Additional results for Are private physicians more likely to veto generic substitution of prescribed pharmaceuticals?

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Abstract

Here results from additional estimations mentioned in the text are presented.

1 Additional results

Table AI first presents results from some of the specifications that were tested when specification 1 was chosen and then, in the fourth column, results obtained when not controlling for ATC-groups. Specification 5 and 6 differ from the baseline specification by controlling for age using the continues variable age and age-squared, and indicator-variables for patients 65 or 80 years of age or older, respectively, instead of by using indicators for 5-year age groups. Specification 7 differs from the baseline specification by included date of prescription as a continues variable (*Date*) instead of controlling for it by using quarter-dummies. Also other specifications were tested, for example controlling for age with the continues variables age and squared age at the same time as date of prescription was included as a continues variable. As for the specifications included in Table AI, the estimates obtained from these specifications are close to those obtained from the baseline specification.

In the paper results for age-, ATC-groups, municipalities and quarter of prescription were suppressed in order to save space. For the baseline specification all results, except for the 882 ATC-groups, are presented in Table AII. The estimates for the ATC-groups are available upon request. The omitted age-group is children up to and including 4 years of age, Umeå is the omitted municipality and the omitted quarter of prescription is the fourth quarter of 2002. Table AIII shows that the variables in each group of variables have jointly significantly effect of the probability of a veto. Hence, that all but one odds ratios for the age groups, and many of the odds ratios for municipalities and quarter of prescription are not significantly different from unity, is likely due to high intra-group correlations.

The first and second column of Table AIV present results obtained when controlling for if the prescription was written at a Jörn's health centre or the employee managed health centres (*Employ*) and when including observations that lack data of ATC-group or that do not belong to any ATC-group, respectively. The third and fourth column of Table AIV present results obtained when sampling weights were not used and when observation where the patient has opposed substitution were excluded, respectively. The estimators for the former specification can be biased, as mentioned in the paper.

In the first column of Table AV coefficients estimated with probit are presented. To facilitate comparison, the second column presents calculated odds ratios based on the probit estimates. The last two columns of the table present results obtained when price-difference in 100 SEK between the prescribed and the cheapest generic substitute, ΔP, was included separately as well as interacted with the copayment-variables. When interpreting the estimates regarding ΔP, one has to consider both how prices are set and the construction of the pharmaceutical insurance. First, the estimated positive effect of ΔP could be caused by reversed causality: if physicians often veto substitution for a pharmaceutical, the price-difference between that and the cheapest generic substitute might be increased. The price differences are also higher in groups with expensive pharmaceuticals. Thus, the estimates for ΔP could reflect that the price difference is correlated with the probability of having zero copayment in the end of the year. Following this line of argument, it is not unexpected that the estimate for $\Delta P * Copay0$ is below unity, since ΔP were not correlated with the probability of having zero copayment in the end of the year for those who already had zero copayments.

The first column of Table AVI presents results obtained when excluding observation where no substitute was available for the prescribed pharmaceutical. The second and third column contains results, mentioned in the result section, that was obtained when restricting the sample to only antibacterial drugs and when including dummy-variables indicating that a brand name pharmaceutical was prescribed as well as an interaction-variable between this variable and *Private*. As mentioned in the paper, controlling for the pharmaceutical the physicians have chosen causes endogeneity. Private physicians are estimated to be approximately 42% more likely to veto substitution when a brand name product is prescribed and 8% more likely otherwise. A weighted average of these two figures is obvious below the estimate of 50% obtained from specification 1. Hence, these figures reveal that endogeneity causes bias in the estimator of the average *Private*-effect in specification 18. The bias arises since I have conditioned on the choice between brand name and other pharmaceutical and since private physicians apparently were more likely to choose brand name products. (This bias also affects the odds ratio for *Private* in specifications 14 and 15, since private physicians also were more likely to prescribe more expensive pharmaceuticals.) However, the results suggest that a large part of the difference between the two physician groups' likeliness to veto substitution can be explained by private physicians having stronger brand name loyalty. Firstly, the difference between private and county employed physicians' likeliness to veto substitution was approximately five times higher when brand name pharmaceuticals, compared to non-brand name ones, were prescribed. Secondly, private physicians were more likely to prescribe brand name products, a decision that is highly correlated with the probability of a veto.

