

# The Liquidity Sensitivity of Healthcare Consumption: Evidence from Social Security Payments

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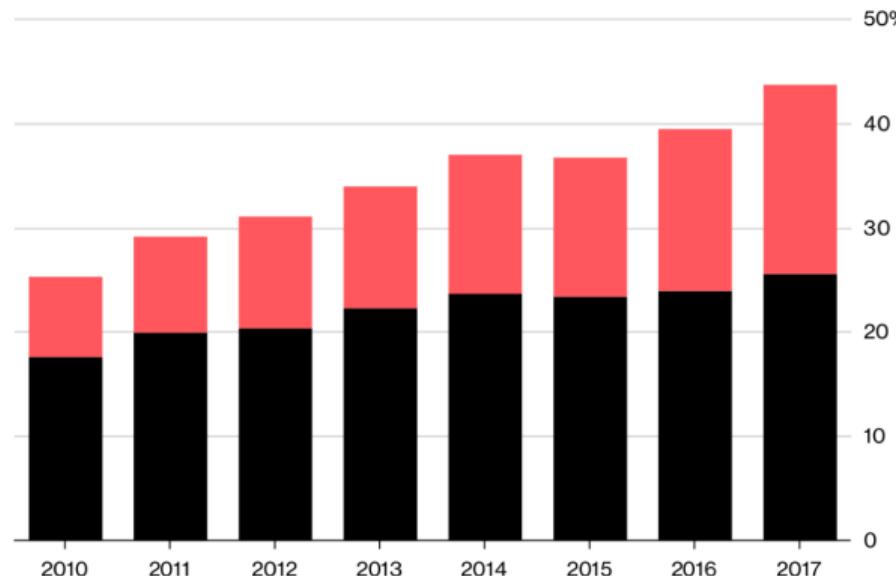
Daniel Prinz

Harvard

## Patients Exposed

The share of Americans under 65 enrolled in high deductible plans is rising

- High deductible without health savings account
- High deductible with health savings account



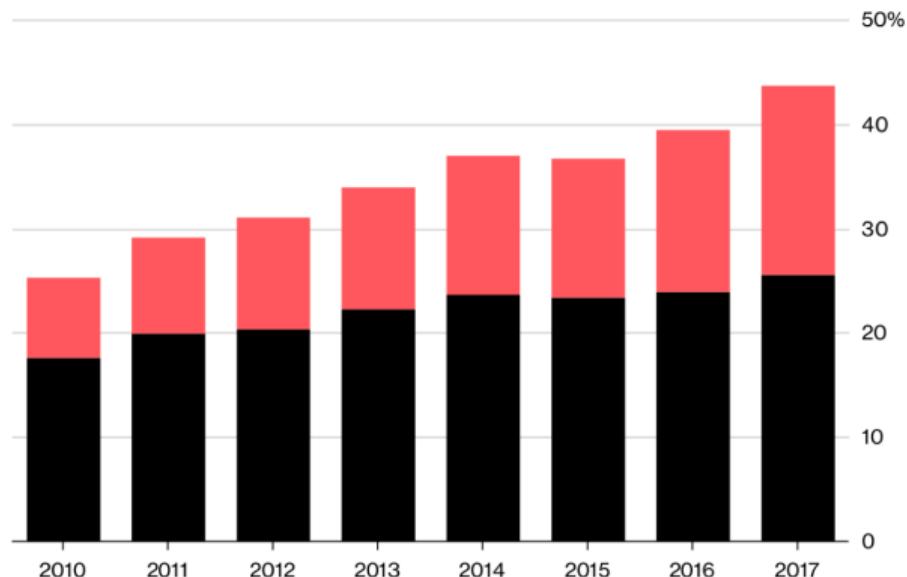
Source: National Health Interview Survey

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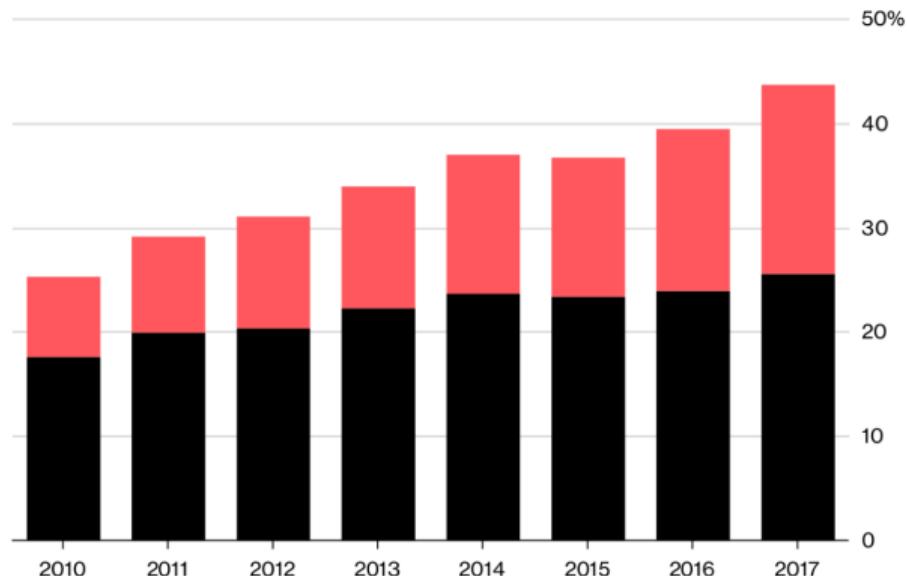
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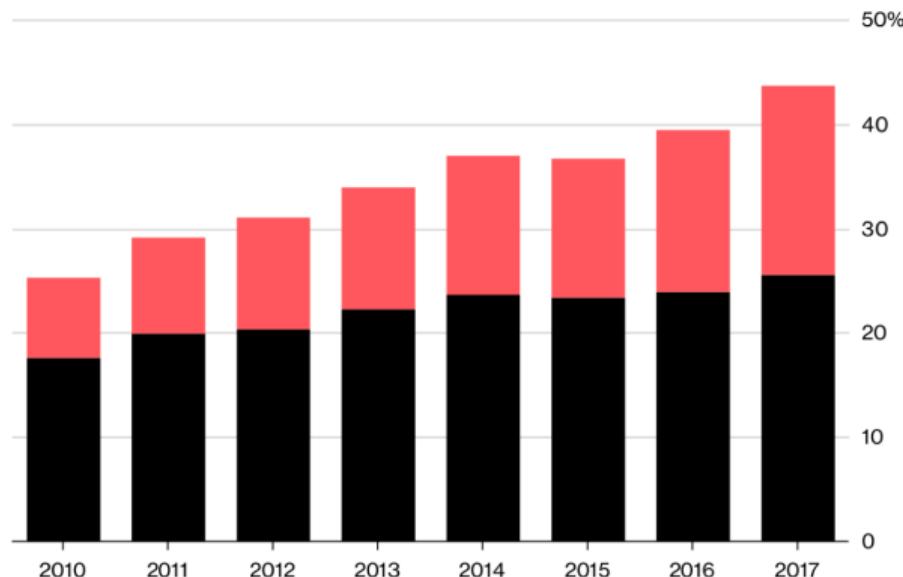
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Parker (1999); Souleles (1999); Agarwal et al. (2007); Agarwal and Qian (2014); Stephens (2003); Johnson et al. (2006); Baugh and Wang (2018); Parker et al. (2013); Gross and Tobacman (2014); Gross et al. (2019).





In the past 12 months have you not taken a medication as prescribed to reduce costs?



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8.4 percent of insured 18–64-year-olds  
(2016 NHIS)

## Research Questions

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Bottom line, should health insurance be structured differently for low-income consumers?

Social Security  
Checks



Medicare-Covered  
Drug Consumption

Preview of Results:

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We propose a simple framework to quantify the share of moral-hazard-driven deadweight loss that can be accounted for by liquidity sensitivity.

① Background

② The Effect of Social Security Checks

③ The Effect of Changes in Generosity

④ Implications

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## Schedule of Social Security Benefit Payments 2019

JANUARY 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

FEBRUARY 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MARCH 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

APRIL 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JUNE 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JULY 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SEPTEMBER 2019						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

NOVEMBER 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

DECEMBER 2019						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Benefits paid on Second Wednesday	1 <sup>st</sup> – 10 <sup>th</sup>
Third Wednesday	11 <sup>th</sup> – 20 <sup>th</sup>
Fourth Wednesday	21 <sup>st</sup> – 31 <sup>st</sup>

Supplemental Security Income (SSI)
Social Security benefits prior to May 1997; or if receiving both Social Security and SSI, Social Security is paid on the third
If you don't receive your payment on the expected date, please allow three additional mailing days before contacting Social Security.



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and tomorrow

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Schedule of Social Security Benefit Payments 2019  
Produced and published at U.S. taxpayer expense

APRIL 2019						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
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Benefits paid on	Birth date on	
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# Social Security Payment Schedule

Two-thirds of checks arrive after a 28-day wait

APRIL 2019						
S	M	T	W	T	F	S
			1	2	3	4
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY 2019						
S	M	T	W	T	F	S
				1	2	3
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

One-third of checks arrive after a 35-day wait

APRIL 2019						
S	M	T	W	T	F	S
			1	2	3	4
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY 2019						
S	M	T	W	T	F	S
				1	2	3
5	6	7	8	9	10	11
12	13	14	15	16	17	18
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			1	2	3	4
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S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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- ② **Subsidized-copay group:** Low-income recipients who pay subsidized copayments (Medicare-only but incomes < \$550/month, \$825/month for couples)

