

Premium Refunds and Claiming Behaviour in the German Private Health Insurance Market

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Outline

- 1 Background
- 2 Research Design
- 3 Results
- 4 Conclusion

- An old question in health economics:
 - How **price sensitive** are health care consumers?
 - \Rightarrow **Moral hazard**: trade-off between risk sharing and incentives.

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 - Welfare consequences of (lack of) strategic behaviour.

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 - To **what prices** do consumers react?
 - Dynamic incentives – spot versus future prices.
 - Welfare consequences of (lack of) strategic behaviour.
- Additional questions:
 - How do dynamic incentives affect **service type mix**?
 - Health consequences and strategic reshuffling of non-acute care.

What we do

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 - **Intensive margin**: Level of claims above new cutoff.

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- Preview of results:
 - Dynamic incentives matter: expenditure reduced by at least € 128 (4.8%).
 - 'Automatic' and extensive margin effect identified as drivers (consistent pattern across subgroups).
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 - 'Automatic' and extensive margin effect identified as drivers (consistent pattern across subgroups).
 - Behavioural effects differ between subgroups.
- **Very preliminary**: comments welcome.

Dynamic Claiming Behaviour

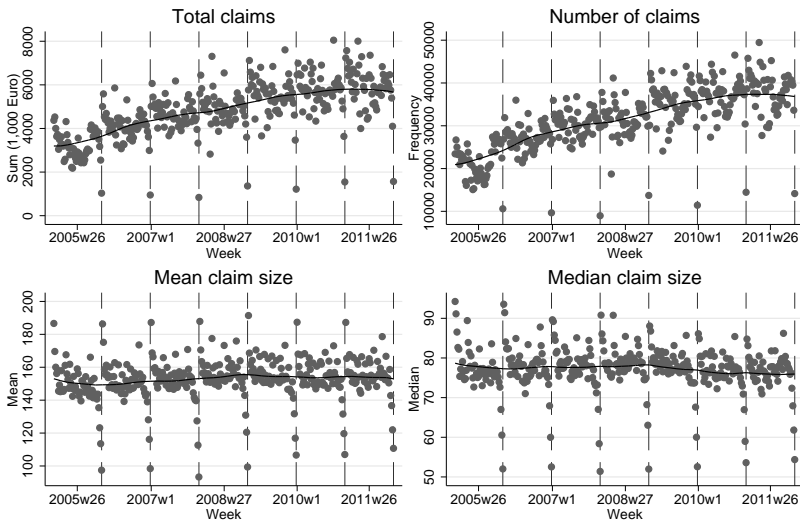


Figure 1. Outpatient Care

Dynamic Claiming Behaviour II

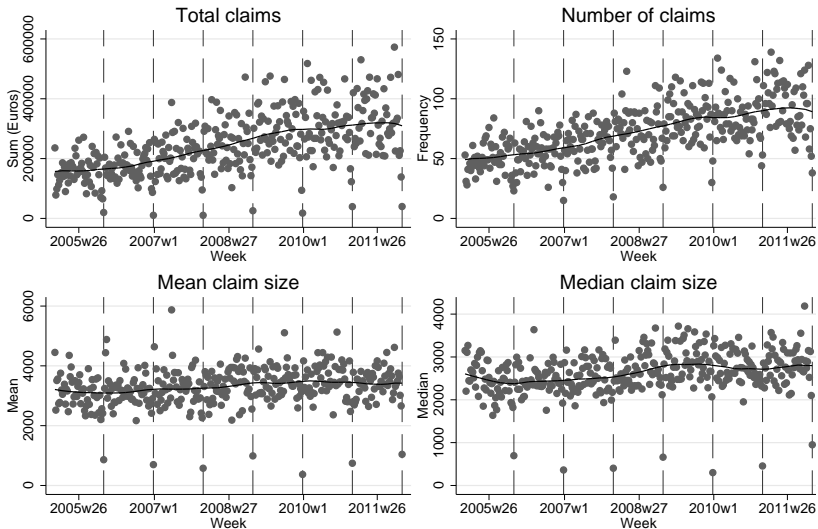


Figure 2. Inpatient Care

Dynamic Claiming Behaviour III

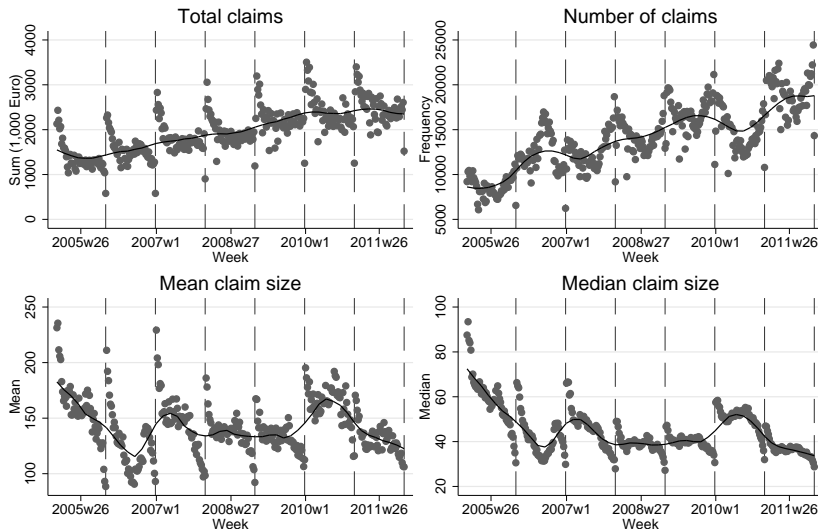


Figure 3. Pharmaceuticals

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 - Rand health insurance experiment: price elasticity -0.2 (Manning et al., 1987; Keeler and Rolph, 1988).
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- On consumer behaviour
 - Clients are completely myopic (Dalton et al, 2015; Brot-Goldberg et al, 2016)
 - Clients take future price into account (Aron-Dine et al, 2012).
- Service types driving results