Finally, the last column of Table AVI presents results obtained when excluding observations written at Dragonen's health center between February 2006 - when the contract regarding privatization of the health centre was signed - and June 2006.

Table AI. Estimation results, odds ratio

	5	6	7	8
Private	1.50**	1.51**	1.49**	1.38*
	(0.24)	(0.24)	(0.24)	(0.25)
*Copay*50	1.19***	1.19***	1.19***	1.23***
	(0.03)	(0.03)	(0.03)	(0.03)
*Copay*25	1.31***	1.32***	1.31***	1.36***
	(0.04)	(0.04)	(0.04)	(0.05)
*Copay*10	1.40***	1.41***	1.39***	1.49***
	(0.04)	(0.04)	(0.04)	(0.04)
*Copay*0	1.98***	1.99***	1.98***	1.97***
	(0.14)	(0.15)	(0.14)	(0.22)
Unsub	1.35***	1.34***	1.35***	0.60***
	(0.13)	(0.13)	(0.13)	(0.04)
Free	0.88	0.84	0.92	0.60***
	(0.48)	(0.44)	(0.52)	(0.09)
Women	1.09*	1.09*	1.09**	0.99
	(0.06)	(0.05)	(0.05)	(0.06)
Skellefteå	0.68***	0.68***	0.68***	0.74*
	(0.09)	(0.09)	(0.09)	(0.12)
Lapland	0.53***	0.53***	0.53***	0.57***
	(0.06)	(0.07)	(0.06)	(0.12)
Age	1.01			
	(0.01)			
Age^2	1.00			
	(0.00)			
$Age \geq 65$		1.03		
		(0.03)		
$Age \geq 80$		0.94		
		(0.05)		
Date			1.02***	
			(0.00)	
AIC	50,910	50,910	50,986	57,674
Pseudo R^2	0.1430	0.1430	0.1418	0.0224
Sample size	346,392	346,392	346,384	368,519

Notes: The asterisks ***, ** and * denote significance at the 1%, 5% and 10% levels. Robust standard errors are shown in parentheses. Estimation results are suppressed for municipalities in all specifications, for ATC-groups is specifications 5-7, for quarter of prescription in specifications 5, 6 and 8, and also for age-groups in specifications 7 and 8. These results are available from the author upon request.

