Retail Entry Effects on Pharmaceuticals prices: a view from large retail chains in Brazil[♦]

Eduardo Pontual Ribeiro
IE-UFRJ

Victor Gomes
UnB

Resumo

Preços de remédios são uma questão relevante de política pública em muitos países. Genéricos foram introduzidos como força competitiva no mercado de medicamentos. Já o papel da competição no varejo de farmácias e drogarias para reduzir preços de remédios é um ponto quase inexplorado na literatura internacional e desconhecido no Brasil. Usando um banco de dados ímpar com mais de 50mil informações de preços de medicamentos em cada loja de uma rede de varejo, propomos um modelo econométrico para avaliar o papel da entrada e rivalidade de firmas nos medicamentos mais vendidos. O modelo diferenças-em-diferenças para entrada de lojas para as cinco maiores redes do varejo de medicamentos nacional aponta para reduções de 5% a 7% nos preços médios para mercados com um dois ou três competidores em relação a um mercado com monopolista. O efeito sobre o preço de genéricos é ainda maior, chegando a 10%. Mercados com uma quarta grande rede competidora não apresentam diferenças significativas de preços em relação a um mercado com três rivais.

Palavras Chave: competição no varejo, preços de remédios, diferenças-em-diferenças, genéricos.

Área ANPEC 8: - Microeconomia, Métodos Quantitativos e Finanças

Abstract

Pharmaceutical prices are an important public policy issue in many countries. In the case of Brazil patent and non-patent (generic) drugs coexist and are sold at retailers in packages with no manipulation. The role of retailer competition on pharma is a little explored topic. Using a unique data set of over 50,000 pharmaceuticals prices at each store for a large retail chain, we explore the role of entry and competition on the most sold drugs (patent, generic and OTC). A difference-in-difference model of large retail chain store date-of-entry for the 5 main retail chains suggest significant price decreases from the first and second competitor to an incumbent on the range of 5%-7%. The effect on generics is even larger, reaching 10%. A third competitor does not generate significant price decreases.

Key words: retail competition, pharmaceuticals prices, generics

JEL: C23, L11, L4

Introduction

Pharmaceuticals prices are an important public policy issue. Different countries regulate prices in different fashion, ranging from almost liberated prices, subject to market forces, to centralized price controls. Evidence from the World Health Organization shows that in Brazil and others emerging markets median medicines prices are well above international reference prices. Also medication expenditures can account for a higher fraction of income and out-of-pocket payments for several developing countries[1].

Many countries, generics have been introduced to create a competitive force to reduce prices on patented and non-patented drugs (e.g. Salkever and Frank, 1997, Saha et al. 1995, Reiffen and Ward, 2005). Caves, Whiston and Hurwitz (1991, p.28) argue that branded drug prices fall 2% with the entry of the first generic producer, 8.5% with five generic competitors and 15 and 22% with ten and twenty generic producers, respectively.

On the other hand, retail effects on pharmaceutical prices are lesser known (the few papers are summarized in Danzon and Furukawa, 2011; see also Stargardt et al, 2007). In this paper we argue that pharmaceuticals price variation can be strongly affected by competition at the retail level. Putting in another way, retail competition is an important factor in lowering drug prices for consumers.

The Brazilian market has consolidated rapidly in the past 10 years with the rise of five national or quasi-national retail chains. There is a large fringe of small, single store 'mom-and-pop' pharmacies/drugstores. Retail chains, on the other side of the market, are recognized as a strong competitive force, taking up 25% of the market (IMS 2012). The market consolidation can lead to two opposing effects. On one direction, market consolidation may concentrate the market and lead to higher consumer prices. On the other direction, retail chains are able to deal directly with manufacturers, eliminating the role of distributor and avoiding a margin placed on drug prices by these distributors.

