Consumer Loyalty in the Swedish Pharmaceuticals Market*

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Abstract

In this paper, we study consumer loyalty for pharmaceutical products, using a dataset of 897,000 observations where consumers were asked if they wanted to pay the price-difference in order to get the prescribed pharmaceutical instead of the cheapest available generic substitute. The main result is that consumers are substantially more loyal toward brand name pharmaceuticals and branded generics than toward "true" generics, which give support to the idea that brand-name recognition is important in creating consumer loyalty for pharmaceutical products. These results are of importance for both pharmaceutical firms and for government agencies regulating the pharmaceutical industry.

Keywords: Brand loyalty; Branded generics; Parallel import; Generic competition.

JEL classification: D12; I11

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1 Introduction

A substitution reform came into effect on October 1, 2002, in Sweden. This reform requires that after the physician visit, when the consumer wants his/her prescription from the physician dispensed, the pharmacists must inform the consumers if there are substitute products available, as well as that the cheapest available substitute product would be provided within the Swedish pharmaceuticals insurance system. The pharmacist must also inform the consumers that they can buy the prescribed pharmaceutical product instead of the substitute if they pay the difference in price between the products themselves.[1] As such, the new regulations provide a possibility to study consumer loyalty in the pharmaceutical market.

Previous literature have often focused on different aspects of brand loyalty in pharmaceuticals markets (e.g. Grabowski and Vernon, 1992; Hellerstein, 1998; Richard and Van Horn, 2004; Rizzo and Zeckhauser, 2005). However, the main focus of these papers has been brand loyalty in the physician prescription decision, rather than the brand loyalty of the consumer of the pharmaceutical product. This potential problem seems to be caused by data restrictions, where it has been impossible for the authors to disentangle the actions of the patient from the actions by their doctor. A notable exception is Coscelli (2000), who uses information about doctor and patient characteristics as well as information about when and how patients switch physicians to estimate the probability of a switch of pharmaceutical brands. Her results show that there is indeed persistence in the use of pharmaceuticals for both patients and physicians.

In this paper, we define consumer loyalty as the willingness of a consumer to oppose the switch from the prescribed brand-name, branded generic or generic pharmaceutical to a cheaper version of the pharmaceutical product, thus paying a premium for receiving the prescribed drug. Brand-name pharmaceuticals are original pharmaceutical products which previously have been patent protected. Branded generics are generic versions of the pharmaceutical product, but are like brand-name drugs sold under their own product name. "True" generics are sold under the substance name, usually followed by the company name.[2] To

[1] There is also an opportunity for the physicians to oppose exchange for medical reasons. During the first 15 months after the reform physicians chose to oppose the exchange in 3 percent of the cases, while physicians chose to oppose exchange in 2 percent of the cases during the period under study in this paper (National Corporation of Swedish Pharmacies et al., 2004; Granlund, 2008).

[2] Reiffen and Ward (2007) used "branded generics" to denote a compleatly different group of products, namely generics introduced by patent holding producers.

give an example, generics including the substance Bisoprolol, are sold under names such as Bisoprolol Ratiopharm, Bisoprolol Sandoz and Bisoprolol Stada, while the brand-name and branded generics are sold under the product names Emconcor and Bisomerck, respectively.

Consumer loyalty toward brand-name pharmaceuticals could, for example, be based on a fear that generics might not provide the same quality of treatment as branded versions of the product, or a willingness to support the R&D performed by brand-name manufacturers. If either of these factors affects consumer loyalty, an indication of this would be that loyalty would be more pronounced for the "true" brands than for the branded generics or the generics.

Consumer loyalty concerning pharmaceuticals could also be due to brand-name recognition, in which case pharmaceutical companies could find it profitable to invest in their own product name, as long as consumers are willing to pay a premium for these products that outweigh the costs associated with these investments. The branded generics could then be compared to the "true" generics in order to investigate to what extent having a non-generic product name (such as Bisomerck instead of Bisoprolol Ratiopharm) will make consumers more brand loyal in the sense that they are willing to pay a premium for the product.

As such, the purpose of this paper is to test if consumer loyalty is more pronounced for brand-name drugs as compared to branded generics, as well as to test if loyalty is more pronounced for branded generics as compared to "true" generics.