Table AII. Estimation results, odds ratio. Baseline specification

		Age :		*Mun* :		*Quarter* :	
Private	1.50** (0.24)	5-9	1.00 (0.11)	*Nordm.*	0.68*** (0.08)	2003:1	0.78*** (0.05)
*Copay*50	1.18*** (0.03)	10-14	1.32** (0.16)	*Bjurh.*	0.92 (0.11)	2003:2	0.61*** (0.04)
*Copay*25	1.31*** (0.04)	15-19	0.88 (0.14)	*Vindeln*	0.77*** (0.08)	2003:3	0.77*** (0.07)
*Copay*10	1.39*** (0.04)	20-24	0.76 (0.15)	*Robert.*	0.65 (0.27)	2003:4	0.85** (0.08)
*Copay*0	1.97*** (0.14)	25-29	0.90 (0.22)	*Norsjö*	1.21 (0.18)	2004:1	0.88** (0.08)
Unsub	1.35*** (0.13)	30-34	0.94 (0.24)	*Malå*	0.74*** (0.06)	2004:2	0.79** (0.07)
Free	2.46 (1.90)	35-39	0.86 (0.20)	*Storu.*	0.95 (0.09)	2004:3	0.88 (0.08)
Women	1.10** (0.05)	40-44	0.92 (0.21)	*Sorsele*	1.11 (0.10)	2004:4	1.08 (0.13)
Skellefteå	0.68*** (0.09)	45-49	0.93 (0.20)	*Dorotea*	0.76*** (0.08)	2005:1	1.13 (0.14)
Lapland	0.53*** (0.07)	50-54	1.03 (0.24)	*Vännäs*	0.90 (0.17)	2005:2	1.19 (0.18)
		55-59	1.00 (0.23)	*Vilhelm.*	0.88 (0.12)	2005:3	1.34** (0.17)
		60-64	1.07 (0.24)	*Åsele*	1.88*** (0.19)	2005:4	1.35*** (0.14)
		65-69	1.07 (0.25)	*Lycksele*	1.42*** (0.11)	2006:1	1.71** (0.40)
		70-74	1.01 (0.22)	*Ske.*	0.84 (0.12)	2006:2	1.41*** (0.18)
		75-79	0.99 (0.22)	*Other county*	0.93 (0.14)	2006:3	1.34* (0.20)
		80-84	0.98 (0.21)			2006:4	1.28 (0.20)
		85-89	0.95 (0.20)				
		90-94	0.91 (0.20)				
		95-99	1.12 (0.32)				
		100-104	1.12 (0.53)				
AIC							50,891
Pseudo R^2							0.1434
Sample size							346,381

Notes: The asterisks ***, ** and * denote significance at the 1%, 5% and 10% levels. Robust standard errors are shown in parentheses. Estimation results for ATC-groups are suppressed in order to save space, but are available from the author upon request.

Table AIII. Wald test. Baseline specification

Variable group	Chi^2-value	Prob>Chi^2
$Copay_c$ $c \in (1,4)$	246.30	0.0000
$Unsub, Free$	12.12	0.0023
Age_a $a \in (1,20)$	189.62	0.0000
ATC_g $g \in (1,882)$	29471.47	0.0000
Mun_m $m \in (1,15)$	320.54	0.0000
$Skellefteå, Lapland$	28.21	0.0000
$Quarter_q$ $q \in (1,16)$	267.94	0.0000

Table AIV. Estimation results, odds ratio

	9	10	11	12
$Private$	1.48**	1.49**	1.28*	1.54***
	(0.23)	(0.24)	(0.17)	(0.25)
$Copay50$	1.18***	1.18***	1.24***	1.17***
	(0.03)	(0.03)	(0.02)	(0.03)
$Copay25$	1.31***	1.32***	1.27***	1.31***
	(0.04)	(0.03)	(0.03)	(0.04)
$Copay10$	1.39***	1.39***	1.07***	1.44***
	(0.04)	(0.04)	(0.03)	(0.04)
$Copay0$	1.97***	1.99***	2.33***	1.93***
	(0.14)	(0.15)	(0.18)	(0.14)
$Unsub$	1.35***	1.36***	1.10	1.36***
	(0.13)	(0.12)	(0.09)	(0.14)
$Free$	0.88	1.72**	0.89	0.90
	(0.51)	(0.45)	(0.56)	(0.52)
$Women$	1.09**	1.09*	1.03	1.10**
	(0.05)	(0.05)	(0.04)	(0.05)
$Skellefteå$	0.70***	0.67***	0.65**	0.68***
	(0.09)	(0.09)	(0.06)	(0.10)
$Lapland$	0.53***	0.53***	0.60***	0.52***
	(0.07)	(0.07)	(0.06)	(0.07)
$Jörn$	1.07			
	(0.08)			
$Employ$	0.81			
	(0.12)			
AIC	50,888	50,673	335,168	30,651
Pseudo R^2	0.1435	0.1438	0.1322	0.1525
Sample size	346,384	367,705	346,384	205,636

See notes to Table II in the paper.