 - Outpatient care (Aron-Dine et al, 2012; Haviland et al, 2015; Brot-Goldberg et al, 2016)
 - All care types (Trottmann et al, 2012; Lo Sasso et al, 2010)

- Small and selective samples (Lo Sasso et al, 2010; Aron-Dine et al, 2012; Dalton et al, 2015)
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 - Before/after analysis (Brot-Goldberg et al, 2016)
 - Anticipation effects (Brot-Goldberg et al, 2016)
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 - No exogenous changes (Lo Sasso et al, 2010; Haviland et al, 2015; Autor et al, 2014)
- Focus on special services
 - Pharmaceuticals (Dalton et al, 2015)
 - Adult vision services (Lipton & Decker, 2015)

The Intervention

- Data base: claims data for one large German PHI company, $N \approx 500,000$.
- In February 2008, sudden increase in rebates for some plans.
- Several other plans experienced no changes.

Table 1. Sample Overview and Treatment Definition

Group	Number of plans	Refundsize in monthly premiums ^a				Insurants
		2005-2007	2008	2009	2010-2011	
Treatment	6	0.5/1/1.5/2	3	1/3	1/2/3	24,707 (60%)
Treatment	2	0.5/1/1.5/2	3	1/3	–	1,755 (4%)
Control	6	0.5/1	0.5/1	–	–	14,498 (35%)

^a If claim-free for one/two/three/four consecutive years. Listed until maximum is reached.

Definitions: Relevant Cutoffs

- Denoting the deductible Δ_i and the insurance premium by Π_{it} , we may define the relevant **thresholds** as:

$$D_{0it} = \Delta_i + \Pi_{it} \times f(C_{i,t-\tau}, \dots, C_{i,t-1})$$

$$D_{1it} = \Delta_i + \Pi_{it} \times 3$$

where $f(C_{i,t-\tau}, \dots, C_{i,t-1}) \in \{0, 0.5, 1, 1.5, 2\}$.

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- Based on these, we define the **censored** outcome variable

$$C'_{it} = \begin{cases} C_{it} & \text{if } C_{it} > D_{1it} \\ 0 & \text{if } C_{it} \leq D_{1it} \end{cases}$$

Two Routes to Identification

- **Before/after analysis:** deviation from trend.
 - + Does not require possibly invalid control group.
 - Does not allow analysis to extend into the future.
- **Difference-in-Differences:** Find control group not exposed.
 - + Opens up many possibilities for the analysis.
 - Based on untestable assumption – but otherwise much weaker assumptions.

