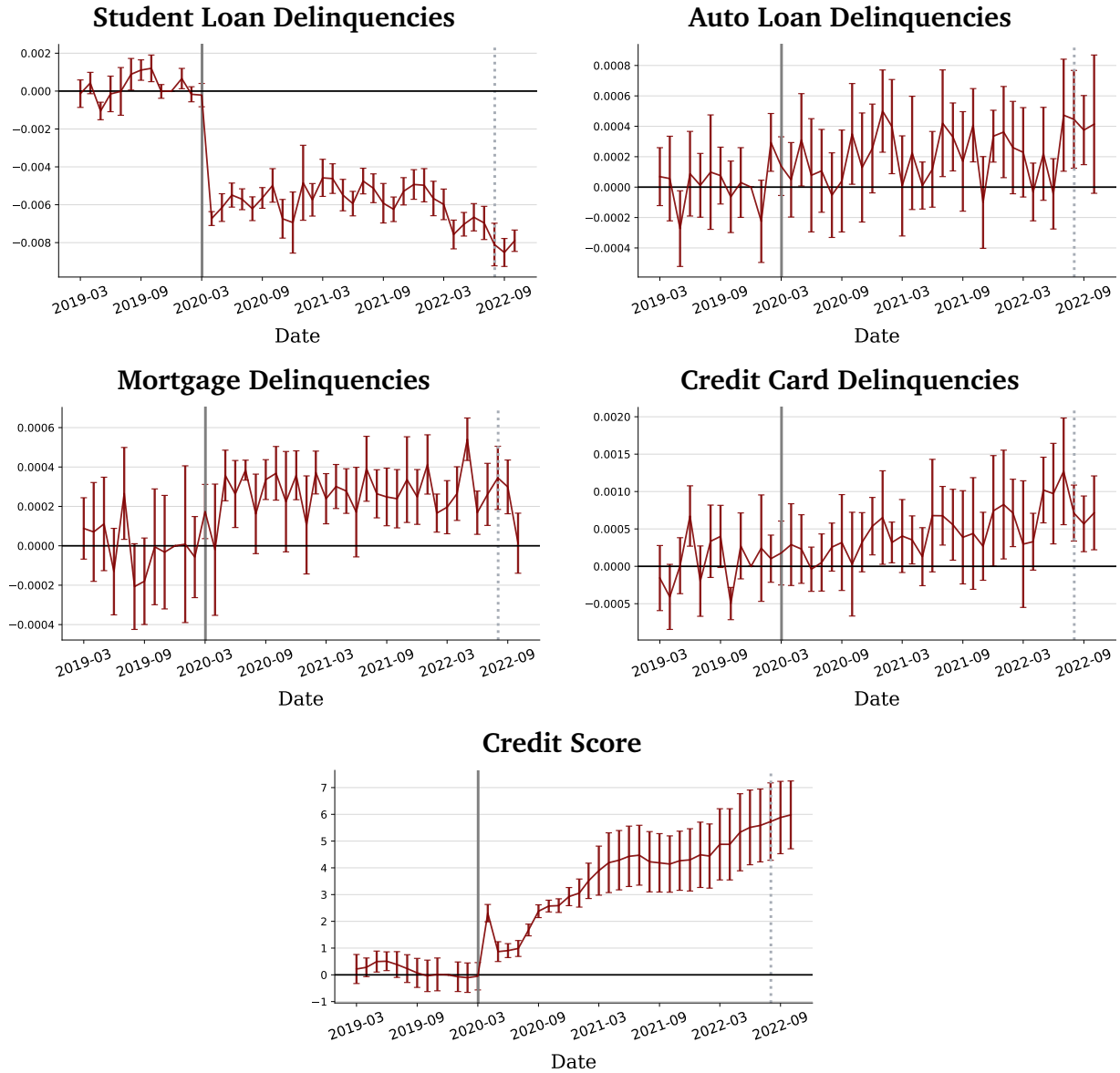
direct loans and under classifying FFEL loans. That said, the results using the alternative classification method are found in Figures B.1 through B.3, and all align closely with the results using the main classification method and thus strengthen the robustness of our results.

