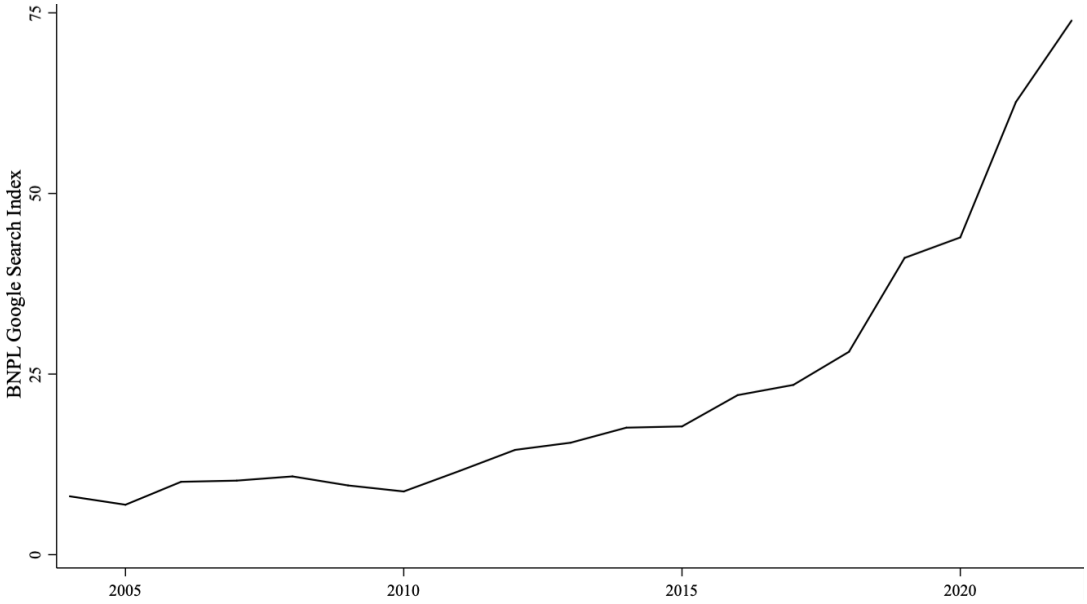
Buy Now, Pay Later and Impulse Shopping

Valentin Burg and Jan Keil

Increasing Popularity of BNPL



A Risk for Consumers?

- Regulators' Concerns:
  - Should it be regulated?
  - Does it lead to financial problems?
  - Does it amplify impulsive shopping behavior?

"... pose a risk to those with some mental health conditions where impulse control is a problem. ... the consumer journey design may, in many cases, play into consumers' behavioral biases. ... These biases ... make it more likely that consumers make impulsive decisions that are not in their best interest."

– Financial Conduct Authority (2021)

Also: US Congress, Monetary Authority of Singapore, ...

We do not intend to perform a welfare analysis and make claims that BNPL is net-negative!

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Overview & Summary

- what does economic theory say about impulse shopping?
  - → self-control techniques: rule-of-thumb & liquidity rationing

- what is different about BNPL?
  - what channels could amplify impulsiveness?
    - → not "feeling" like debt; liquidity provision (could undermine self-control)

↯ proxying impulsiveness (challenge of studies of impulsiveness)

- empirical evidence from RCT
  1. differential conversion effects
     - → impulsive conversions ↑ 13%
  2. general ex-post effects on behavior
     - → becoming ↑ 25% more hasty, premature
  3. no differential catering ex-ante

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Impulsiveness

- Characteristics
  - short time
  - little cognitive effort
  - lack of prior intent
  - reaction to external stimulus

"Impulsive consumption is defined as the result of sudden and powerful urges that induce consumers to buy immediately without a lot of reflection about the long-term consequences of the purchases." – Rook (87 JCR)

- Normative dimension
  1. by definition disregarding adverse consequences
  2. theory: reducing lifetime utility (e.g. Thaler & Shefrin 81 JPE)
  3. empirical: fin. problems, low self-esteem, post-dissatisfaction (Rook 87 JCR, Vohs & Faber 07 JCR)