Table AV. Estimation results, odds ratio and coefficients, respectively

	13-coeff.	13-OR	14	15
Private	0.17**	1.37**	1.39***	1.39***
	(0.07)	(0.17)	(0.17)	(0.17)
*Copay*50	0.06***	1.16***	1.23***	1.21***
	(0.01)	(0.03)	(0.03)	(0.04)
*Copay*25	0.10***	1.26***	1.25***	1.22***
	(0.01)	(0.04)	(0.04)	(0.04)
*Copay*10	0.13***	1.35***	1.24***	1.15***
	(0.01)	(0.04)	(0.04)	(0.04)
*Copay*0	0.28***	1.75***	1.96***	2.10***
	(0.13)	(0.15)	(0.13)	(0.17)
Unsub	0.11***	1.29***	1.00	1.00
	(0.03)	(0.10)	(0.12)	(0.13)
Free	-0.03	0.92	1.55	1.39
	(0.22)	(0.48)	(0.99)	(0.91)
Women	0.04**	1.07**	1.11***	1.11***
	(0.02)	(0.03)	(0.04)	(0.04)
Skellefteå	-0.16***	0.76***	0.75***	0.76***
	(0.05)	(0.07)	(0.07)	(0.07)
Lapland	-0.27***	0.66***	0.63***	0.63***
	(0.05)	(0.07)	(0.07)	(0.07)
ΔP			1.29***	1.34***
			(0.04)	(0.03)
$\Delta P * Copay50$				1.02
				(0.03)
$\Delta P * Copay25$				1.02
				(0.02)
$\Delta P * Copay10$				1.07*
				(0.04)
$\Delta P * Copay0$				0.91***
				(0.03)
$\Delta P * Unsub$				1.02
				(0.09)
$\Delta P * Free$				1.26
				(0.25)
AIC	50,974	50,974	68,784	68,659
Pseudo R^2	0.1420	0.1420	0.1282	0.1298
Sample size	346,384	346,384	240,511	240,511

Notes: For specifications 13 the coefficients obtained from the probit estimation are reported as well as calculated odds ratios. The latter are calculated using the definition of odds ratio presented in footnote 28 of the paper and discrete effects of the independent variables estimated using Stata/SE 9.0. Odds ratios are reported for specifications 14 and 15. The lower numbers of observations in these two specifications are caused by missing information on prices.
Also, see notes to Table II in the paper.

Table AVI. Estimation results, odds ratio

	16	17	18	19
Private	1.53***	1.42	1.08	1.75***
	(0.18)	(0.51)	(0.17)	(0.25)
*Copay*50	1.18***	1.16	1.15***	1.16***
	(0.03)	(0.21)	(0.03)	(0.03)
*Copay*25	1.30***	0.93	1.25***	1.27***
	(0.04)	(0.22)	(0.03)	(0.03)
*Copay*10	1.33***	1.31	1.28***	1.35***
	(0.05)	(0.31)	(0.03)	(0.04)
*Copay*0	1.91***	2.39***	1.85***	1.85***
	(0.12)	(0.51)	(0.14)	(0.09)
Unsub	1.06	0.75	1.13	1.33***
	(0.14)	(0.26)	(0.10)	(0.13)
Free	3.25	#	1.24	2.61
	(4.64)		(0.57)	(1.93)
Women	1.13***	1.00	1.09**	1.12***
	(0.05)	(0.12)	(0.05)	(0.04)
Skellefteå	0.79**	0.54	0.70***	0.77**
	(0.09)	(0.25)	(0.07)	(0.09)
Lapland	0.64***	0.39***	0.52***	0.64***
	(0.07)	(0.14)	(0.06)	(0.06)
Brand			6.27***	
			(0.63)	
$Private * Brand$			1.34***	
			(0.12)	
Clinic				1.58***
				(0.22)
Dragonen's				0.76***
				(0.04)
$Dragonen's^{private}$				1.58***
				(0.10)
AIC	49,477	808	48,805	50,774
Pseudo R^2	0.1214	0.1004	0.1756	0.1477
Sample size	260,761	9,393	342,634	346,951

Notes: # In specification 17 Free is dropped due to collinearity. Also, see notes to Table II in the paper.