Figure B.1: Student Loan Balances and Payments: Alternative Classification



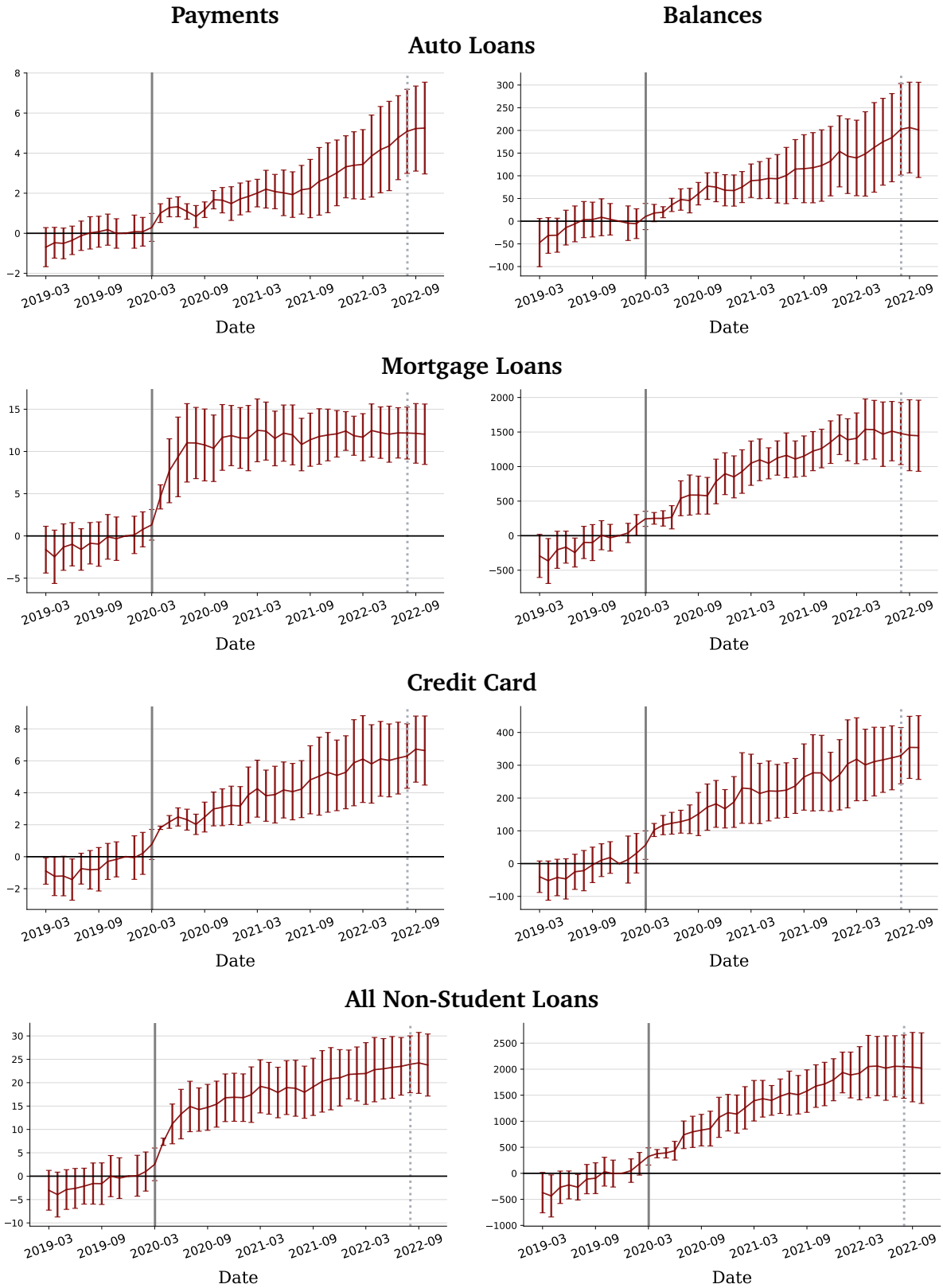
Notes: This figure shows the coefficients β_t from the OLS estimates of equation (2), $y_{it} = \sum_t \beta_t Eligible_i + \mu_i + \tau_t + \epsilon_{it}$, where y_{it} is student loan balances or payments, along with a 95% confidence interval. We include fixed effects for individual and initial loan payment decile interacted with month. The outcome is labelled above each panel. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Standard errors are clustered at the repayment cohort level. Source: TransUnion.

Figure B.2: Loan Delinquency: Alternative Classification



Notes: This figure shows the coefficients β_t from the OLS estimates of equation (2), $y_{it} = \sum_t \beta_t Eligible_i + \mu_i + \tau_t + \epsilon_{it}$, where y_{it} is loan delinquency or credit scores, with a 95% confidence interval. We include fixed effects for individual and initial loan payment decile interacted with month. The outcome is labelled above each panel. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Standard errors are clustered at the repayment cohort level. Source: TransUnion.

Figure B.3: Student Loan Balances and Payments: Alternative Classification



Notes: This figure shows the coefficients β_t from the OLS estimates of equation (2), $y_{it} = \sum_t \beta_t Eligible_i + \mu_i + \tau_t + \epsilon_{it}$, where y_{it} is loan balances or payments, along with a 95% confidence interval. We include fixed effects for individual and initial loan payment decile interacted with month. The outcome is labelled above each panel. The solid line shows the month of the payment moratorium announcement, while the dashed line shows the month of the forgiveness announcement. Standard errors are clustered at the repayment cohort level. Source: TransUnion.