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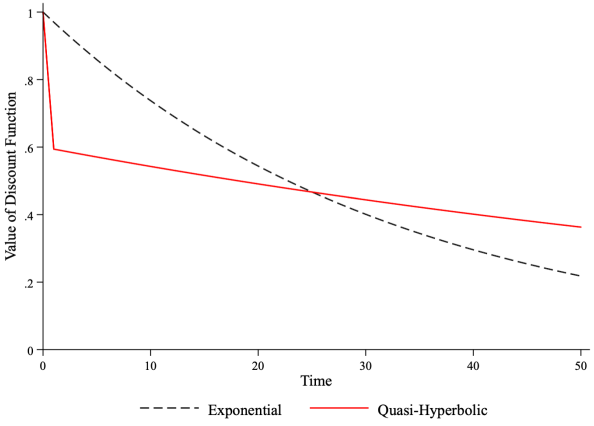
- precondition: present bias
  - hyperbolic discounting (Laibson 97 QJE; Frederick et al. 02 JEL)
  - increases utility from immediate purchase

$$U_t = \delta^t u(c_t) + \beta \sum^{T-1} \delta^\tau u(c_\tau)$$



Impulsiveness & Economic Theory

- present bias used in dual-self models, e.g. Thaler & Shefrin (81 JPE)
  - short-run self controls moments
    - myopic, impulsive: e.g. $\beta = 0$, $\boldsymbol{U_t = u(c_t)}$ (simplifying $\delta = 1$)
    - maximizes immediate utility
  - long-run self plans ahead
    - maximizes lifetime utility
    - $U\,(u(c_1), ..., u(c_t), ..., u(c_T))$
    - patient: e.g. $\beta = 1$, $\boldsymbol{U_t = \sum u(c_t)}$

↯ problem if marg. utility in t is concave

- short-run self wants to borrow against future income to consume now
- low-run self wants equally distributed consumption

→ impulse-control techniques of long-run self

- adding manipulation parameter to utility function: $U_t = u(\boldsymbol{\theta}, c_t)$

1. rules of thumb, e.g. debt ban
2. liquidity rationing (illiquid assets)

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BNPL is Different

1. Cheaper
   - low or no interest & fees
   - marketing (portrayed as new and convenient way to pay; not called a "loan", "debt")
   - ↯ not "feeling" like debt → not classified as debt → sidestepping "debt ban"
     - ! but it is debt; e.g. reporting to credit agencies

2. Easy access & spontaneous, erratic supply
   - convenient, quicker approval
   - higher approvals, fewer checks
   - POS – spontaneous, erratic offers (algorithms opaquely vary availability)
   - ↯ transfers financial control to short-run self → undermining liquidity rationing

3. Price differentiation
4. Overcoming trust problems in e-commerce

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Channels

H1. differential conversion (Ex Post)

- increases willingness to "convert" for impulsive customers
  - $Conversion_i = \alpha + \beta_1 BNPL_i + \beta_2 Impulsive_i + \beta_3 BNPL_i \times Impulsive_i + \epsilon_i$

H2. (general) behavior impact (Ex Post)

- making the shopping behavior (of any customer) more impulsive
  - $Impulsive_i = \alpha + \beta_1 BNPL_i + \epsilon_i$

H3. differential catering (Ex Ante)

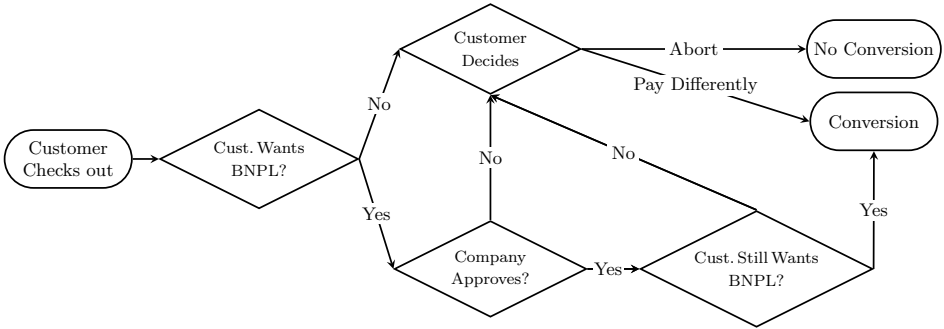
- providers cater actively towards impulsive customers
  - $BNPL\ Approved_i = \alpha + \beta Impulsive_i + \epsilon_i$