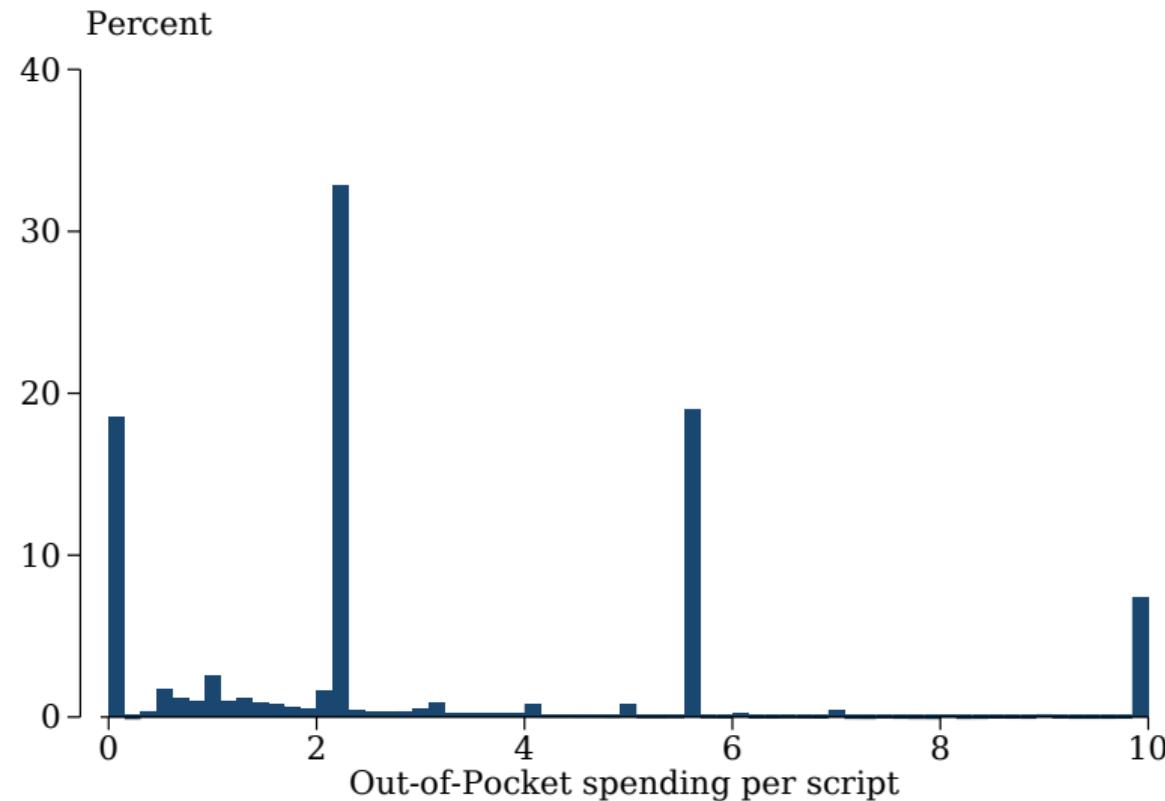
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- ③ **Full-copay group:** Typical Part D population w/ full premiums and copays

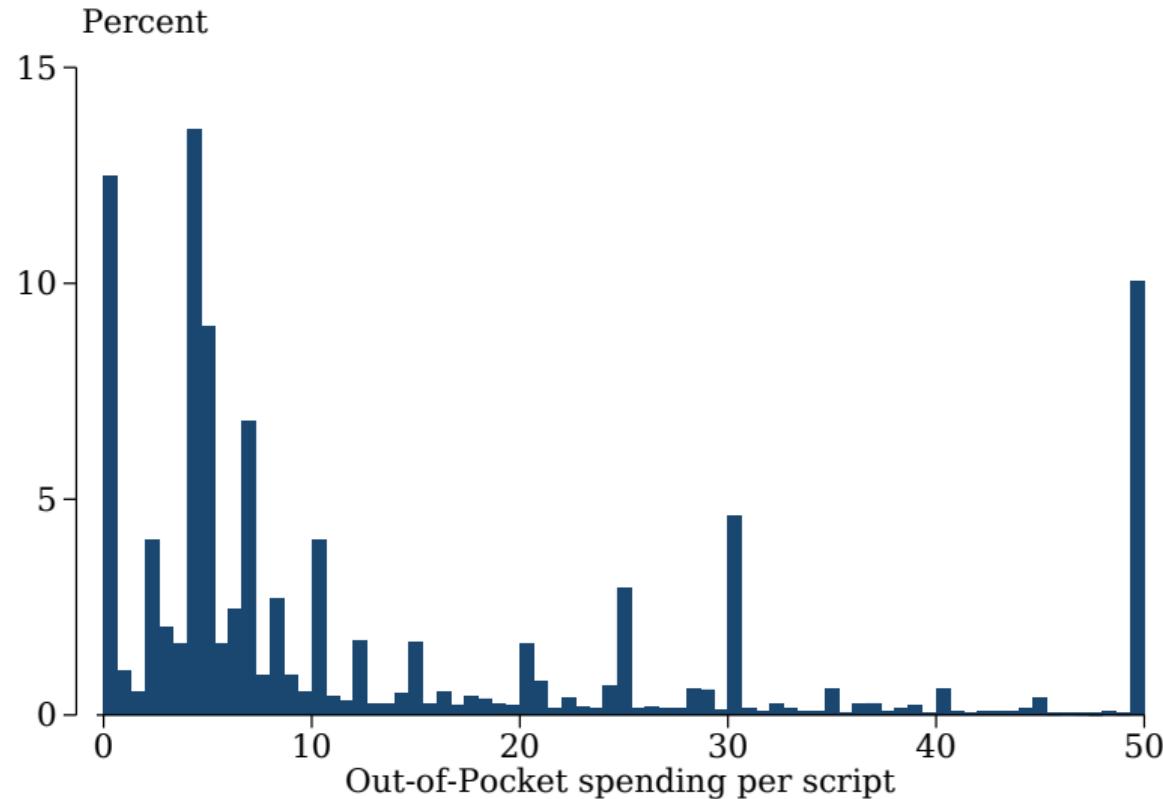
## Summary Statistics

	No-Copay Group	Subsidized-Copay Group	Full-Copay Group
Number of beneficiaries in 20% sample in 2015	678,447	143,779	3,788,347
Mean total scripts per year	52.48	44.08	29.11
Mean out-of-pocket spending per year	\$0	\$183.38	\$550.67
Mean share filling a script each day	.064	.058	.0475
Share male	.367	.392	.447
Average age	70.35	70.31	70.71
Average number of chronic conditions	4.40	3.99	3.64
Share white	.578	.693	.883

## Subsidized-Copay Group Out-of-Pocket Payments



## Full-Copay Group Out-of-Pocket Payments



We Have Several Points of Comparison

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Different check dates

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28- versus 35-day waiting periods

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Different check dates

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28- versus 35-day waiting periods

Different beneficiaries, different drugs, etc.

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④ Implications

## First Empirical Approach: A Re-Centered Time Series

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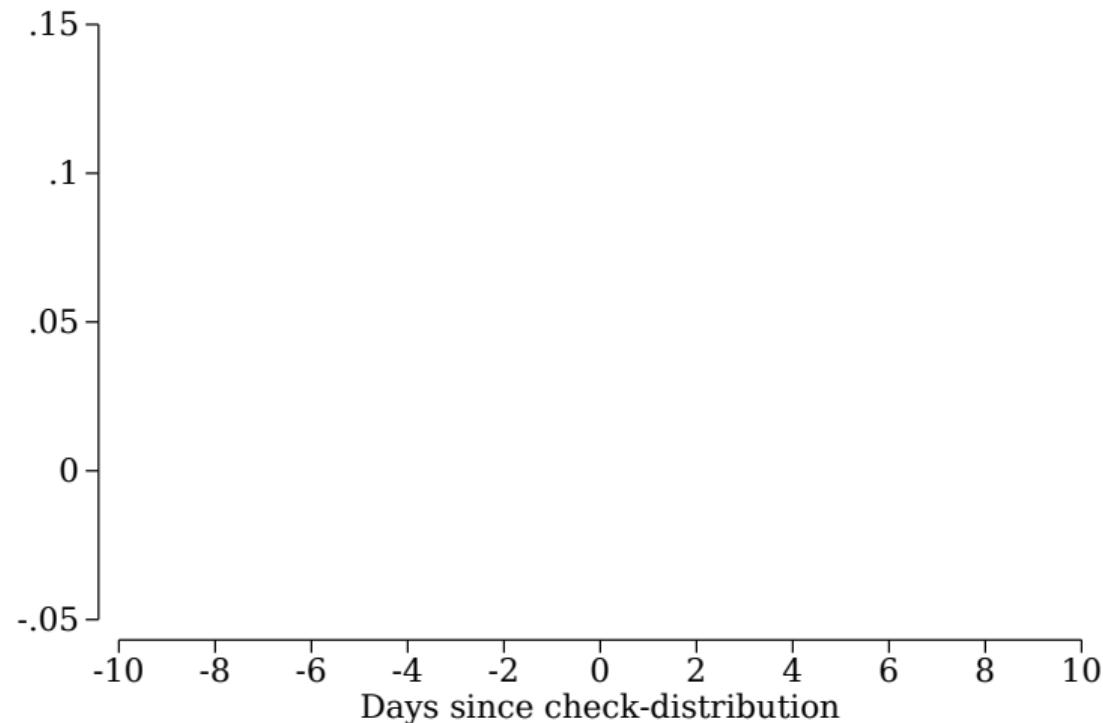
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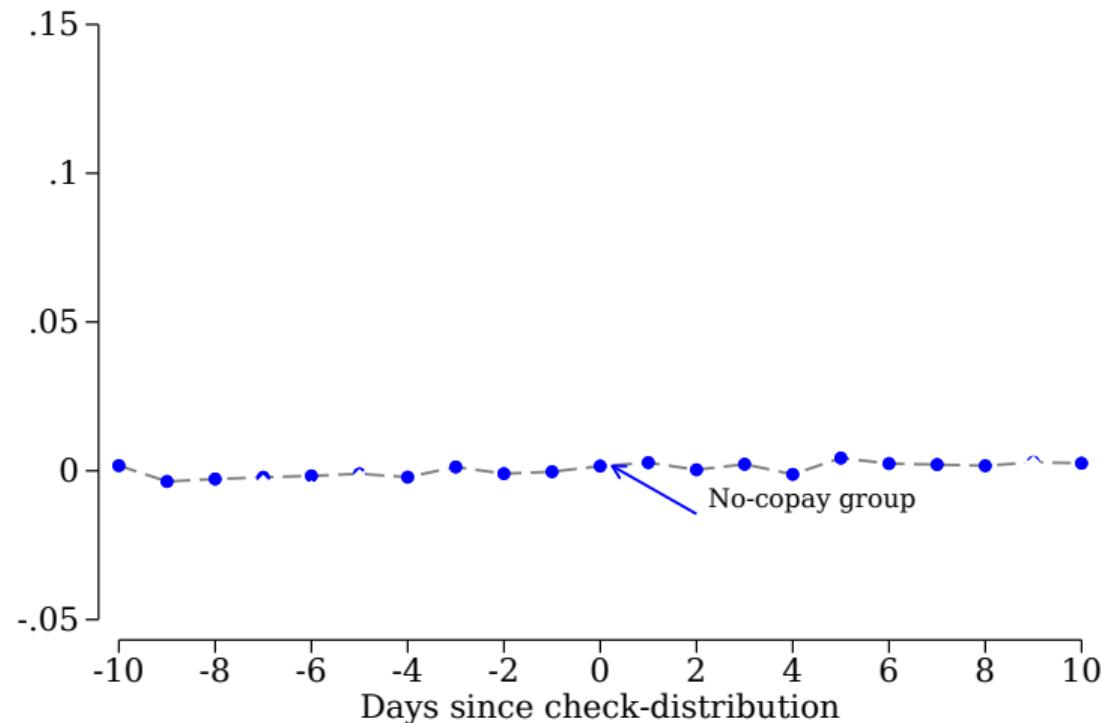
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We perform that calculation both for those who face copayments and those who do not