- Define the treatment effect on claims as

$$ATT^c = \int_{y=0}^{\infty} C^1(y) dF(y) - \int_{y=0}^{\infty} C^0(y) dF^0(y) \quad (1)$$

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- The second component unobserved. Impose common time trend assumption

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- If the identifying assumption is fulfilled, this is the causal effect on claims.
- However, this effect is of limited interest since the intervention changes the cutoff for claims.

- The overall effect ATT^c can be decomposed into three components:
 - 'Automatic effect': $-\int_{y=D_0}^{D_1} y dF^0(y)$
 - Extensive margin: $(F^0(D_1) - F(D_1)) \mathbb{E}_1[Y | Y > D_1]$
 - Intensive margin: $(1 - F^0(D_1)) [\mathbb{E}_1[Y | Y > D_1] - \mathbb{E}_0[Y | Y > D_1]]$

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- This decomposition comes with three additional common trend assumptions.
- Note parallel to Oaxaca-Blinder decomposition. We ignore weighting issue for now.

Before / After: Identification

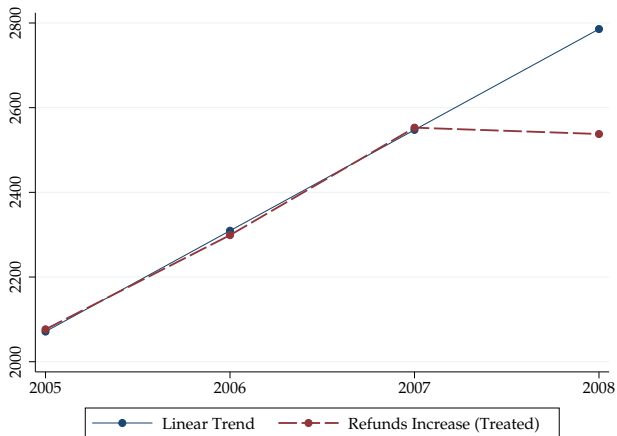


Figure 4. Mean Claims

Before/After: Identification II

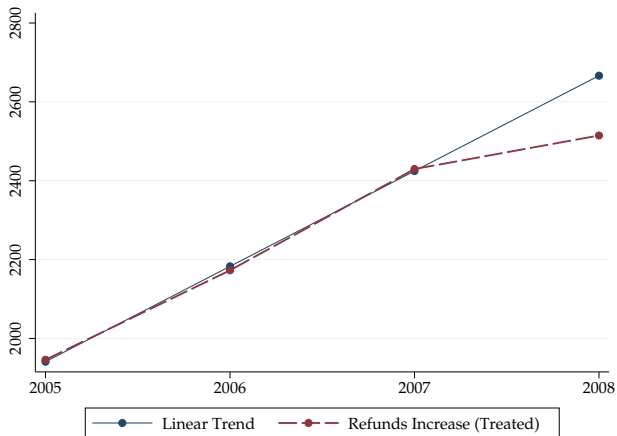


Figure 5. Mean of Claims above D_1

Before/After: Identification III

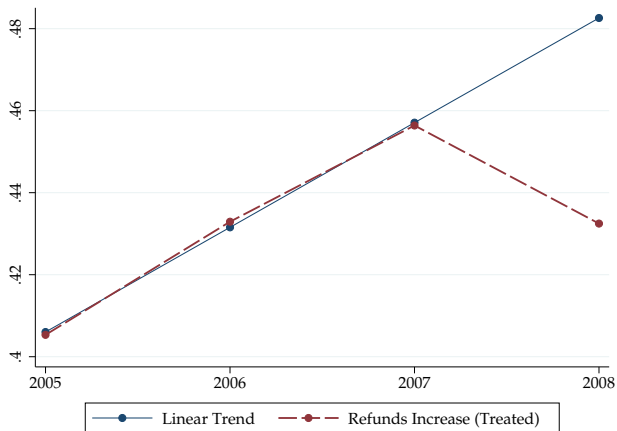


Figure 6. Probability of claiming above D_1

Table 2. DID: Descriptive Statistics (2008)

	Treated		Control	
	mean	sd	mean	sd
Female	0.09	0.29	0.35	0.48
Age	43.56	7.23	47.70	9.60
Premium	415.15	155.34	198.65	79.47
Deductible	98.94	152.79	883.92	122.87
Risk premium	0.29	0.45	0.47	0.50
Self employed	0.29	0.45	0.74	0.44
White-collar	0.68	0.47	0.17	0.38
Other occupation	0.03	0.18	0.08	0.28
Observations	26,462		14,498	