- E-commerce merchant (Germany; 2021-2022)
- selling furniture, home decor
- providing BNPL short-term consumer loans on the platform
  - → akin to "pay in 30 days" (popular in the EU)
    - late payment fees
    - adverse effects on external credit scores

- We observe highly granular data
  - conversions
  - browsing history, personal data
  - internal credit scores, defaults

Setting

- Normal Times



- RCT
  - merchant makes BNPL...
    a) unavailable (control group; 1,582)
    b) available (treatment group; 88,406)
    ! important: 14% of applications are still rejected in this group (estimate LATE for eligible)

30% of customers at check-out do not convert → check-outs are useful to analyze

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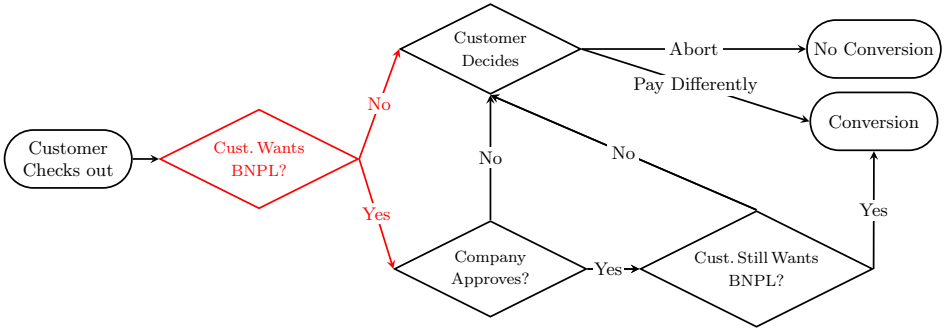

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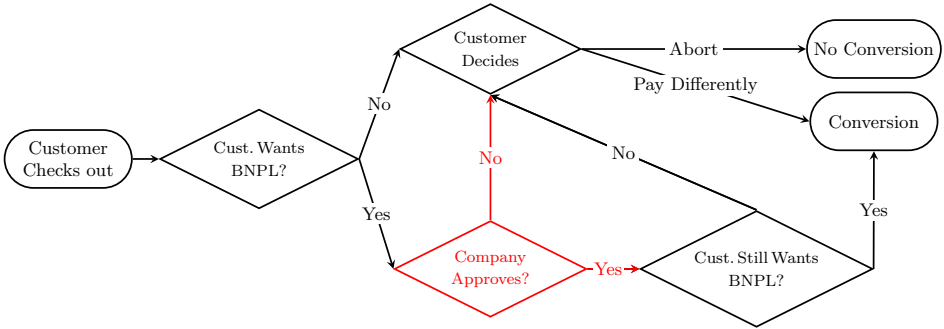

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Measuring Impulsiveness

- Strategy:
  - deriving proxies from literature
  - multiple alternative proxies

- Prior Browsing
  - 1: < 15 min
    - spontaneous visit more likely
  - 0: A day before (or earlier)
    - prior consideration more likely

- Marketing Channel
  - 1: Responding to Ad
    - reactive
    - cue, complement or willpower depleting
  - 0: Organic Web Search
    - more effort, comparison, & own initiative: e.g. scrolling through ads
  - (Economic) Theory:
    - impulsive consumption is cue-triggered (Laibson 01 QJE)
    - ads = complementary with consumption (Becker & Murphy 88 JPE, 93 QJE)
    - ads = depleting willpower (Baumeister 02 JCR)

Measuring Impulsiveness

- Other Ex-Ante Proxies
  - Branded vs general Targeting Ads
  - Gender Differences

- Ex-Post Proxies
  - Optimizing the shopping cart (1/0)
  - Returning Purchased Item (1/0)
    - indicator for post-dissatisfaction
  - Time To Conversion
    - correlates with time available to compare, consider, reflect