Drug prices in Brazil are subject to a maximum price regulation in their first years of release. In practice they are free to float, particularly for generics. Generics are non-branded and produced by more than one company, and presented by the active

---

[1] Prices are the "median consumer price ration of selected medicines" from WHO (2013). The definition of the series is "Median consumer price ratio of selected originator medicines". In Brazil the median consumer price ratio of selected medicine is 11.32 for Rio Grande do Sul state. For other Latin American economies those figures are around 4-5.

ingredient (IMS, 2012). Thus, we believe that there is large scope for producer competition and retail competition to influence drug prices, particularly for generics, larger than Danzon and Furukawa(2011) argue.

This paper provides empirical evidence of retail competitive price pressure on a basket of 30 top pharmaceuticals, equally divided between prescription, OTC and generics in Brazil. Our data set obtained recorded prices for more than 50,000 transactions, on the last business day of each month over a 24 month period for the five largest pharmacy retail chains in the country, geographically located by store. We use as treatment entry of a chain in a local market. Given time, location variation on chain entry, we are able to control for log-additive location and time effects that may confound the effect of entry on prices. In other words, casual effects were verified by the "natural experiment" approach, which is widely documented in economics and in other social and biological sciences (see, e.g., Angrist and Pischke, 2009).

This analytic method became popular on antitrust analysis in the U.S. in the renowned case of a merger between two office supply superstores – *Staples* and *Office Depot*. The FTC challenged this merger in 1997.[2] In the *Staples-Office Depot* case, empirical and econometric evidence showed that the prices of products sold on markets with three suppliers were lower than on markets with two suppliers, which, in turn, were cheaper than on markets with only one rival, after eliminating other factors that could explain price differences not due to competition. The evidence obtained was compelling enough to support the idea that the merger was problematic from a competition policy view, with expected higher prices for the end consumer. Johnson (2008) provides an overview of the relation of entry models to competition and their effect on prices.

A great advantage of the selected empirical method in this paper is that it deals directly with final prices. This is an important indicator, perhaps the most relevant one, of firm competition behavior, particularly when products can be recognized in other dimensions. In the retail sector, quality of service, location, and other factors influence the sales service, yielding different trade margins for the sold products, depending on the quality of service. Therefore, comparing the same product, from the same manufacturer, in different outlets in the same retail chain, price differences should reflect the retail margin, that depends ultimately in local competition conditions. The

---

[2] See Federal Trade Commission v. Staples, Inc, 970 p. Sup. 1066, United States District Court for the District of Columbia, 1997 and Ashenfelter et al. 2006.

ease with which consumers can compare prices as the upshot of the sales service, recommends the analysis of price changes, as evidence of rivalry between companies. A recent survey of these methods is Hosken et al., 2015)

Advancing our results, markets with two large retail chain competitors have prices about 5% smaller than markets with only one retail chain. The effect on generics is even larger, reaching 11%. A third competitor in a local market generates additional price decreases, at a smaller rate, but a fourth competitor is not associated with smaller prices that a three-large retail chain market structure. While a pro-competitive effect of entry on pharmacies prices have been described by Schaumans and Verboven (2008) for Belgium, we provide previously unknown results for a developing/middle income country.

The paper is divided as follows. Following this introduction, we describe the empirical method in detail. The empirical results are in the third section and the last section provides final comments.

2. Data and Empirical Method description

The usual empirical analysis of causal effects identification in a firm competition analysis consists in exploiting the differences in price behavior between local markets controlling for the differences in potentially confounding variables using regression analysis with fixed effects per market (Cameron and Trivedi, 2010, e.g.). As mentioned earlier, location effects captures local demand shocks or cost shocks that do not change (or change very slowly) over time, such as epidemiological profile, the distance from the factory or distance from supplier infrastructure. In addition, as in the *Staples* case analysis, aggregate price behavior over time is controlled for with time dummies (that also account for seasonality).