The results from this study show that the probability of a consumer opposing substitution is slightly larger for brand-name pharmaceuticals compared to branded generics, and that consumers are on average about three times as likely to oppose the switch when a brand-name product or a branded generic is prescribed instead of a true generic. However, since the price-differences between the prescribed product and the cheapest available substitute is higher for brand-name drugs than for branded generics, and since a higher price-difference has a negative effect on the probability of a consumer opposing substitution, we conclude that consumer loyalty is stronger toward brand-name products than toward branded generics.

The results from this study are of importance for generic pharmaceutical firms trying to maximize their profit, but also for governments trying to regulate the pharmaceutical sector. First, we believe that profit maximizing generic pharmaceutical firms should at least consider investing in non-generic product names since this increases consumer loyalty considerably. Second, if a regulator

wanted to reduce the probability of the consumer mistaking a branded generic for a true brand name drug, the regulator could then consider banning generic pharmaceutical firms from using their own non-generic product names. This would for example reduce the possibility of the consumer mistakenly buying the branded generic believing that he/she is supporting research and development.

2 Empirical analysis

2.1 Data and empirical specifications

The county council of Västerbotten, Sweden, has provided a dataset containing information on all prescriptions sold in the county of Västerbotten, or sold in other parts of Sweden to residents of Västerbotten, between January 2003 and October 2006.[3] In this study we use the 897 090 cases from this dataset where the patients have been given the choice to deny the switch.

The baseline empirical specification (specification 1) is

$$\begin{aligned}\Pr(O_i = 1) = F(&a + \beta_1 Brand_i + \beta_2 Bgen_i + \beta_3 Other_i + \beta_4 Parallel \\ &+\beta_5 NotMD_i + \beta_6 Female_i + \sum_{a=2}^{20} \eta_a Age_{ai} + \beta_7 100DDDs_i \\ &+ \sum_{m=2}^{16} \eta_m Mun_{mi} + \sum_{t=2}^{43} \kappa_t Trend_{ti} + \sum_{g=2}^{252} \mu_g ATC_{gi} + \epsilon_i). \qquad (1)\end{aligned}$$

The dependent variable (O_i) takes the value one in the 16.88 percent of the observations when the patient opposed substitution. Indicator variables which equal one if the prescription is for a brand-name pharmaceutical ($Brand$) or branded generic ($Bgen$) are included to study the presence of consumers' brand loyalty. An indicator variable ($Other$) is also included for products that do not belong to any of the groups generics, brand-name pharmaceuticals or branded generics. This group consists of, for example, vitamins and/or minerals (i.e. Vitamin B 12 and different calcium combinations).

We also control for if the prescribed pharmaceutical product is parallel imported ($Parallel$). Parallel imported pharmaceuticals are legally imported without the permission of the patent, copyright, or trademark holder of that pharma-

[3] Prescriptions sold in November and December 2003 and September 2004 are not available since the county council's data files for these months was damaged. For a more detailed description of the data, the reader is refered to Granlund (2008).

ceutical. These products are usually market by firms which are less well known by consumers, which might affect their likeliness to oppose substitution.[4]

$NotMD$ indicates that the prescription is written by someone other than a medical doctor, i.e. a dentist or a nurse. This indicator variable is included since patients' likeliness to veto substitution might depend on perceptions about the prescriber's ability to evaluate different pharmaceutical treatments. In addition, we control for the consumer's gender by including the indicator variable $Female$, and age by including indicator variables for 5-years age-groups. The municipality of residence of the consumer (Mun) and the month the prescription was dispensed ($Trend$) are included to control for socioeconomic differences between municipalities and possible changes in consumer attitudes toward substitution over time. Finally, we control for the number of defined daily doses prescribed (DDD) and to which 7-digit ATC code group (ATC) the prescribed pharmaceutical belongs to.

There are two additional specifications estimated and presented below. The first one differ from the baseline specification by also including an interaction term taking the value one if the prescribed pharmaceutical is classified as branded generic, generic or other and is also parallel imported ($Parallel*NotBrand$). The second one differs from the baseline specification by including the difference in price in SEK 100 between the prescribed pharmaceutical and the cheapest available generic substitute (ΔP) and this price-difference per defined daily dose ($\Delta P/DDD$).[5] In all estimations a maximum-likelihood logit estimator was used.[6]

Including price-differences might be problematic for two reasons. First, for the price-difference to be observable, both the prescribed pharmaceutical and the cheapest generic substitute must be sold during the current month. If no, or all, consumers oppose substitution of a pharmaceutical during a month, the price-difference is therefore less likely to be observable, meaning that selection bias arises when price-differences are included. In our dataset this is indeed the case, and about one third of the sample is lost when we include price-differences. Second, pharmaceutical firms likely take consumer loyalty into account when setting prices, making the price-differences endogenous. As such, the results from specification three should be interpreted with caution, but we still present them since they might help readers to judge the robustness of the results. As

[4] For a more elaborate discussion regarding parallel imported pharmaceuticals, see Ganslandt and Maskus (2004) and references therein.