DID: Identification

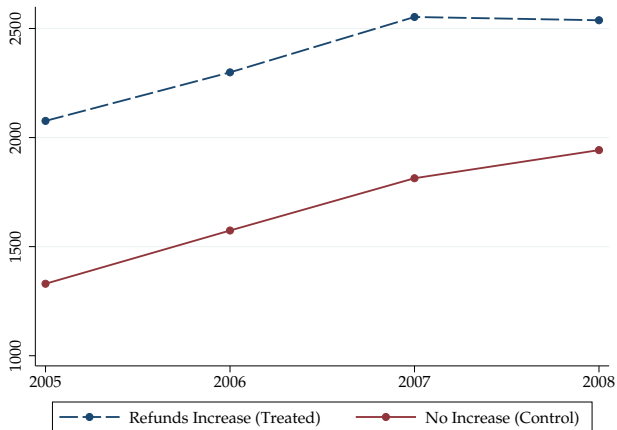


Figure 7. Mean Claims

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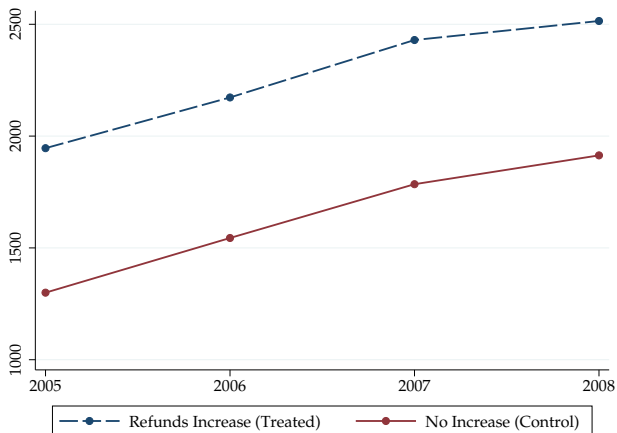


Figure 8. Mean of Claims above D_1

DID: Identification III

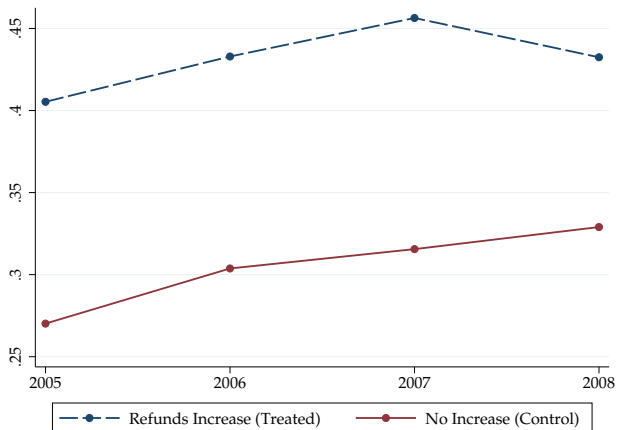


Figure 9. Probability of claiming above D_1

Results – Before-After-Comparison

Table 3. Total Claims

	Total	=	Intensive Margin	+	Extensive Margin	+	Automatic
	(1)		(2)		(3)		(4)
Effect	-258.66		-35.35		-127.19		-96.12
(s.e.)	(50.48)		(48.01)		(11.20)		(3.33)
%	100%		14%		49%		37%
Baseline					2785.73		
% of Baseline	-9.29%		-1.27%		-4.57%		-3.45%

Obtained after bootstrapping with 400 replications.

Different Specifications

Table 4. Total Claims – Different Specifications

	Before-After: Trends			DID
	Common	Plan	Individual	
Total	-258.66 (50.48)	-256.93 (49.33)	-252.62 (50.89)	-127.76 (59.31)
Intensive Margin	-35.35 (48.01)	-32.98 (47.18)	-32.22 (49.69)	68.98 (54.98)
Extensive Margin	-127.19 (11.20)	-128.00 (10.16)	-124.27 (10.80)	-88.81 (13.37)
Automatic	-96.12 (3.33)	-95.95 (3.19)	-96.12 (3.33)	-107.93 (3.38)