In the present empirical exercise, we estimate the effects from large pharmacy chains competition on prices at each municipality, as a proxy for geographical relevant market[3]. We assess the presence of stores belonging to large chains on individual prices

---

[3] The Brazilian antitrust authority considers as a pharmacy geographical market a city for municipalities with up to 200,000 inhabitants and city region for municipalities with population more than 200,000. See, e.g., case 08012.006043/2012-13.

and on the basket of prices. As a reference case, we used the Retail Chain "A" chain and we assessed the change in price levels in the presence of an additional chain, of two, and of three chains. We thus infer how the price level changes as a function of the presence of rivals, controlling for differences between municipalities and aggregate time effects. Rivalry among chains is inferred when the presence of specific competitors produces average price decreases in a set of products.

Drugstores and pharmacies sell a wide range of products. The competitive relevance of products and the consumers' awareness of competition depend on how important the product is for them. Hence, as in the *Staples-Office Depot* case, we use the products which are most visible to and used by consumers, that is, the most frequently sold products (products with a larger weight on the total revenue obtained by the company).

A basket of the 30 top sale pharmaceuticals (in all presentations/prescriptions) is specified, and average sale prices charged on different dates are obtained. The prices recorded are actual transactions on the last day of the month over a 24-month period (January 2010 to December 2011). The data were obtained from the database of 'loyalty' cards of the chains. The basket of pharmaceuticals included the 30 most frequently drugs sold in Brazil (and their revenue) in 2011, sorted out as follows: 10 prescription drugs, 10 over-the-counter drugs, and 10 generic drugs. Table 1 below presents the list of drugs investigated

The information obtained from the retail chains included the addresses of branches (postal code, neighborhood, city/town, and state), and opening date or date it was acquired by the chain. In addition total chain revenue for each of the drugs in our basket was obtained. These data were used to specify weights to a price index per branch. The large chains that provided information were, in alphabetical order, BRPharma, DSP, Imifarma, Onofre, Pague Menos and Raia-Drogasil. Prices from one of them was used as dependent variable and for confidentiality reasons is denominated Retail Chain "A" hereafter.

Tabela 1: Medicines included in the study

Sal eno	OTC
Dipirona sodica	Generic
Neosaldina	Reference
Dorflex	Reference
Tylenol	OTC
Parecetamol	Generic
Benegripe	OTC
Nimesulida	Generic
Hipoglos	OTC
Citrato de sildenafila	Generic
Torsilax	OTC
Maleato de enalapril	Generic
Losartana potássio	Generic
Buscopan	OTC
Novalgina	OTC
Amoxilina + clavo	Generic
Dermacyd sabonet	OTC
Sinvastatina	Generic
Omeprazol	Generic
Pantoprazol	Generic
Diovan hct	Prescript
Bisulfato de clopitrogrel	Generic
Gerovital	OTC
Crestor	Prescript
Lexapro	Prescript

Fonte: Ofício 5653/2012 - CADE

Our empirical analysis lends itself very easily to antitrust case use. It consists in comparing the level and variation of prices over time charged by a specific firm in different markets, which are characterized by the number of large, rival, chains and by the identity of these competitors. After controlling for other factors that might produce differences in prices over time or between markets, such as wholesale prices (aggregate prices), local sales conditions (e.g., income, taxation) and the purchasing power of consumers (consumer basket), which could also be associated with the number of local competitors, the price differences measured by econometric tools can be attributed to

the competitive relationship only, generating, thus, factual evidence of rivalry between companies.

Two approaches will be used to calculate the dependent variable (drug prices): individual prices of each of the selected products and branch mean prices. The latter allows for store comparison more directly, at the cost of less variation in prices and possible negative price correlations within branches (composition effect), used to attract customers with a specific price but compensating it with higher prices in other drugs so to meet a branch revenue target. We will use price data on a specific day, the same for all competitors, to avoid the effect of seasonal discounts (within each month) on measures such as 'monthly average price.'

When constructing an average store price, how weights are constructed may influence the results. We use two cases. The simplest case would be a simple mean (equal weighted). Although it is not very sophisticated, it is neutral to measurement bias in the total sales by drug. Another commonly used weighting scheme is that of a basket of prices weighted by the share of each product in the total revenue of the company.[4] The weight per revenue may vary depending on the month, year, branch, etc. We use a fixed chain weight as it is the praxis for mostly used price indeces, such as IPCA and others.