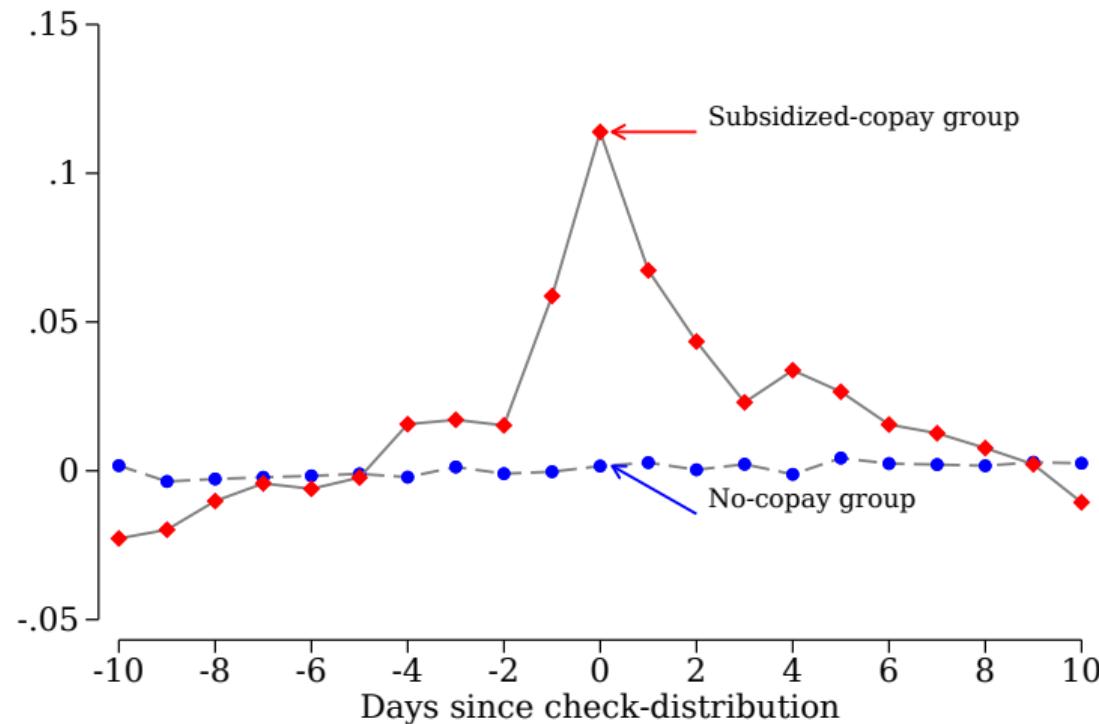
Log total scripts in relevant  
payday group relative to other payday groups



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## Regression Framework

$$Y_{bt} = \alpha_b + \alpha_t + \sum_{\tau=-10}^{10} \beta_\tau \times I_{bt}^\tau + \varepsilon_{bt}$$

where

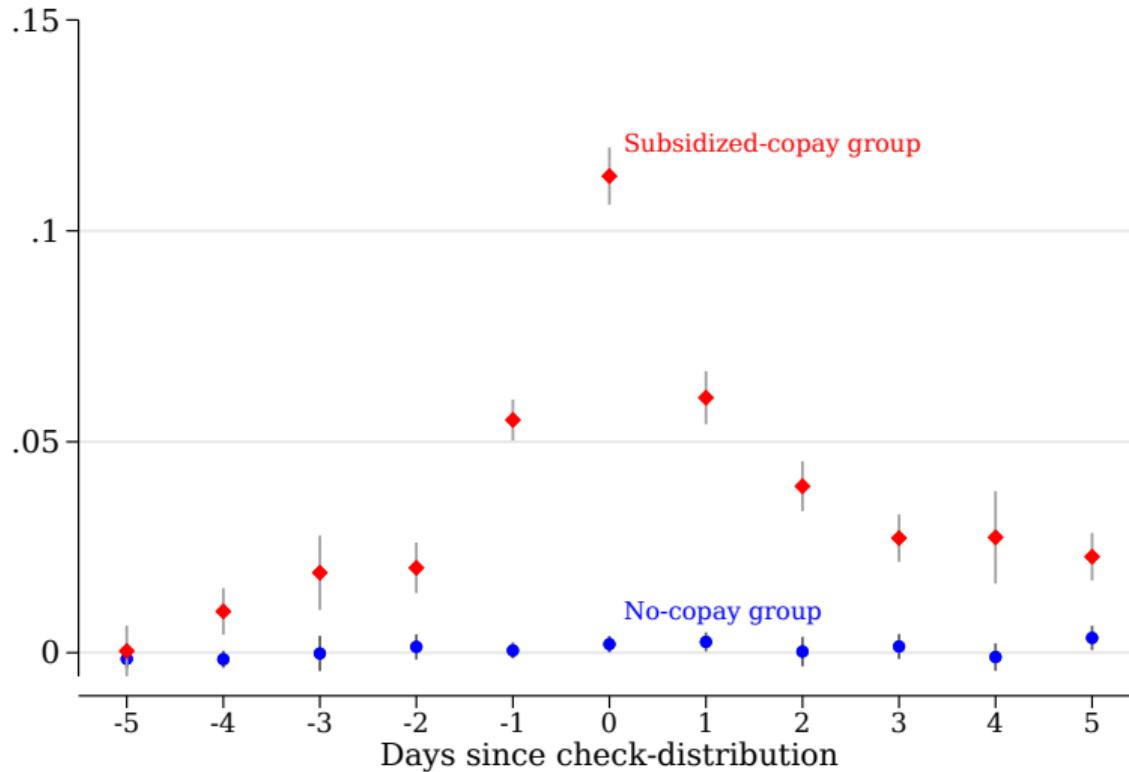
$Y_{bt}$  scripts filled for each birthday group (1 through 31) and date (January 1, 2006 through December 31, 2015)

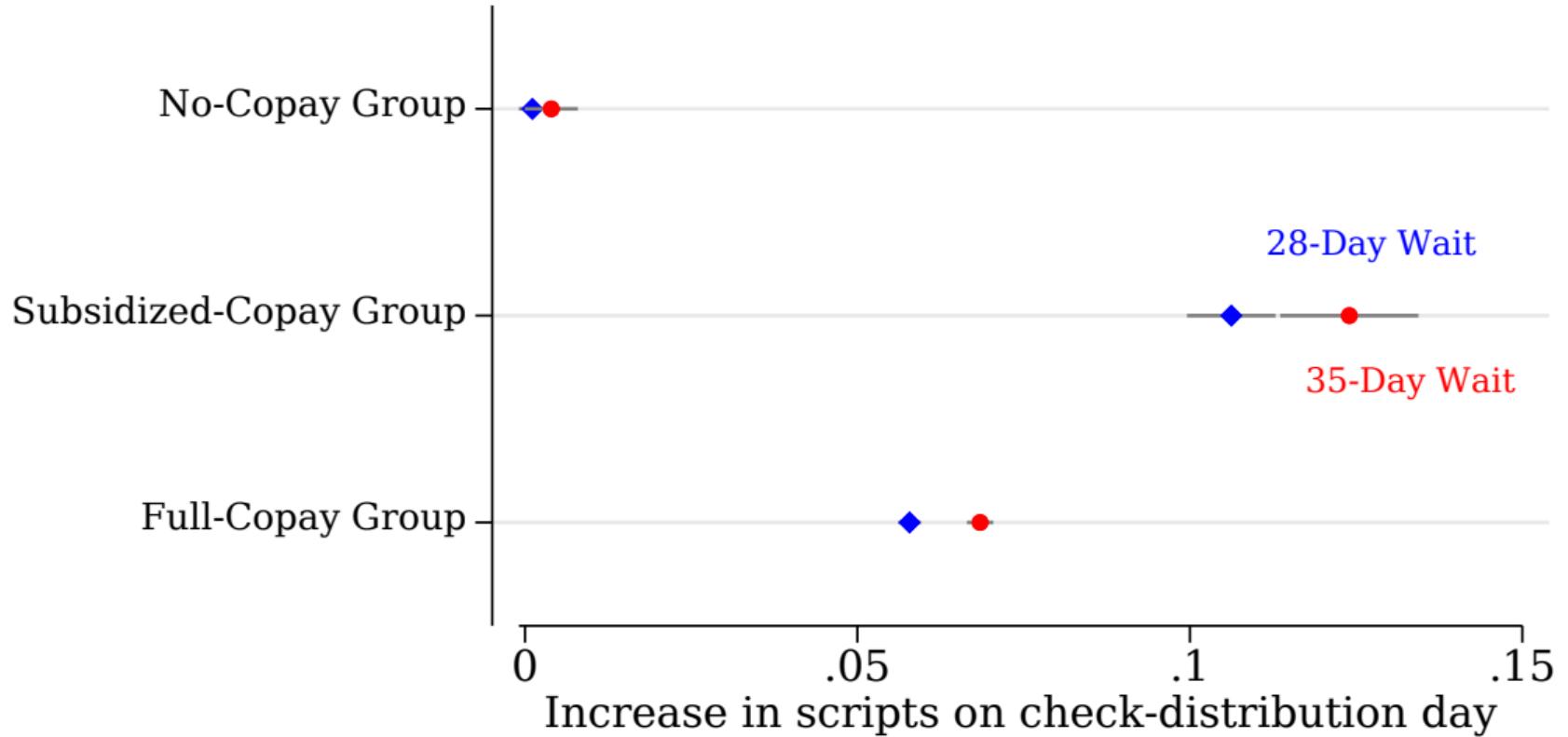
$\alpha_b$  birthday-specific fixed effects