[5] On 30 April 2008, USD/SEK = 6.00 and EUR/SEK = 9.34.

[6] Several other specifications have been tested, which all gave the same qualitative results. These results can be found at www.hui.se under research.

discussed below, we will be able to draw qualitative conclusions regarding consumer loyalty without controlling for (endogenous) price-differences.

Some descriptive statistics are presented in Table 1. For the different indicator variables the percentage of the material which belongs to each category are presented. For the continuous variables means and standard deviations are presented instead. The value for ΔP in the first column shows that the average price-difference is SEK 47. The corresponding figures by pharmaceutical classification are *Brand*: SEK 71; *Bgen*: SEK 12; *Gen*: SEK 11 and *Other*: SEK 4. The value for ΔP in the second column shows that those who opposed substitution paid an average premium of SEK 23.[7]

Table 1 here.

2.2 Estimation results

The results from the estimations of equation (1), as well as from the alternative specifications discussed above are reported in Table 2, while marginal effects[8] are reported in Table 3. The results from the first two specifications show that the probability of a consumer opposing substitution is slightly larger for brand-name pharmaceuticals compared to branded generics. Since the price-differences are higher for brand-names and since a higher price-differences has a negative effect on the probability of a consumer opposing substitution,[9] we conclude that consumer loyalty is stronger toward brand-name products. The opposite pattern is found in the third specification, but this is likely due to selection- or endogeneity bias as discussed above.

Also, the results show a large difference between the probability of a consumer opposing substitution for brands and branded generics compared to ordinary generic products. According to the marginal effects, consumers are on

[7] National Corporation of Swedish Pharmacies et al (2004) found that the corresponding average premium for the entire Swedish market during the first 15 months after the substitution reform was SEK 18. It was found to be SEK 19 in our dataset for the same time period, indicating that our data from Västerbotten is fairly representative for Sweden.

[8] The calculations of the marginal effects are performed using the method suggested by Caudill and Jackson (1989). This method takes explicit account of the fact that we want to measure a discrete difference in probabilities depending on if dummy variables takes the value zero or one.

[9] The results from specification 3 indicate that the probability of a consumer opposing substitution is negatively affected by the price-difference: $\partial \Pr(O_i = 1)/\partial \Delta P = -0.14 + 3.36/67.29 = -0.09$. Thus, this estimate support the well known fact that consumers, ceteris paribus, prefer lower prices, but the results from specification 3 should, as mentioned, still be interpreted with caution.

average about three times as likely to oppose the switch when a brand-name product or a branded generic is prescribed instead of a generic. Since the price-differences are lowest for generics, this result is not driven by consumers financial incentives. Thus, we can conclude that consumer loyalty is considerable weaker toward generics than toward branded generic and brand-name products.

Table 2 here.
Table 3 here.

3 Discussion

This paper can be seen as a first effort to investigate if and to what extent consumer loyalty exist in the Swedish pharmaceuticals market in the sense that consumers are willing to pay a premium in order to receive the prescribed pharmaceutical instead of a cheaper generic version.

The empirical results indicate that consumer loyalty is strongest for brand-name pharmaceuticals. The results also indicate that consumer loyalty is considerably weaker toward "true" generics as compared to both brand-name pharmaceuticals and branded generics. These results support the idea that brand-name recognition is important in creating consumer loyalty toward pharmaceuticals, and we believe that generic pharmaceutical firms should therefore consider investing in their own non-generic product name in order to increase sales.

There are also some policy conclusions that could be drawn from the results presented in this paper. If, for example, a regulator wanted to reduce the probability of the consumer mistaking a branded generic for a true brand name drug, the regulator should consider banning generic pharmaceutical firms from using their own non-generic product names. The possibility of the consumer mistakenly buying the branded generic believing that he/she is supporting research and development would then be reduced considerably. This (rather paternalistic) policy could even be taken one step further if the regulator wanted substitution between all different types of pharmaceutical products to be as easy as possible. This could then be achieved by stating that all pharmaceuticals should be sold under their substance name followed by the company name, and physicians and pharmacy personnel could be trained accordingly.