The basic econometric model takes the following functional form:

$$p_{fgt} = \alpha + \mu_f + \mu_g + \delta_1 c_{1gt} + ... + \delta_m c_{mgt} + \tau_t + \varepsilon_{fgt}, \qquad (*)$$

where p_{fgt} stands for the (log) price of drug f in region g at time t. We use a drug fixed effect per drug, μ_f, as well as a fixed effect per geographical region (μ_g) to control for location demand shifters. In addition, c_{jgt} is a dummy indicating the number of rivals (one, two or three rivals, omitting the category of no rivals) in region g on date t; τ_t is a fixed effect per date, which includes the effects of seasonality for each month; and, finally, ε_{fgt} is a region-specific and date-specific unobserved component. We use the prices of a specific chain (Retail Chain "A") as dependent variable

The model above is complemented by a model in which drug prices are averaged at each branch, either as a simple or weighted average, as described above. The model simplifies to

$$p_{gt} = \alpha + \mu_g + \delta_1 c_{1gt} + ... + \delta_m c_{mgt} + \tau_t + \varepsilon_{gt}, \qquad (**)$$

---

[4] This type of basket is known as the Stone index. See Davis and Garces (2010), e.g..

The municipality is the geographic unit of analysis, as it was difficult to geo-reference all branches and the specification of their coverage areas.[5] Note that the analysis per municipality takes into account an extremely large market in the case of cities with over 200,000 inhabitants. A potential bias regarding the identification of rivalry in some of the data with a too large geographical market could *underestimate* the effects of competition by including competitors that perhaps do not have a competitive effect, actually weakening our results. On the other hand, the number of regions (big cities) where this relevantly broad market exists is relatively small in the data set and is controlled for in our robustness analysis in each model.

To assess the impact of competition on the pricing of drugs, we split our analysis in two setes or regression models: all 30 products and generics only. Information was requested from the companies about generic, prescription, and over-the-counter drugs. We decided to have a specific model for generics as they are the ones that are most frequently sold in all the stores we investigated. This also suggests that the variation in the basket of prices for all products is more closely related to the variation in the prices of generic drugs than to the variation in the prices of the other products.

We do not elaborate here on why generic drugs are more responsive sensitive to competition. Heuristics arguments can be obtained from either the demand side or from the supply side. Generic products can be the first choice of prescription as well as an alternative to the sales of prescription drugs (unique product), and price can be the most relevant competitive variable compared to the case of reference drugs, especially for they cannot enjoy their status as such.

3. Empirical estimates

Table 1 shows the regression results for all drugs. Models A and B refer to individual drug prices, while in the remaining cases they are calculated as an store average (with national chain fixed weights). As with the Staples/Office Depot case, we measured the impact of competition on baskets of prices weighted by the weight of the product in the total revenue (Models C and E). For the sake of simplicity and for a robustness check, we also built a basket of prices calculated as arithmetic mean (Model D).

---

[5] The information, after critically examined for reliability and for the percentage of typing errors, was submitted to a relatively large number of corrections so that the latitude and longitude of the stores, outside the period covered by the analysis of a merger case, could be identified.

Table 1 – Effect of the Presence of Rivals on the Prices of Major Products

Regressors		Model A	Model B	Model C	Model D	Model E
One Rival	Coefficient	**-0.0446**	**-0.0440**	**-0.0498**	**-0.0579**	**-0.0591**
	Standard error	0.0036	0.0047	0.0217	0.0281	0.0327
	p-value	0.0000	0.0000	0.0220	0.0390	0.0710
Two Rivals	Coefficient	**-0.0752**	**-0.0790**	**-0.0554**	**-0.0911**	**-0.0194**
	Standard error	0.0052	0.0063	0.0283	0.0349	0.0122
	p-value	0.0000	0.0000	0.0500	0.0090	0.1130
Three Rivals	Coefficient	**-0.0534**	**-0.0595**	**-0.0343**	**-0.0982**	**-0.0082**
	Standard error	0.0149	0.0157	0.0961	0.1038	0.0161
	p-value	0.0000	0.0000	0.7210	0.3440	0.6110
Store fixed effect		yes	yes			
Location fixed effect		yes	yes	yes	yes	yes
Time fixed effect		yes	yes	yes	yes	yes
Number of observations		49,622	26,662	3,700	1,805	1,805