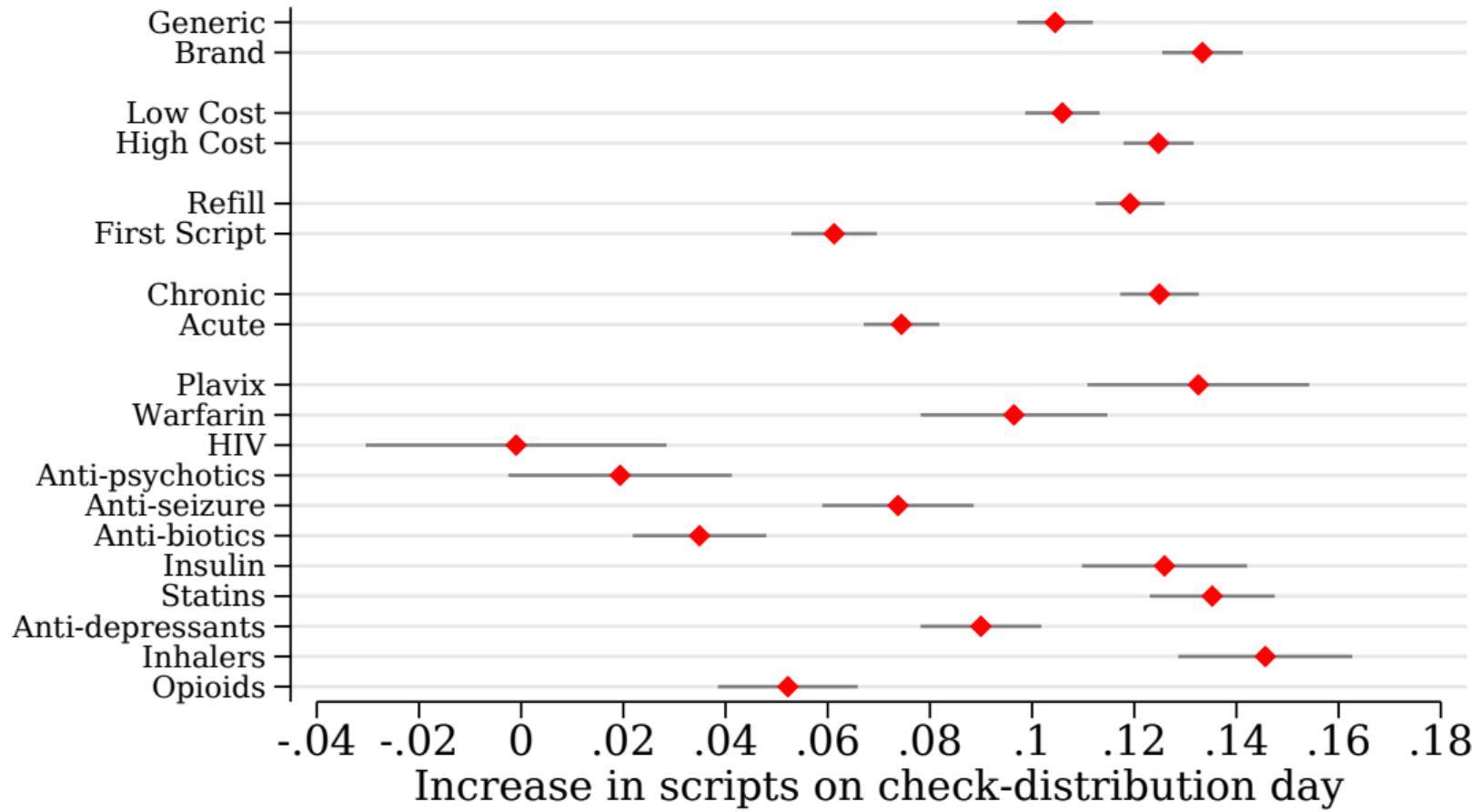
$\alpha_t$  calendar-date-specific fixed effects

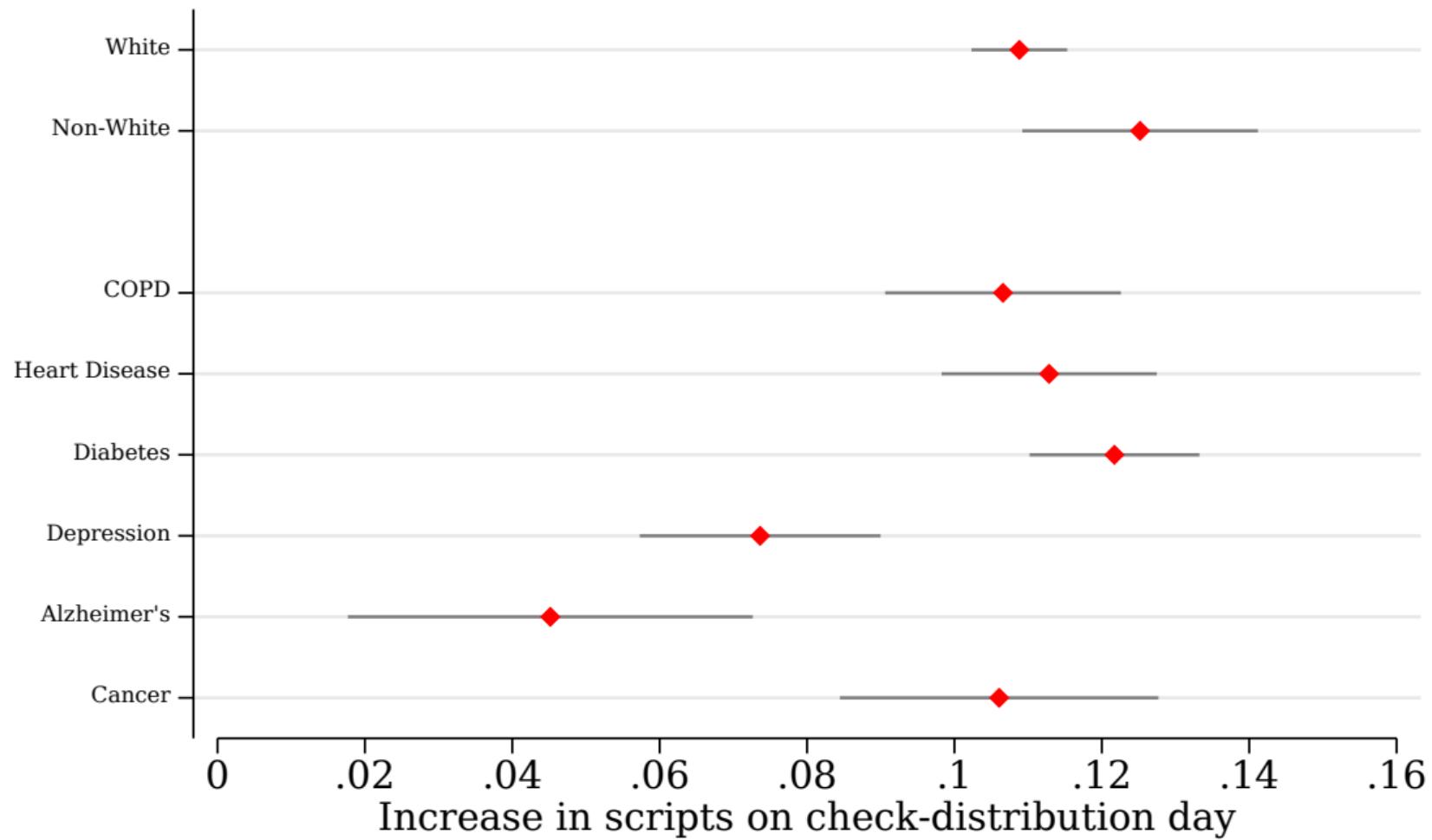
$I_{bt}^\tau$  event-time indicator functions

### Event-study estimate

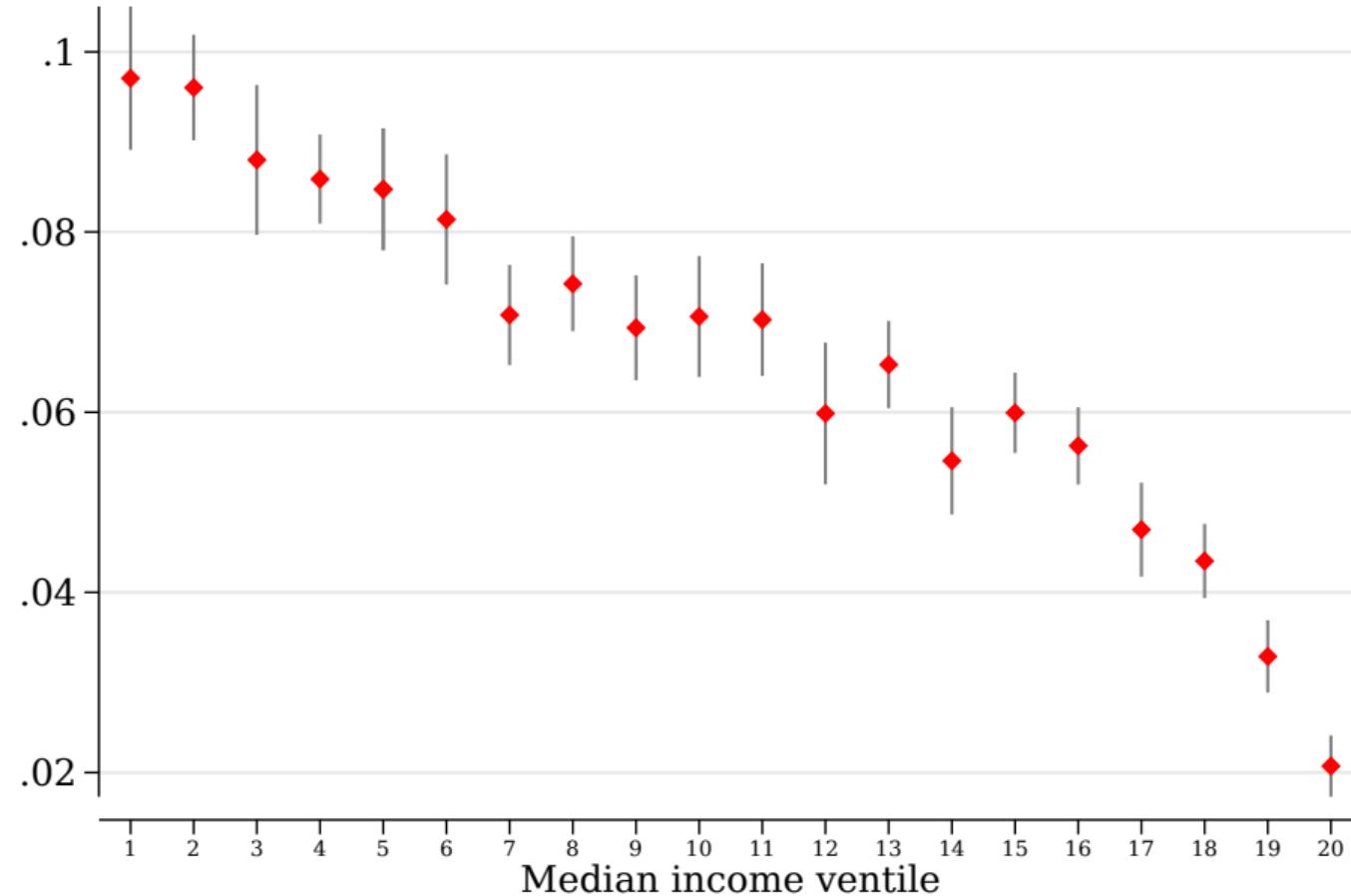








## Increase in scripts on check-distribution day



## Summary of Overall Effect

On Social Security paydays, we observe a 6–14-percent increase in total scripts being filled.

Prescription filling of some Medicare beneficiaries is highly sensitive to liquidity, even with very generous insurance.

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But either way, consumers face a “liquidity-related friction.”