Table 5. Total Claims, by Age Group

	Total	= Intensive Margin	+ Extensive Margin	+ Automatic
	(1)	(2)	(3)	(4)
Age in 2005 \leq 42 (median age) ($n = 24,632$)				
Effect	-156.73	17.57	-86.04	-88.27
(s.e.)	(51.81)	(45.38)	(13.16)	(3.49)
%	100%	-11%	55%	56%
Baseline			2217.79	
% of Baseline	-7.07%	0.79%	-3.88%	-3.98%
Age in 2005 $>$ 42 (median age) ($n = 16,328$)				
Effect	-39.55	194.45	-94.69	-139.30
(s.e.)	(111.31)	(107.68)	(29.41)	(5.96)
%	100%	-492%	239%	352%
Baseline			3524.51	
% of Baseline	-1.12%	5.52%	-2.69%	-3.95%

Table 6. Total Claims, by Sex

	Total (1)	= Intensive Margin (2)	+ Extensive Margin (3)	+ Automatic (4)
Males (<i>n</i> = 33,368)				
Effect	-105.48	72.83	-75.44	-102.87
(s.e.)	(54.71)	(48.20)	(15.72)	(3.24)
%	100%	-69%	72%	98%
Baseline			2486.97	
% of Baseline	-4.24%	2.93%	-3.03%	-4.14%
Females (<i>n</i> = 7,592)				
Effect	-203.28	202.68	-229.47	-176.49
(s.e.)	(138.89)	(129.18)	(42.78)	(10.12)
%	100%	-100%	113%	87%
Baseline			4267.61	
% of Baseline	-4.76%	4.75%	-5.38%	-4.14%

Table 7. Total Claims, by Risk Group

	Total	= Intensive Margin	+ Extensive Margin	+ Automatic
	(1)	(2)	(3)	(4)
Risk premium (<i>n</i> = 14,546)				
Effect	-213.46	-8.08	-102.98	-102.40
(s.e.)	(95.81)	(92.04)	(22.18)	(6.43)
%	100%	4%	48%	48%
Baseline			2780.69	
% of Baseline	-7.68%	-0.29%	-3.70%	-3.68%
No risk premium (<i>n</i> = 26,414)				
Effect	-98.90	91.93	-80.54	-110.28
(s.e.)	(66.77)	(64.23)	(17.75)	(5.11)
%	100%	-93%	81%	112%
Baseline			2624.95	
% of Baseline	-3.77%	3.50%	-3.07%	-4.20%

Results by Type of Care

Table 8. Effects by Type of Care

Service Type	Baseline	Total		Intensive		Extensive		Automatic	
	€	€	%	€	%	€	%	€	%
All Types	2,832	-292.51	-10.33%	-31.92	-1.13%	-97.49	-3.44%	-163.10	-5.76%
Outpatient	990	-120.80	-12.20%	-11.40	-1.15%	-24.28	-2.45%	-85.13	-8.60%
Inpatient	503	-47.78	-9.50%	-25.95	-5.16%	-16.95	-3.37%	-4.88	-0.97%
Pharmaceutical	542	-51.00	-9.41%	-1.63	-0.30%	-14.45	-2.67%	-34.92	-6.44%
Dental	594	-47.42	-7.99%	13.90	2.34%	-16.00	-2.70%	-45.32	-7.64%
Other	204	-38.03	-18.62%	-8.39	-4.11%	-4.49	-2.20%	-25.15	-12.31%

- Insurants **reduce claims by 5–10%** when rebates increase.
 - ‘Automatic effect’ is responsible for lion’s share.
 - But **important behavioural changes** too: **fewer claims** above the new cutoff.
 - Intensive margin: nothing or small reduction – exception dental care.
 - Pattern also apparent in subgroups.
 - Thus, clients are not entirely myopic.

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- Large **heterogeneity** in effects.
 - ‘Automatic effect’ same in all groups.
 - But behavioural effects are stronger for **females** and the **older** subgroup.

Conclusion

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 - But **important behavioural changes** too: **fewer claims** above the new cutoff.
 - Intensive margin: nothing or small reduction – exception dental care.
 - Pattern also apparent in subgroups.
 - Thus, clients are not entirely myopic.
- Large **heterogeneity** in effects.
 - ‘Automatic effect’ same in all groups.
 - But behavioural effects are stronger for **females** and the **older** subgroup.
- Results visible for all care types, in particular **outpatient** and **other**; less **dental**.