	Long Browsing		**Brief Browsing**		**Difference in Means**	
	N (1)	Mean (2)	N (3)	Mean (4)	Absolute (5)	p-value (6)
Other Impulsiveness Proxies						
Ad Response (1/0)	11,078	0.840	11,536	0.865	0.025***	(0.000)
Cart Modification (1/0)	27,607	0.136	34,428	0.111	-0.025***	(0.000)
Time to Conversion (Minutes)	27,607	5.588	34,428	4.798	-0.790***	(0.000)
Returned Item (1/0)	27,606	0.084	34,426	0.091	0.007***	(0.004)

Are Impulsive Customers Converting More?

$$Conversion_i = \alpha + \beta_1 BNPL_i + \beta_2 Impulsive_i + \beta_3 BNPL_i \times Impulsive_i + \epsilon_i$$

- $Impulsive_i$ is ex-ante
- $BNPL_i$ = randomized availability (RCT)

- White robust standard errors (should be unbiased – Athey and Imbens, 2017)
- increase statistical power via covariates and fixed effects

Are Impulsive Customers Converting More?

Dependent Variable: Conversion (1/0)					
	(1)	(2)	(3)	(4)	(5)
Controls					
County			Yes	Yes	–
Customer			Yes	Yes	Yes
Website Visit				Yes	Yes
Fixed Effects					
County					Yes
Date					Yes
Time-of-Day					Yes
Brief Prior Browsing (1) vs Long Prior Browsing (0)					
Brief Browsing × BNPL Offered		0.091***	0.087***	0.085***	0.084***
		(0.024)	(0.026)	(0.026)	(0.026)
Brief Browsing (1/0)	-0.222***	-0.311***	-0.275***	-0.269***	-0.267***
	(0.003)	(0.024)	(0.026)	(0.026)	(0.026)
BNPL Offered (1/0)	0.086***	0.026	0.036*	0.037*	0.026
	(0.012)	(0.018)	(0.020)	(0.020)	(0.020)
Observations	80,649	80,649	73,190	73,190	73,435

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Do Customers Become More Impulsive?

$$Impulsive_i = \alpha + \beta_1 BNPL_i + \epsilon_i$$

- ! $Impulsive_i$ is now ex-post
- $BNPL_i$ is still randomized availability
- not differentiating by impulsiveness

Do Customers Become More Impulsive?

Dependent Variable: Cart Modification (1/0)				
	(1)	(2)	(3)	(4)
BNPL Offered (1/0)	-0.032***	-0.036***	-0.038***	-0.026**
	(0.011)	(0.012)	(0.011)	(0.011)
Observations	70,972	65,767	65,767	65,990
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
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Time-of-Day				Yes

Dependent Variable: Time to Conversion (Minutes)

	(1)	(2)	(3)	(4)
BNPL Offered (1/0)	-2.116***	-2.231***	-2.271***	-1.485***
	(0.503)	(0.539)	(0.526)	(0.526)
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Customer		Yes	Yes	Yes
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County				Yes
Date				Yes
Time-of-Day				Yes

Dependent Variable: Returning Purchased Item (1/0)				
	(1)	(2)	(3)	(4)
BNPL Offered (1/0)	-0.001	0.010	0.009	0.020**
	(0.009)	(0.009)	(0.009)	(0.009)
Observations	70,969	65,764	65,764	65,987
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes

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County		Yes	Yes	–
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Website Visit			Yes	Yes
Fixed Effects				
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Time-of-Day				Yes

Differential Approval?

$$BNPL\ Approved_i = \alpha + \beta Impulsive_i + \epsilon_i$$

- $Impulsive_i$ is ex-ante
  - **!** not analyzing the RCT
  - but the sample of visits to which BNPL is shown

Dependent Variable: Merchant Approves BNPL (1/0)				
	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Brief (1) vs. Long Browsing (0)				
Brief Browsing (1/0)	-0.158***	-0.128***	-0.125***	-0.121***
	(0.004)	(0.004)	(0.004)	(0.004)
Observations	25,137	24,460	24,460	24,556

Is BNPL Catered to Impulsive Customers?

Dependent Variable: Merchant Approves BNPL (1/0)

	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
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Summary

- Economic Theory
  - BNPL could trigger impulse shopping:
    - lifting budget constraints
    - evading rules of thumb
- Empirical Findings
  - differential conversions: 13%
  - general behavior change: 25% less likely to modify cart
  - no differential catering

Thank you!