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② The Effect of Social Security Checks

③ The Effect of Changes in Generosity

④ Implications

We analyze changes in insurance generosity in three steps

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- ① Price Sensitivity: Insurance generosity → Drug purchases

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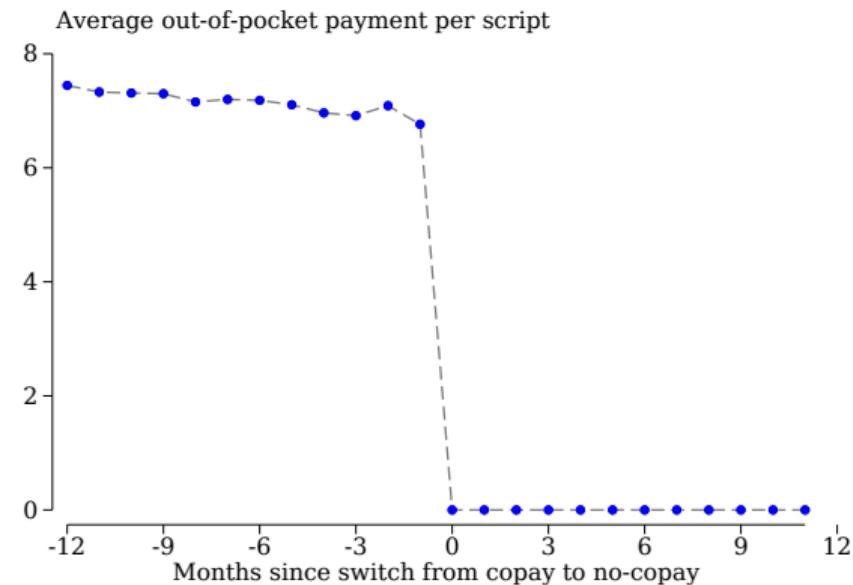
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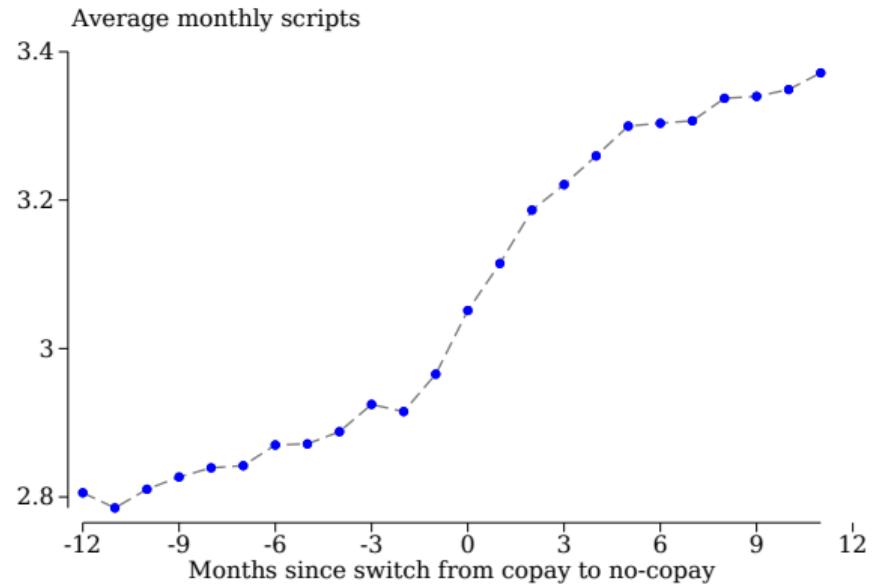
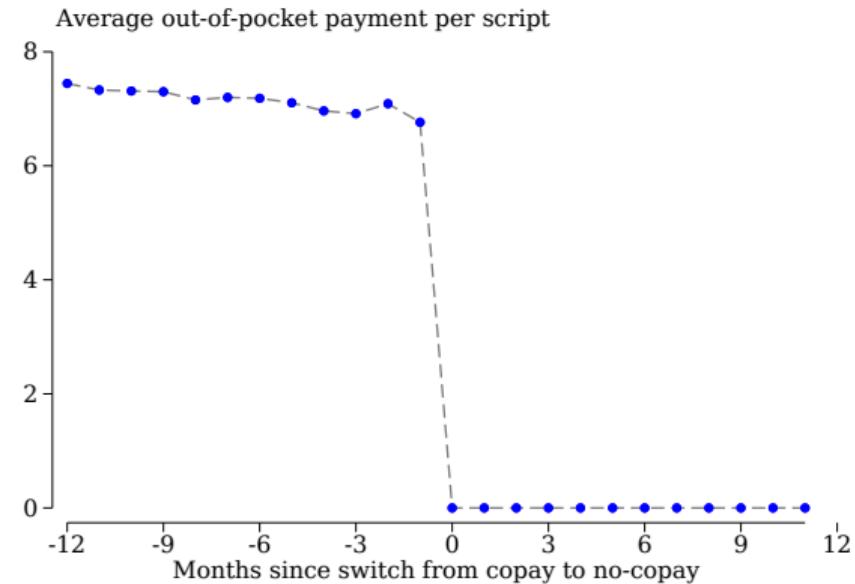
- ① **Price Sensitivity:** Insurance generosity → Drug purchases
- ② **Liquidity Sensitivity:** Insurance generosity → Payday filling
- ③ **Interaction:** Liquidity sensitivity ←→ Price sensitivity

## Step 1. Price Sensitivity

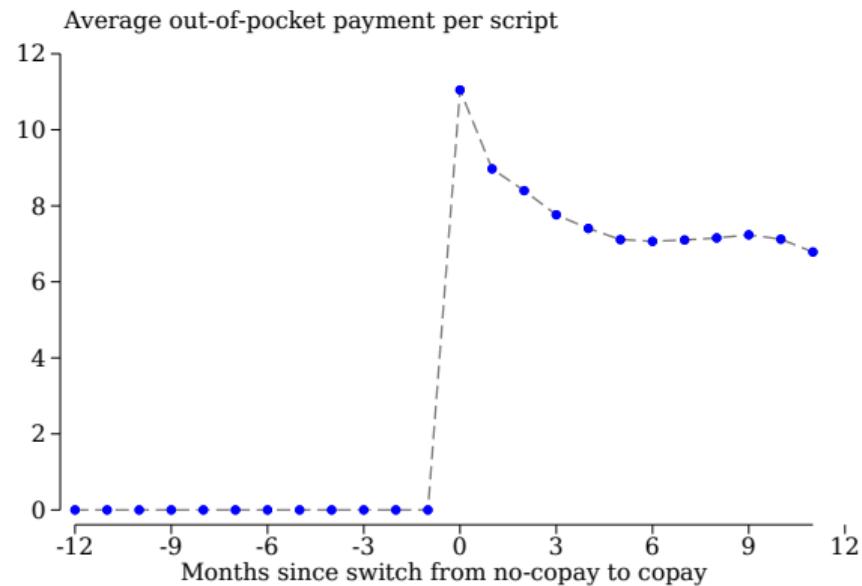
## Price and Quantity Changes for Copay to No-Copay



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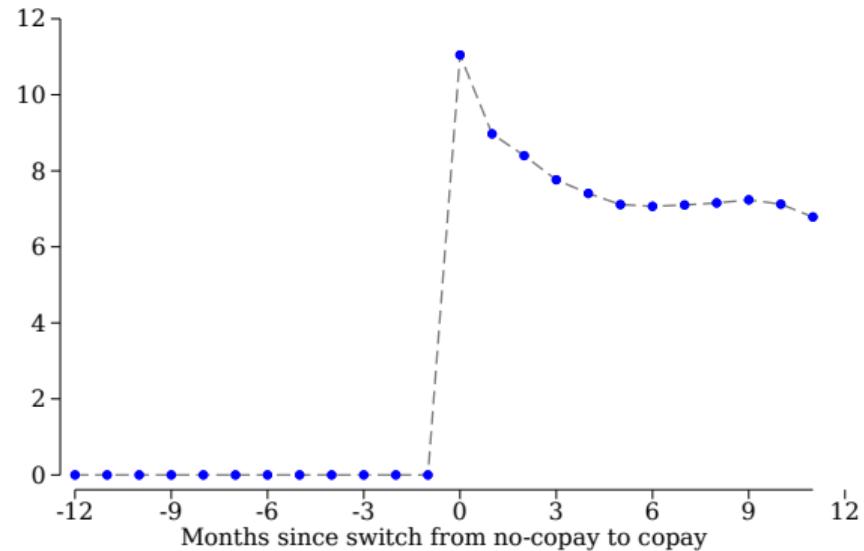


## Price and Quantity Changes for No-Copay to Full-Copay

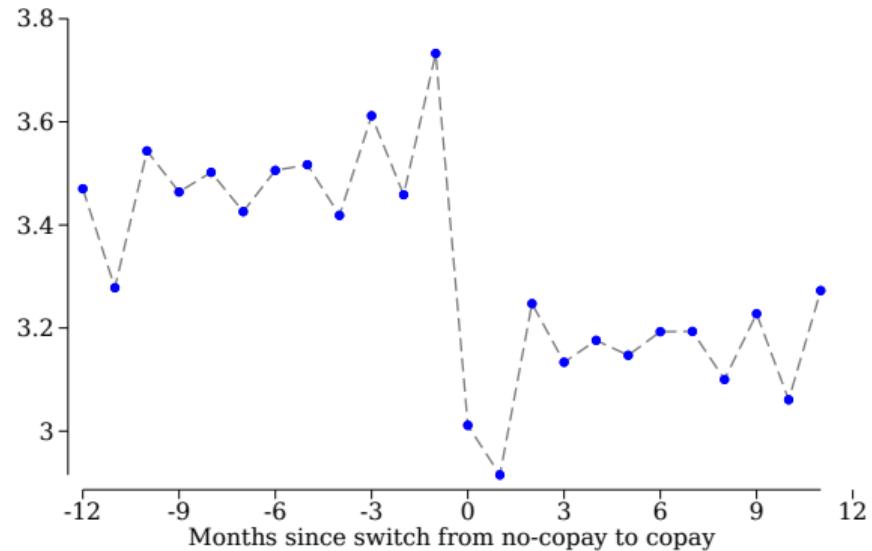


# Price and Quantity Changes for No-Copay to Full-Copay

Average out-of-pocket payment per script



Average monthly scripts



## Regression Framework for Studying Copay-Group Transitions

$$\log(Y_{ict}) = \alpha_i + \gamma_t + \beta \times \mathbf{1}\{t - s_c \geq 0\} + \varepsilon_{ict}$$

where:

$Y_{ict}$  scripts filled in calendar-month  $t$  by each person  $i$  in switching cohort  $c$

$\alpha_i$  individual-specific fixed effects

$\alpha_t$  calendar-date-specific fixed effects

$\mathbf{1}\{t - s_c \geq 0\}$  an indicator function equal to one for months after the transition to a new copayment group

	(1) Log Total Scripts	(2) Log Out-of -Pocket	(3) Elasticity
--	-----------------------------	------------------------------	-------------------

### A. Switch from Copay to No-Copay

Post	0.0808*** (0.0028)	-1.2690*** (0.0087)	-0.0636*** (0.0022)
Transition			
Mean	2.97	6.76	
N	1,103,232	1,103,232	1,103,232

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#### B. Switch from No-Copay to Copay

Post	-0.0640*** (0.0033)	1.3096*** (0.0156)	-0.0489*** (0.0019)
Mean	3.73	0.00	
N	579,264	579,264	579,264

Standard errors in parentheses

## Step 2. Liquidity Sensitivity

## How to measure “payday filling?”

In order to assess the effects of more-generous insurance on liquidity sensitivity, we want a measure of liquidity sensitivity that we can calculate for every quarter pre- and post-transition to the no copay group