A final question that should be discussed is why consumers are more loyal to branded generics compared to ordinary generics sold under the substance name. One possibility is that consumers are more easily convinced by the pharmacy personnel that the cheapest generic substitute is equivalent to the

prescribed generic, since their names indicate this. As mentioned above, another explanation to our results might be that consumers mistake branded generics for being original brand-name pharmaceuticals. However, given the available data it is not possible to know if consumers are aware of the difference between these two types of products, but this is an interesting question for future research.

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Table 1. Descriptive statistics:

Variable	Population	$O = 1$	$O = 0$
O	16.88	1.00	0.00
$Brand$	55.96	53.50	56.46
$Bgen$	16.44	29.74	13.74
Gen	21.57	10.15	23.89
$Other$	6.03	6.61	5.91
$Parallel$	19.48	4.46	22.55
$Parallel$*$NotBrand$	0.03	0.00	0.04
$NotMD$	0.02	0.02	0.02
$Female$	59.71	60.80	59.48
Age	60.02±18.59	62.12±17.48	59.60±18.78
DDD	67.29±59.06	71.11±65.92	66.52±57.53
ΔP	0.47±1.25	0.23±0.64	0.53±1.37
$\Delta P/DDD$	0.01±0.03	0.01±0.04	0.01±0.03
Population size	897,090	151,453	745,637

Note: For Parallel and Parallel*NotBrand 6,317 observations are missing, for Female 506 are missing, and for the last two variables 288,740 observations are missing,

Table 2. Estimation results, coefficients

Variable	1	2	3
$Brand$	1.65***	1.65***	1.40***
	(0.01)	(0.01)	(0.02)
$Bgen$	1.59***	1.59***	1.59***
	(0.02)	(0.02)	(0.02)
$Other$	0.03	0.06	-1.62
	(0.92)	(0.92)	(1.37)
$Parallel$	-1.06***	-1.01***	-0.94***
	(0.02)	(0.02)	(0.02)
$NotMD$	-0.26***	-0.26***	-0.15**
	(0.04)	(0.04)	(0.06)
$Women$	0.16***	0.16***	0.15***
	(0.01)	(0.01)	(0.01)
100 $DDDs$	-0.07***	-0.07***	-0.10***
	(0.01)	(0.01)	(0.01)
$Parallel * NotBrand$		-1.41***	
		(0.11)	
ΔP			-0.14***
			(0.01)
$\Delta P/DDD$			3.36***
			(0.17)
Observations	890,231	890,231	604,042
Pseudo-R^2	0.30	0.30	0.32

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

Table 3. Estimated probabilities (a) and marginal effects (b)

Variable	1		2		3	
	a	b	a	b	a	b
Generic	7.22		7.20		13.34	
Brand	22.66	15.44	22.61	15.41	28.91	15.57
		(0.23)		(0.26)		(0.21)
Bgen	21.83	14.62	21.80	14.61	31.50	18.16
		(0.26)		(0.26)		(0.36)
Other	7.40	0.18	7.55	0.36	4.38	-8.96
		(5.48)		(5.60)		(5.35)
Domestic	17.87		17.81		23.85	
Parallel	8.59	-9.28	8.86	-8.95	13.64	-10.21
		(0.11)		(0.12)		(0.27)
MD	17.00		17.00		22.72	
$NotMD$	14.41	-2.59	14.43	-2.57	20.93	-1.79
		(0.36)		(0.36)		(0.70)
Male	16.02		16.02		21.62	
Female	17.64	1.62	17.64	1.62	23.46	1.83
		(0.07)		(0.07)		(0.10)
Domestic &/or Brand			16.99			
*Parallel*NotBrand*			6.14	-10.85		
				(0.57)		
100 $DDDs$		-0.71		-0.71		-1.22
		(0.07)		(0.07)		(0.10)
ΔP						-1.69
						(0.14)
$\Delta P/DDD$						41.09
						(1.43)

Notes: The reported values are the estimates multiplied by 100. The a-columns report the estimated average probability of a consumer opposing substitution, conditioned on the observation belonging to each category. The b-columns report the average marginal effects, estimated by the method suggested by Caudill and Jackson (1989), and average standard errors, estimated by the delta method. A high ratio between an *average* marginal effect and the *average* standard error indicates that the marginal effect is significant for many observation, but it is not correct to talk about significance for the *average* marginal effects.