Source: authors' estimates. **Notes**: the omitted category refers to municipalities at the time the company had no rival/competitor. The standard errors are robust to heteroscedasticity. The dependent variable is the log of the price of the major products sold by Retail Chain "A", from January 2010 to December 2011, in 197 municipalities. In *Models A* and *B*, the price is an average across different active ingredient presentation. In *Models C* and *D*, the dependent variable is the store unweighted average log prices from model "A". In *Model E*, the same basket was calculated as the weighted average of the sales share of each product in the annual revenue of the retail chain. In *Models B, D and E*, the sample was restricted to municipalities whose number of rivals (entry) varied.

In column A, the dependent variable are log prices for each of the 30 drugs surveyed, in each of the 24 months, in each Retail Chain "A" store, regardless of the opening date of the store, in each municipality. As we control for the aggregate drug, municipality, and time price differences, the coefficients in the Model A column can be interpreted as follows. Compared to municipalities and dates were retail Chain "A" is the sole large retailer (incumbent with no rivals), the presence of a store from a large retail change is associated with prices that are, on average, 4.46% lower. Regions and dates with the presence of two rivals, reduce drug prices, on average, by 7.52% relative to municipalities and months where Retail Chain "A" is the only large chain. In other words, we can say that a 3.06% decrease in prices is expected when a second rival store starts operating in municipalities where there existed a rival to Retail Chain "A". Last,

the average effect of the presence of three rivals compared to markets without any rival to Retail Chain "A" is estimated at a 5.34% decrease.

The "model B" column, uses the same model as in "Model A," but restricts the geographical scope to those municipalities where we do observe change from a single large chain to two, three or four chains during the data period (from January 2010 to December 2011). Regions where the number of competitors did not change are excluded. The results remain largely unchanged, indicating that the entry of large chains, rivals to Retail Chain "A", can lead to price decreases.

In the "Model C" column, we aggregate drug prices to a store average. This reduces the number of observations to about 3,700. This is model (**) above. The most noticeable difference is in precision, as well as two and three rivals effects. A competing explanation is that local price management by store management minimize the variation in average prices. Nonetheless, we may conclude that the effects were statistically and economically relevant concerning the presence of rival stores, but it should be noted that the entry of a second rival, where another one already existed, accounts for less than 1%. The participation of a third rival does not cause a noticeable effect from a usual statistical confidence standpoint, despite the negative coefficient.

Last, models "Model D" and "Model E" columns take into account only the municipalities with change in the number of rivals over time. In the former, the average prices per chain are obtained by simple mean, while in the latter, the prices are weighted according to the importance of the product for the company's revenue.

It should be noted that a simple average to construct a price index generate insignificant coefficients. In short, there is an impact of decrease of an average price in the presence of large chains, regarded as rivals. On average, when the first rival enters (two rivals in the same municipality), prices drop by approximately 4.5 to 6%. When the second rival arrives, prices go down by 7.5 to 9% compared to a market with only one large retail chain.6 When a third rival appears, which means four competitors in the market, the results are more modest and are not captured by the average price models. In Models A and B, the presence of a fourth rival makes prices fall by 5.3 to 6%.

---

[6] One of the models (Model C) shows a moderate reduction for the third rival (approximately 5.54%); however, this holds at a 95% significance level.