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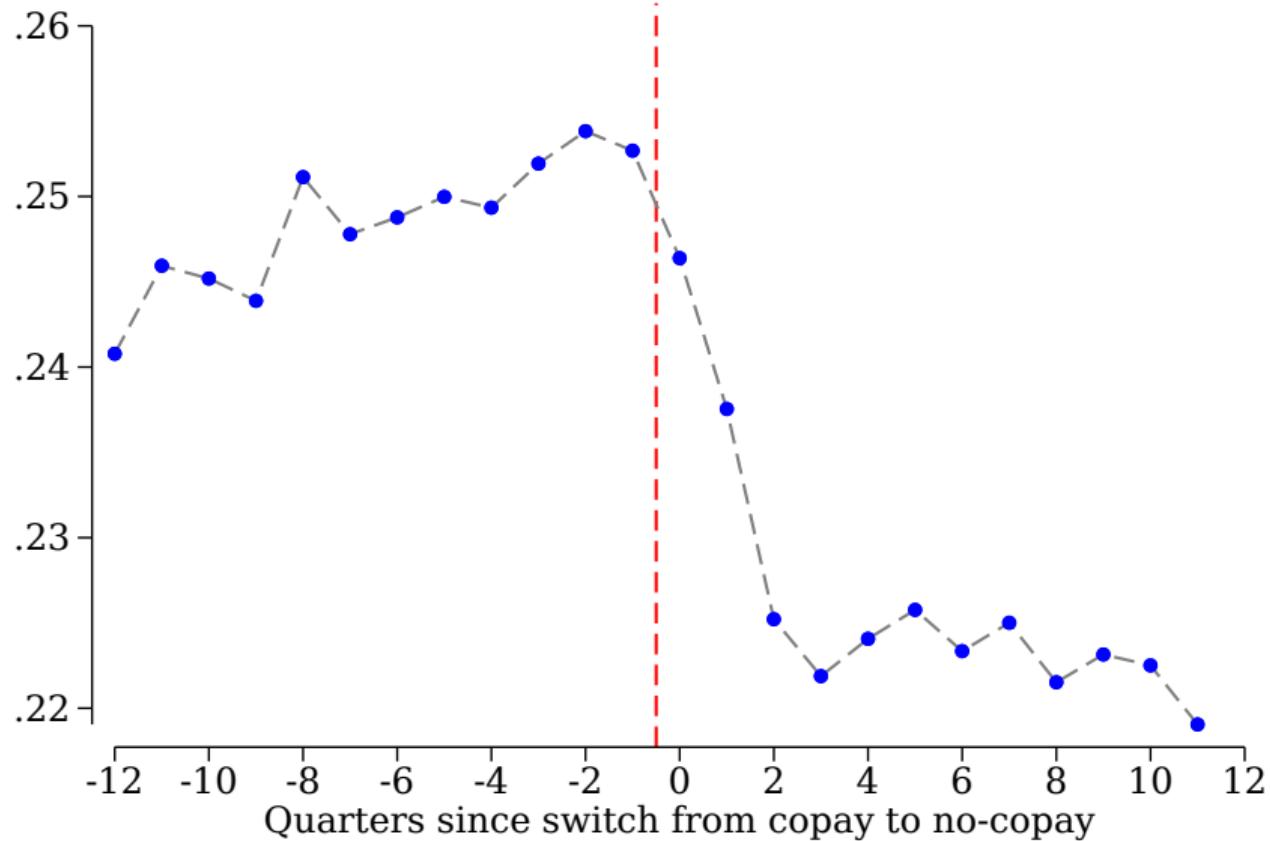
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- ① Divide beneficiaries into cohorts based on month of transition onto the no-copay group
- ② For each quarter relative to the transition, calculate share of Wednesday drug fills that occurred on payday

Share of Wednesday fills on payday



## Step 3. Interaction

How does price sensitivity vary with liquidity sensitivity?

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We assess how the demand-response to more-generous coverage differs for liquidity-sensitive versus other beneficiaries

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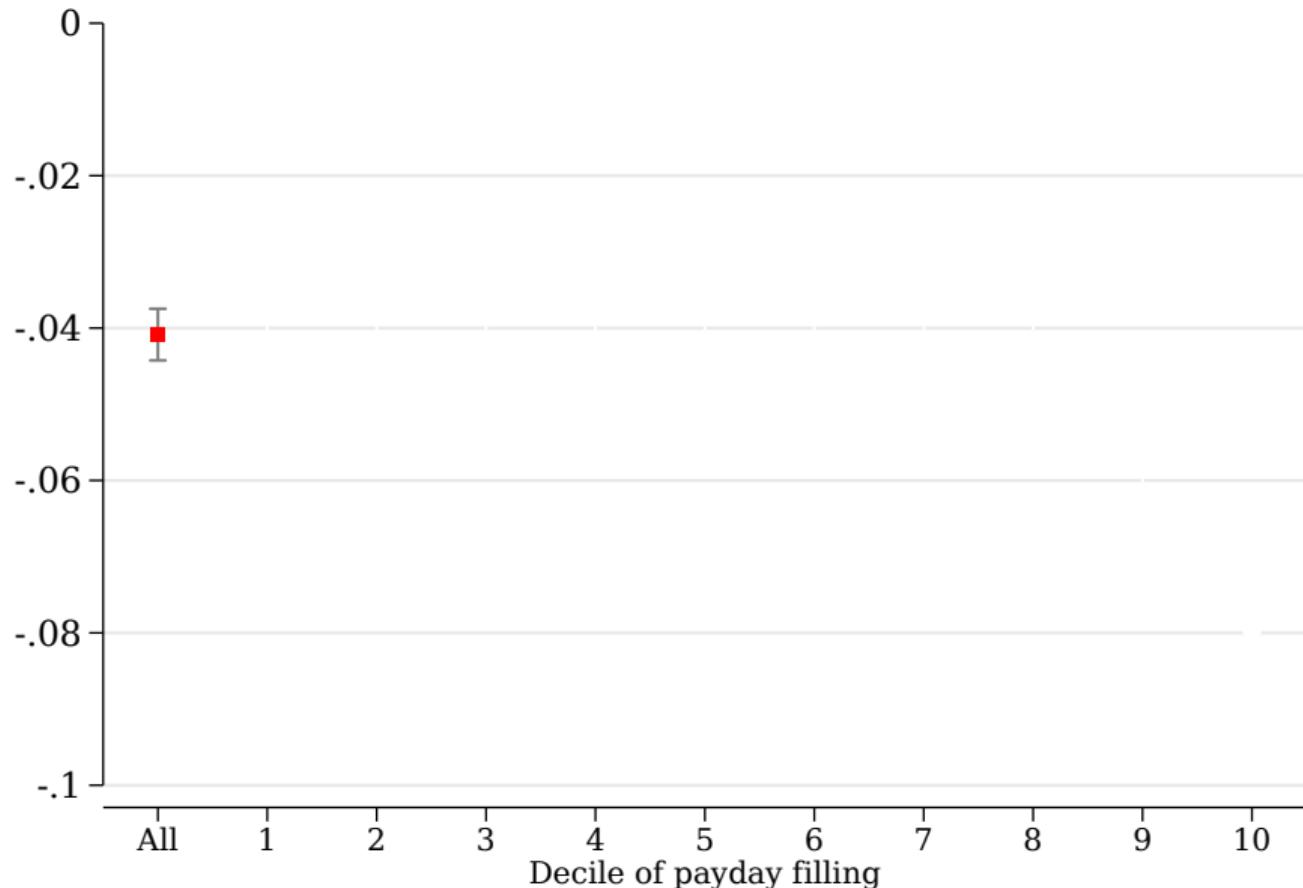
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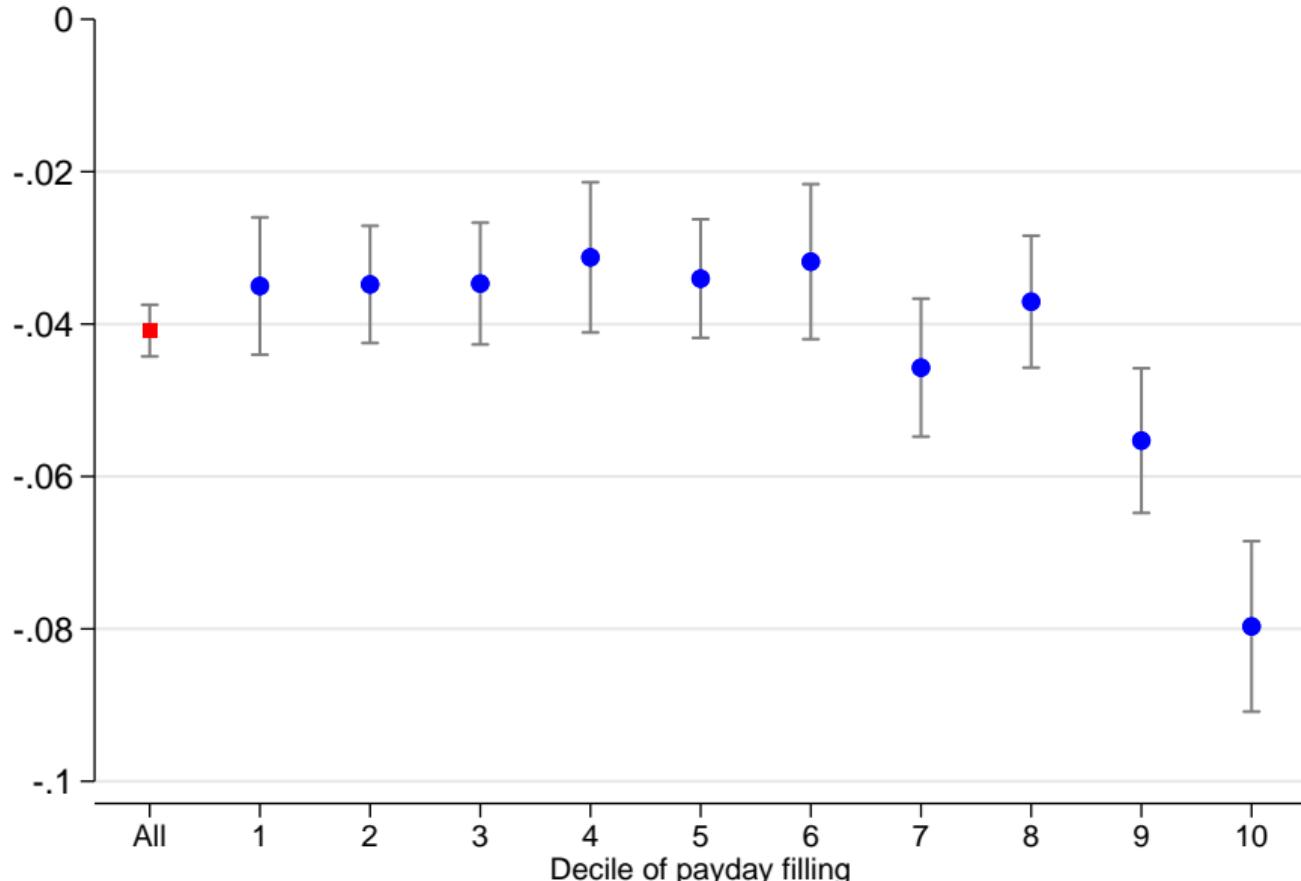
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We estimate a separate price elasticity of demand for each decile

### Estimated price elasticity of demand



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- ① People consume more drugs.
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- ③ Those who were previously most liquidity sensitive, increase their consumption the most.