Are Impulsive Customers Converting More?

Dependent Variable: Conversion (1/0)					
	(1)	(2)	(3)	(4)	(5)
Controls					
County			Yes	Yes	–
Customer			Yes	Yes	Yes
Website Visit				Yes	Yes
Fixed Effects					
County					Yes
Date					Yes
Time-of-Day					Yes
Ad Response (1) vs. Organic Search (0)					
Ad Response × BNPL Offered		0.168***	0.134**	0.129**	0.135**
		(0.053)	(0.058)	(0.057)	(0.058)
Ad Response (1/0)	-0.007	-0.171***	-0.133**	-0.129**	-0.133**
	(0.008)	(0.053)	(0.057)	(0.057)	(0.057)
BNPL Offered (1/0)	0.075***	-0.067	-0.012	-0.005	-0.026
	(0.021)	(0.048)	(0.053)	(0.052)	(0.053)
Observations	26,755	26,755	24,485	24,485	24,571

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Dependent Variable: Returning a Purchased Item (1/0)

	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Using BNPL (1) or Other Options (0)				
BNPL Used (1/0)	0.028***	0.035***	0.037***	0.037***
	(0.002)	(0.002)	(0.002)	(0.002)
Observations	69,884	64,823	64,823	65,041

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Impulsiveness and Defaults

Dependent Variable:	**Credit Score (min 0, max 1)**		**County Income (€)**		**Default (1/0)**	
	(1)	(2)	(3)	(4)	(5)	(6)
Controls						
County		–		Yes		–
Customer		Yes		Yes		Yes
Website Visit		Yes		Yes		Yes
Fixed Effects						
County		Yes				Yes
Date		Yes		Yes		Yes
Time-of-Day		Yes		Yes		Yes
Brief Prior Browsing (1) vs Long Prior Browsing (0)						
No Prior Browsing (1/0)	-0.051***	-0.044***	-180.958***	-163.464***	0.006***	0.007***
	(0.002)	(0.002)	(26.589)	(26.936)	(0.002)	(0.002)
Observations	40,669	40,346	43,996	43,995	16,271	16,175

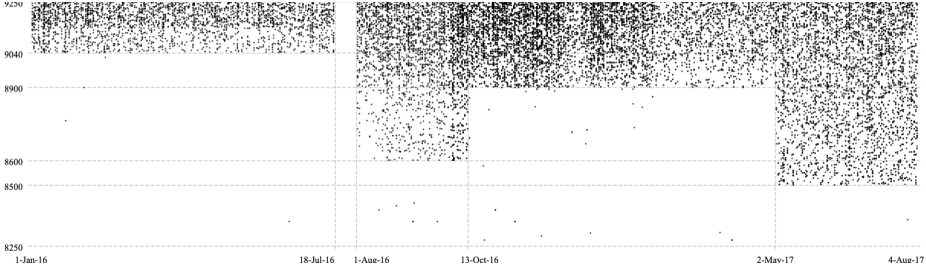
Impulsiveness and Defaults

Dependent Variable:	**Credit Score (min 0, max 1)**		**County Income (€)**		**Default (1/0)**	
	(1)	(2)	(3)	(4)	(5)	(6)
Controls						
County		–		Yes		–
Customer		Yes		Yes		Yes
Website Visit		Yes		Yes		Yes
Fixed Effects						
County		Yes				Yes
Date		Yes		Yes		Yes
Time-of-Day		Yes		Yes		Yes
Brief Prior Browsing (1) vs Long Prior Browsing (0)						
No Prior Browsing (1/0)	-0.051***	-0.044***	-180.958***	-163.464***	0.006***	0.007***
	(0.002)	(0.002)	(26.589)	(26.936)	(0.002)	(0.002)
Observations	40,669	40,346	43,996	43,995	16,271	16,175