Backup slides

Identification – DiD

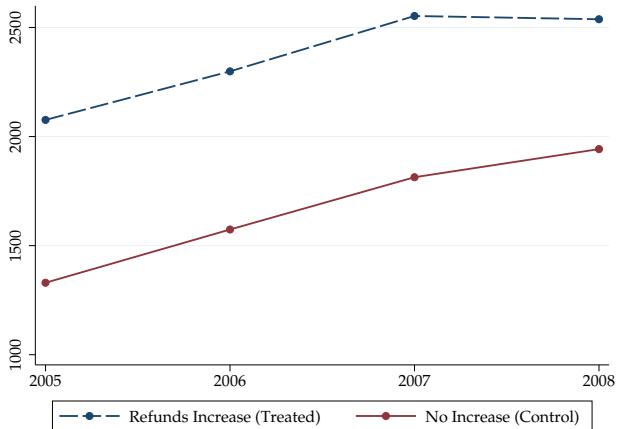


Figure 10. Mean Claims

Identification II – DiD

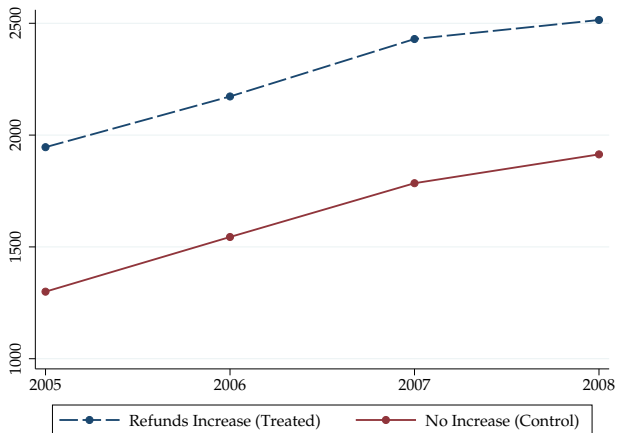


Figure 11. Mean of Claims above D_1

Identification III – DiD

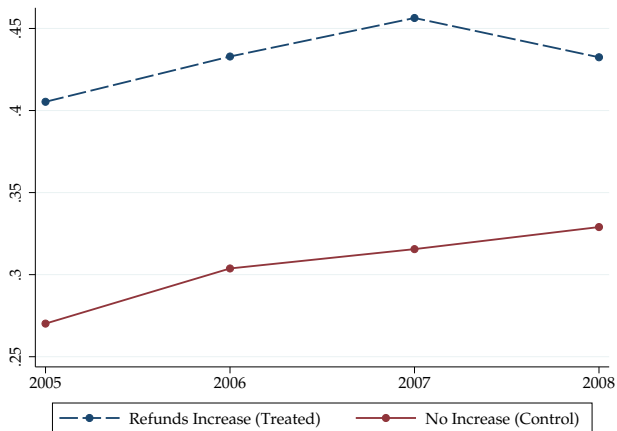


Figure 12. Probability of claiming above D_1

Results – deviation from plan-specific trends

Table 9. Total Claims

	Total	=	Intensive Margin	+	Extensive Margin	+	Automatic
	(1)		(2)		(3)		(4)
Effect	-256.93		-32.98		-128.00		-95.95
(s.e.)	(49.33)		(47.18)		(10.16)		(3.19)
%	100%		13%		50%		37%
Baseline					2785.73		
% of Baseline	-9.22%		-1.18%		-4.59%		-3.44%

Obtained after bootstrapping with 400 replications.

Results – deviation from individual trends

Table 10. Total Claims

	Total	=	Intensive Margin	+	Extensive Margin	+	Automatic
	(1)		(2)		(3)		(4)
Effect	-252.62		-32.22		-124.27		-96.12
(s.e.)	(50.89)		(49.69)		(10.80)		(3.33)
%	100%		13%		49%		38%
Baseline					2785.73		
% of Baseline	-9.07%		-1.16%		-4.46%		-3.45%

Obtained after bootstrapping with 400 replications.

Table 11. Total Claims – DiD Specification

	Total	= Intensive	+ Extensive	+ Automatic
		Margin	Margin	
	(1)	(2)	(3)	(4)
Effect	-127.76	68.98	-88.81	-107.93
(s.e.)	(59.31)	(54.98)	(13.37)	(3.38)
%	100%	-54%	70%	84%
Baseline			2665.57	
% of Baseline	-4.79%	2.59%	-3.33%	-4.05%