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Our results suggest an additional benefit of generous insurance: Insurance allows liquidity-sensitive consumers to purchase healthcare when they need it rather than when they have cash (Ericson and Sydnor, 2018).

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Further, if CMS could “tag” the liquidity sensitive and give them Medicaid, then the overall elasticity of demand would be 13 percent lower

## Implications

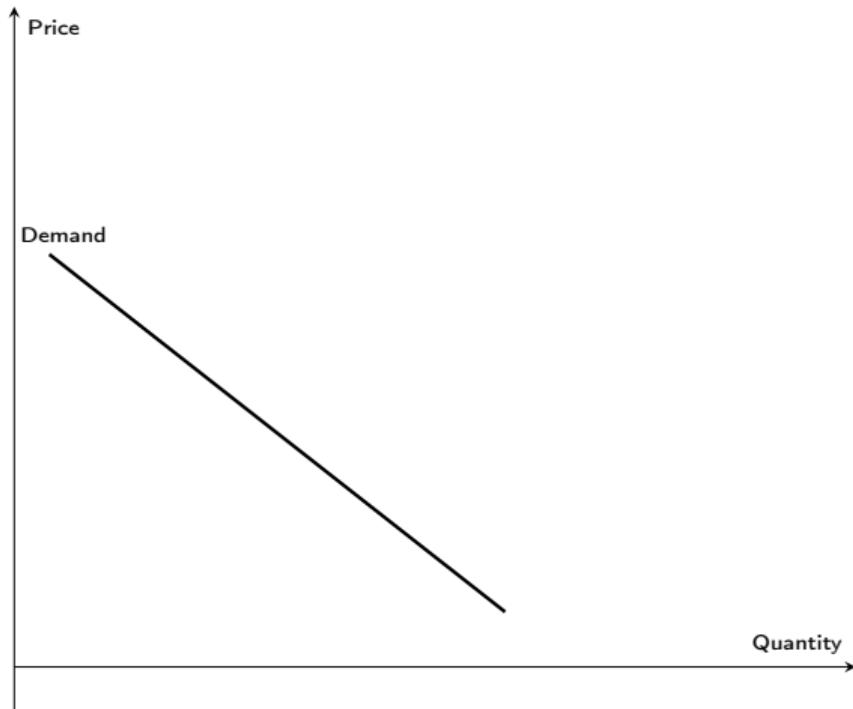
Typical discussion about cost sharing: risk protection versus moral hazard

Our results suggest an additional benefit of generous insurance: Insurance allows liquidity-sensitive consumers to purchase healthcare when they need it rather than when they have cash (Ericson and Sydnor, 2018).

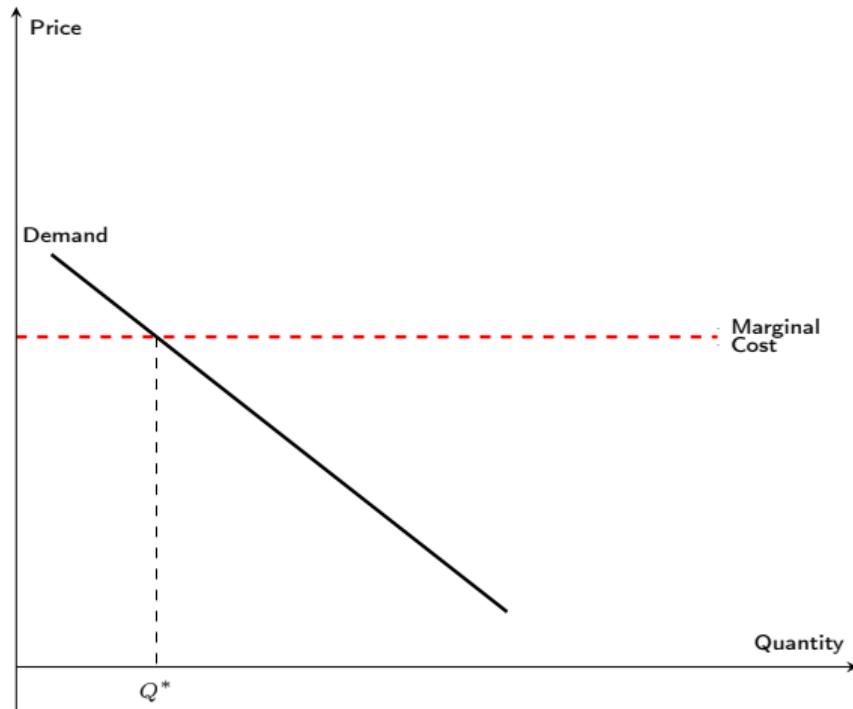
Further, if CMS could “tag” the liquidity sensitive and give them Medicaid, then the overall elasticity of demand would be 13 percent lower

We next construct a simple framework based on Baicker et al. (2015) to explore other implications