3.1 - Generic drugs

We called attention to the fact that generic drugs in our basket of drugs represent the largest sales share, compared to patented and OTC drugs. In addition, generics regulation allows manufacturer substitution at the pharmacy counter as prescriptions are not allowed to restrict to a specific manufacturer. This suggest the analysis of generics only. The results are presented on Table 2.

Table 2 – Effect of the Presence of Rivals on the Prices of Generic Drugs

Regressors		Model U	Model V	Model X	Model Y	Model Z
One Rival	Coefficient	**-0.1128**	**-0.1061**	**-0.0583**	**-0.0927**	**-0.0850**
	Standard error	0.0077	0.0102	0.0250	0.0309	0.0302
	p-value	0.0000	0.0000	0.0200	0.0030	0.0050
Two Rivals	Coefficient	**-0.1804**	**-0.1857**	**-0.0731**	**-0.1652**	**-0.1371**
	Standard error	0.0111	0.0132	0.0328	0.0388	0.0364
	p-value	0.0000	0.0000	0.0260	0.0000	0.0000
Three Rivals	Coefficient	**-0.1132**	**-0.1246**	**-0.0490**	**-0.2099**	**-0.1668**
	Standard error	0.0317	0.0337	0.0590	0.0659	0.0616
	p-value	0.0000	0.0000	0.4060	0.0010	0.0070
Drug Fixed Effects		yes	yes			
Local Fixed Effects		yes	yes	Yes	yes	yes
Time Fixed Effects		yes	yes	Yes	yes	yes
Number of observations		18,341	10,084	3,640	1,761	1,761

Source: authors' estimates. **Notes**: the omitted category refers to municipalities at the time the company had no rival/competitor. The standard errors are robust to heteroscedasticity. The dependent variable is the log of the price of the major products sold by Retail Chain "A", from January 2010 to December 2011, in 197 municipalities. In *Models U* and *V*, the price is an average across different active ingredient presentation. The dependent variable for models *X* and *Y* is the store simple average of log prices from Model *U*, using chain drug sales relevance weights. In *Model Z*, the same basket was calculated as the weighted average of the sales share of each product in the annual revenue of the retail chain. *Models V, Y* and *Z* samples were restricted to municipalities whose number of rivals (entry) varied.

A striking initial feature of the table, compared to Table 1 is the magnitude of coefficients. They are much higher than those obtained in Table 1, which used all products (generic, prescription, and over-the-counter drugs).

In the case of generic drugs, based on Model U, we conclude notice that the presence of a rival reduces the price of generic drugs by more than 11% compared to those municipalities and dates without any large Pharma retail chains. Markets with two rivals had, on average, an 18% lower price compared to a single retail chain market. Put

differently, the second rival induces a decrease of nearly 7% in prices, compared to markets with only two competitors, i.e., the Retail Chain "A" chain and one rival. The presence of a third rival do not reduces prices compared to the presence of two rivals. In other words, the average prices between markets with two or three rivals revealed similar levels.

This pattern of relevant and increasing effects for one and two rivals is maintained in all the other models estimated (only markets whose entry occurred over the period – Models V, Y and Z – or in which prices are average per region, i.e., weighted or simple average prices), but with lower magnitude, as in the previous table. In short, the results obtain leads one to conclude that that price reduction in the presence of one rival is almost 6 to 11%, while that of a second rival ranges from 7 to 18% compared to a market without rivals.

The fact that the effects obtained with generic drugs are stronger than when all of the investigated drugs were taken into account indicates that most of the variation (reduction) in the prices computed earlier, in Table 1, stems from pricing strategies for generic drugs. So, generic drugs are the ones that adjust more to the presence of rivals, compared to prescription (patented or not) and OTC drugs.

Final Comments

Competition in the pharmaceutical industry may be an important, market driven, channel to keep drug prices in control. While competition among manufacturers of pharmaceutical drugs have been extensively studies, including patent-generic and generic-generic competition, there is little evidence on the role of *retail* competition on pharmaceuticals price dynamics.