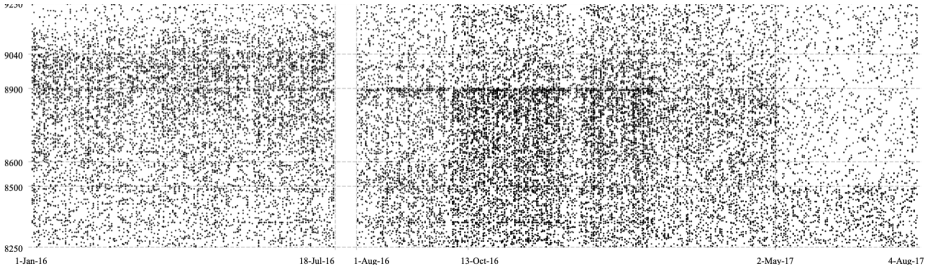
Impulsiveness and Defaults

Dependent Variable:	**Credit Score (min 0, max 1)**		**County Income (€)**		**Default (1/0)**	
	(1)	(2)	(3)	(4)	(5)	(6)
Controls						
County		–		Yes		–
Customer		Yes		Yes		Yes
Website Visit		Yes		Yes		Yes
Fixed Effects						
County		Yes				Yes
Date		Yes		Yes		Yes
Time-of-Day		Yes		Yes		Yes
Brief Prior Browsing (1) vs Long Prior Browsing (0)						
No Prior Browsing (1/0)	-0.051***	-0.044***	-180.958***	-163.464***	0.006***	0.007***
	(0.002)	(0.002)	(26.589)	(26.936)	(0.002)	(0.002)
Observations	40,669	40,346	43,996	43,995	16,271	16,175

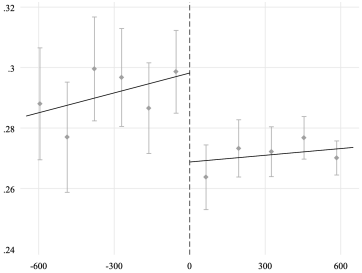
Offers



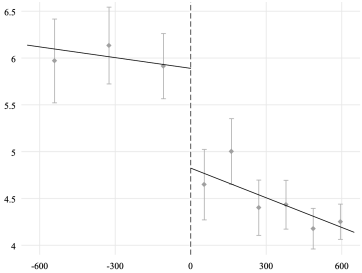
Rejections



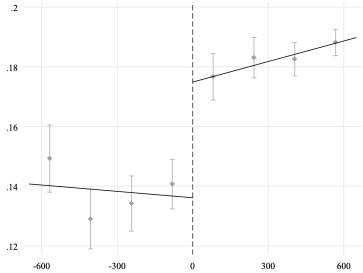
RDD – Results



Prob. of Cart Change (1/0)



Time to Conversion (Minutes)



Prob. of Returning an Item (1/0)

Dependent Variable: Merchant Approves BNPL (1/0)

	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Ad Response (1) vs. Organic Search (0)				
Ad Response (1/0)	-0.043***	-0.031***	-0.030***	-0.032***
	(0.010)	(0.009)	(0.009)	(0.009)
Observations	10,125	9,995	9,995	10,039

Dependent Variable: Merchant Approves BNPL (1/0)				
	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Ad Response (1) vs. Organic Search (0)				
Ad Response (1/0)	-0.043***	-0.031***	-0.030***	-0.032***
	(0.010)	(0.009)	(0.009)	(0.009)
Observations	10,125	9,995	9,995	10,039

Are Impulsive Customers More Likely to Select BNPL?

Dependent Variable: Customer Selects BNPL (1/0)				
	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Ad Response (1) vs. Organic Search (0)				
Ad Response (1/0)	0.019*	0.013	0.014	0.019*
	(0.010)	(0.011)	(0.011)	(0.011)
Observations	19,998	18,358	18,358	18,426

Are Impulsive Customers More Likely to Select BNPL?

Dependent Variable: Customer Selects BNPL (1/0)				
	(1)	(2)	(3)	(4)
Controls				
County		Yes	Yes	–
Customer		Yes	Yes	Yes
Website Visit			Yes	Yes
Fixed Effects				
County				Yes
Date				Yes
Time-of-Day				Yes
Ad Response (1) vs. Organic Search (0)				
Ad Response (1/0)	0.019*	0.013	0.014	0.019*
	(0.010)	(0.011)	(0.011)	(0.011)
Observations	19,998	18,358	18,358	18,426