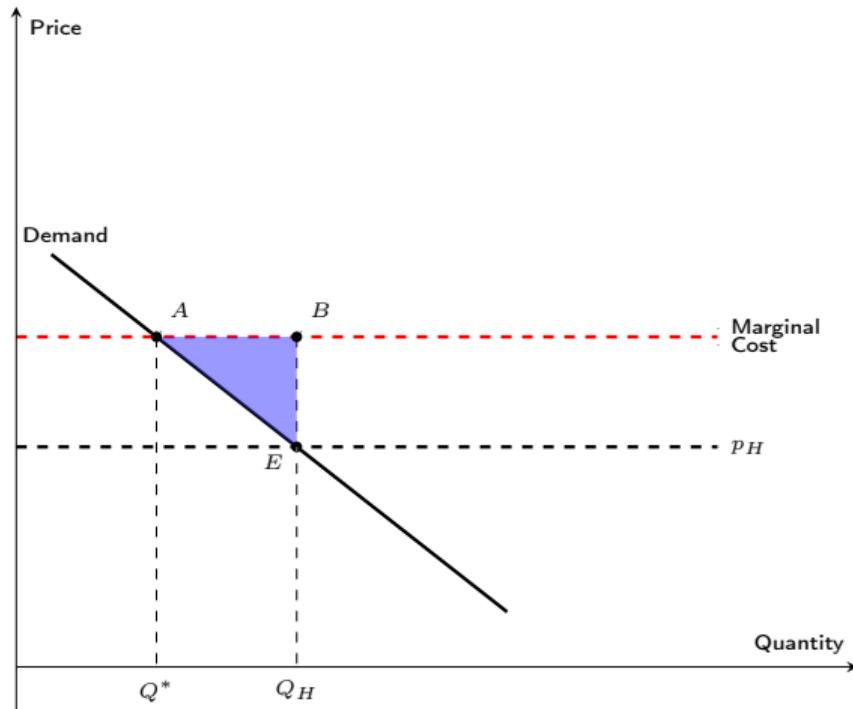
## Conventional View



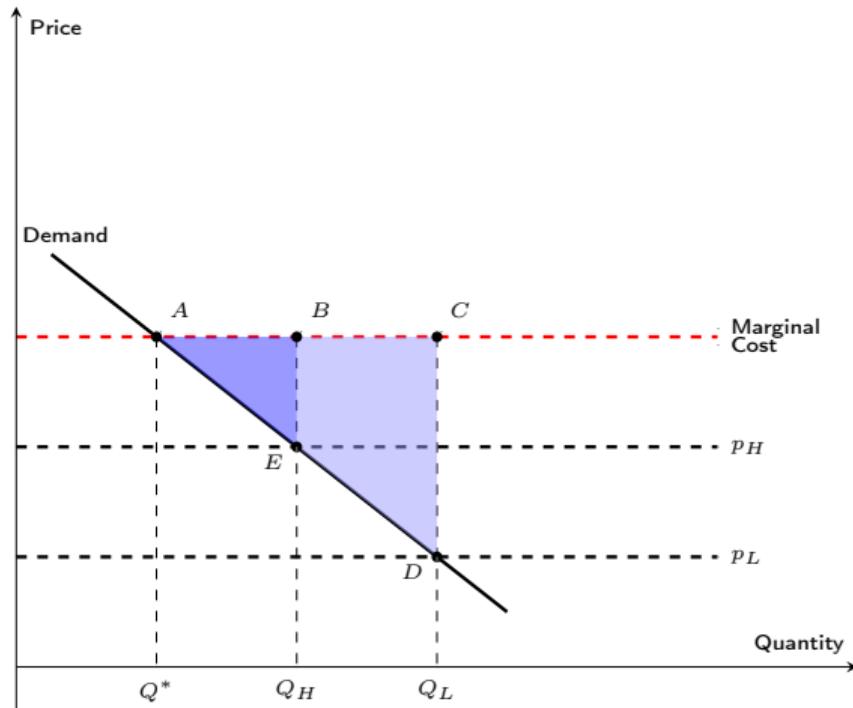
## Conventional View



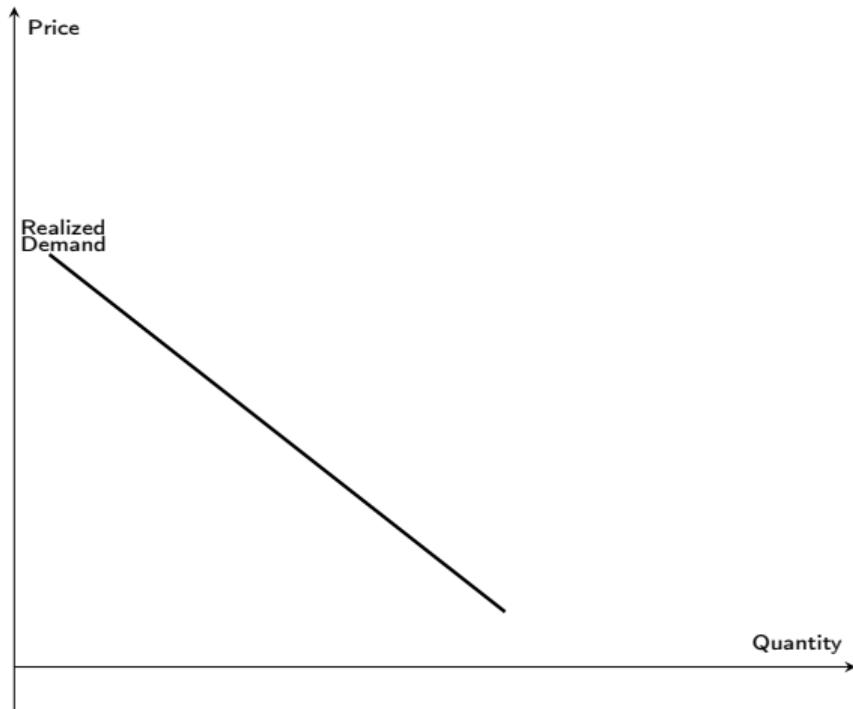
## Conventional View



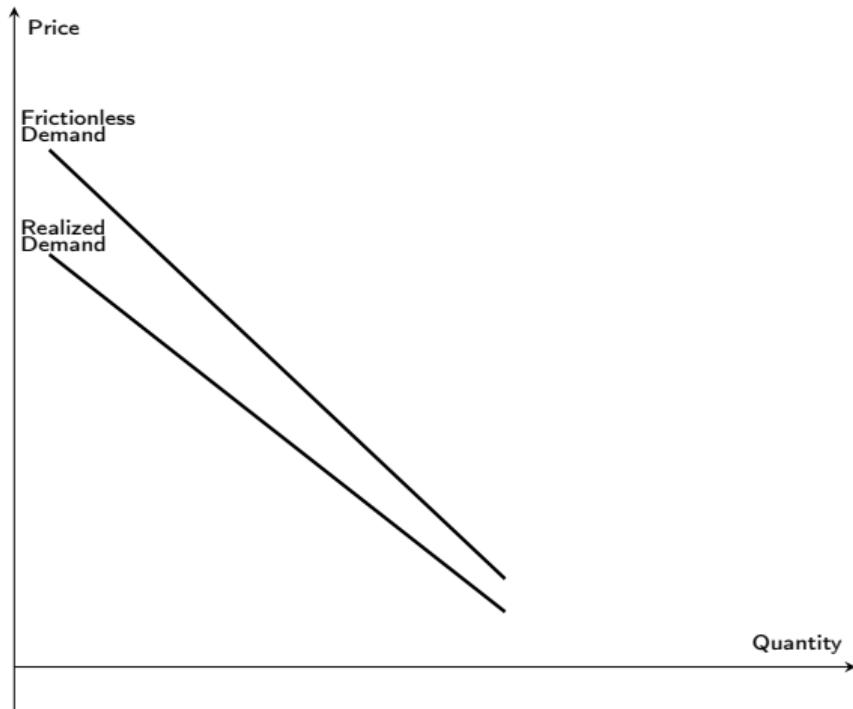
## Conventional View



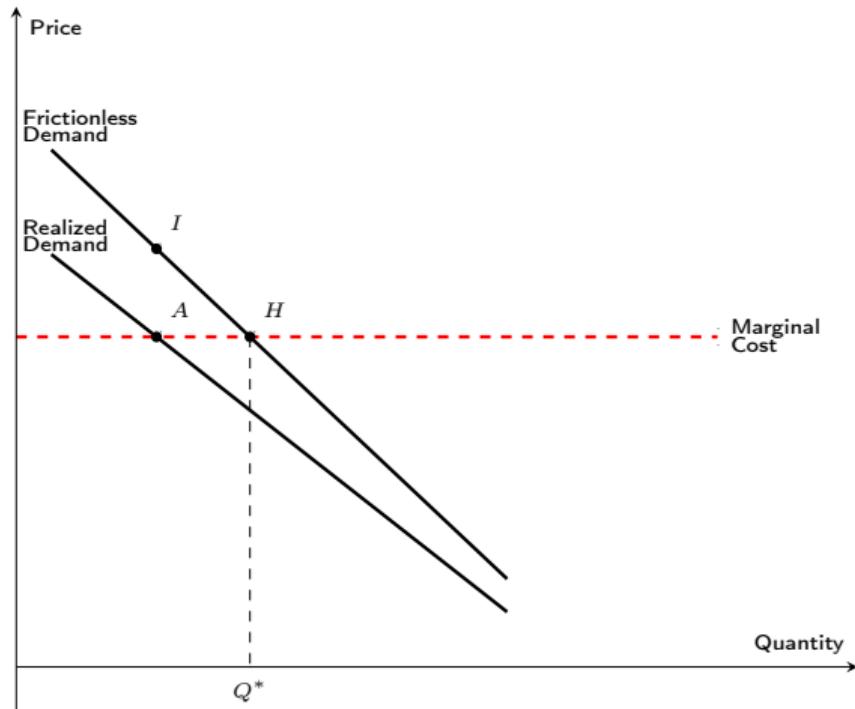
## Incorporating Liquidity



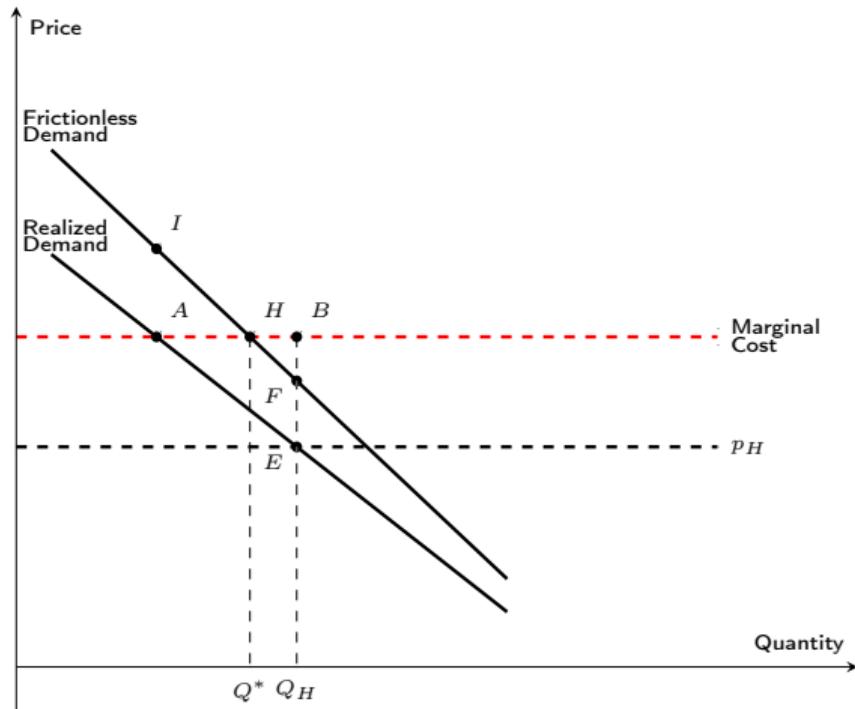
# Incorporating Liquidity



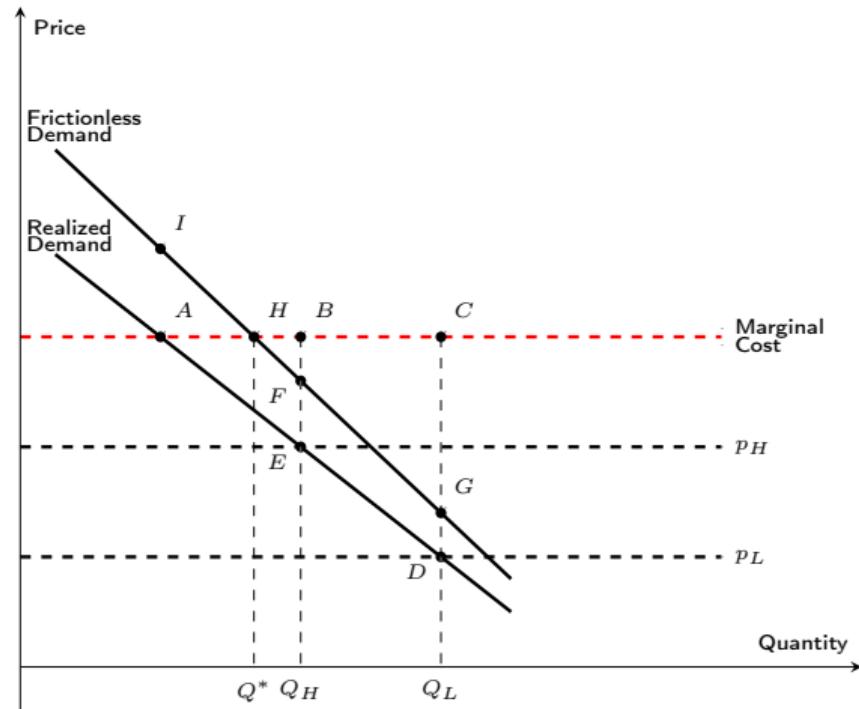
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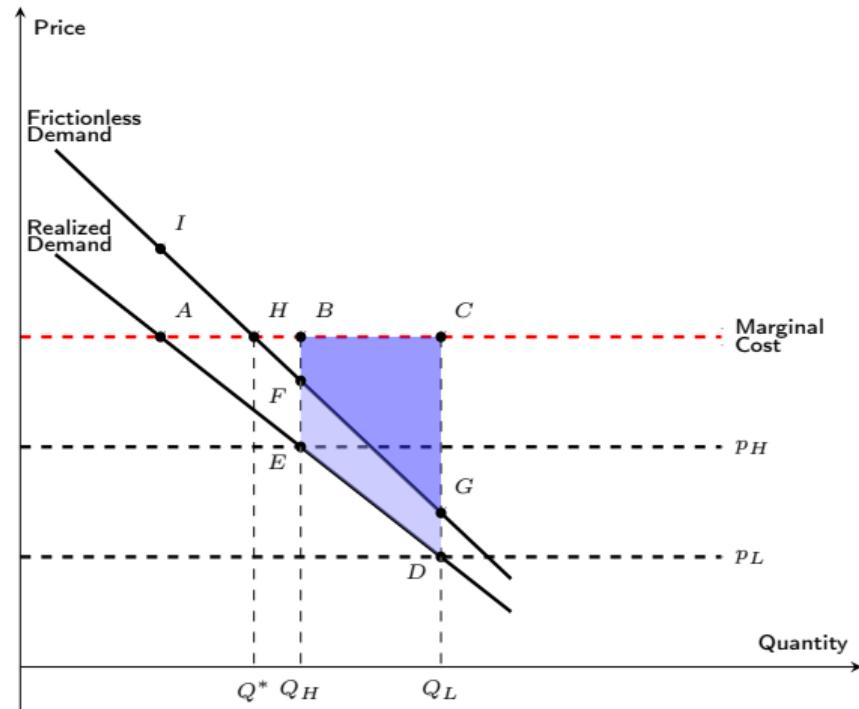
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## Numerical Estimates

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- ② One heroic assumption: if liquidity-sensitive consumers were to no longer face a liquidity-related friction, then they would exhibit the same demand curve as other recipients.
- ③ With that assumption, we can construct both the “realized” and “frictionless” demand curves and calculate deadweight loss based on each

Conventional estimate of deadweight loss	Deadweight loss accounting for liquidity	Share of deadweight loss explained by liquidity
Entire Market		
Only Liquidity Sensitive		

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- ③ Those who tend to fill scripts on Social Security paydays exhibit a price elasticity of demand that is twice as large as other recipients' price elasticity of demand
- ④ “Liquidity sensitivity” suggests that optimal copayments would be lower than the optimal copayments implied by the conventional model.