The Brazilian case may be of interest as regulation on prices is not very strict (maximum entry price) and overall there are no binding regulatory restrictions for drugstore location and/or entry[7]. The Brazilian pharma retail market has consolidated

---

[7] While some municipalities have enacted strict zoning laws for pharmacies, e.g., restricting the number of them within a given radius, these laws have been ruled unconstitutional by the Brazilian Supreme Court (STF) [IMS, 2014].

quickly and the five largest chains represented about 25% of the market[8]. This tends to segment the market, where the large chains compete among themselves, and a fringe small store market take prices from these chains as given.

Using a very rich data set of actual transactions and prices of the top selling 30 drugs (prescription, generics and OTC) over a 24 month period, we estimate a differences-in-differences model in a panel data structure to evaluate the effect of entry and the number of competitors on drug prices. The data was used in a merger case at CADE, the Brazilian antitrust authority.

Our results suggest that competition surrounding generic drugs seems to be fiercer than that among prescription and over-the-counter drugs. For generics, which are part of an important public policy for easier access to healthcare, we observed stronger rival entry and presence price effects, with price reductions greater than 10%, compared to markets with no rival chains.

In addition, the effects of rivalry appear in different specifications, but have different magnitudes. When an average of drug prices by store is considered, the effects are smaller. This suggests that chains charge less as a consequence of competition for specific products, making up for these reductions with other drugs, so that, usual indicators such as the average ticket price or other indicators of average revenue per purchase appear to change little across market structures.

A limitation of the above study is the relatively short time frame and use of additive in logs drug, location and time effects. Implicit is the assumption that a market size did not change significantly over the two year period and entries represent a move into a long term solution. Time varying market size effects could help identify the effects of entry under less strict assumptions, but these are not available at the frequency and coverage of the data.

References

ANGRIST, J and PISCHKE, J-S. *Mostly Harmless Econometrics: an empiricist's companion*, Princeton: PUP, 2009;

---

[8] IMS health at
http://www.raiadrogasil.com.br/raiadrogasil/web/conteudo_en.asp?idioma=1&conta=44&tipo=40282

ASHENFELTER et al.. "Empirical Methods in Merger Analysis: Econometric Analysis of Pricing in FTC v. Staples," *International Journal of the Economics of Business*, 13(2), 2006, pp. 265-279.

CAMERON, C. and TRIVEDI, P.K. *Microeconometrics: methods and applications*. Cambridge: CUP, 2005;

DANZON P. and FURUKAWA, M. Cross-National Evidence on Generic Pharmaceuticals: Pharmacy vs. Physician-Driven Markets. *NBER Working Paper Series*, 2011.

DAVIS, Peter and GARCES, Eliana. Quantitative Techniques for Competition and Antitrust Analysis. Princeton, Princeton University Press, 2010, p. 243.

HOSKEN, D, OLSON, L. and SMITH, L. Can entry or exit event studies inform horizontal merger analysis? Evidence from grocery retailing. *Economic Inquiry*, DOI: 10.1111/ecin.12208, 2015.

IMS. *Understanding the pharmaceutical value chain*. IMS Institute for Healthcare Informatics., 2014.

JOHNSON, P. *Entry Exit Event Analysis*. In ABA (eds) Issues in Competition Law and Policy. 2008.

LEE, M.J. *Microeconometrics for policy, program and treatment effects*. Oxford: University Press, 2005.

SALKEVER, D. and FRANK, R. Generic Entry and the Pricing of Pharmaceuticals, *Journal of Economics & Management Strategy*, vol. 6, no. 1, pp. 75-90 Spring 1997

SCHAUMANS, C and VERBOVEN, F. Entry and regulation: evidence from health care professions, *RAND Journal of Economics*, vol. 39(4), pages 949-972, 2008.

STARGARD, et al. Pricing behaviour of pharmacies after market deregulation for OTC drugs: The case of Germany. *Health Policy* 84, 30–38, 2007

REIFFEN, D. WARD, M. Generic Drug Industry Dynamics. *The Review of Economics and Statistics* 87(1), 37-49, 2005.