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Collusion and price-fixing of drugs in Mexico: The case of metformin (2008-2018)

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Abstract

Objective. This study aims to analyze the collusion of pharmaceutical companies that hinders competition in the pharmaceutical market and if this phenomenon leads to an increase in overpricing in government drug purchases and a decrease in social welfare.

Design and setting. A descriptive analysis was carried out based on drug purchase data by the Mexican Social Security Institute (MSSI) to the leading companies in the pharmaceutical sector, and a well-being changes analysis was carried out using the Harberger triangle method.

Results. The data shows that a consortium of drug suppliers sold metformin at a premium to one of the prominent public health institutes in the country. Furthermore, there was a highly significant decrease in well-being indices.

Conclusion. Industry executives and government officials were acting during that period as a cartel, colluding to set high prices during 2008-2018. Collusion hinders competition between companies; consequently, the consumer does not always have access to the lowest available drug price.

Keywords: Collusion; Price-fixing; Drug pricing; Triangle of Harberger; Cartelized markets; Health expenditures

1. Introduction

Households in Mexico reported a 40.5% increase in healthcare expenses related to the health emergency due to the COVID-19 pandemic. In addition, the highest percentage increase in household health expenses was related to drug consumption and other goods (52.1%), followed by private medical services with 13.9% [1]. In this context, the optimal use of the resources allocated to obtaining drugs is required, especially in those part of a prolonged or life-long treatment.

Studies on the impact of drug prices on out-of-pocket (OOP) health expenditures are not easy to conduct. In Mexico, statistical information on drug prices by type, brand, pharmacy chain, or laboratory is limited. Consequently, metformin, a drug of first choice in treating diabetes mellitus (DM), was selected [2]. DM was the second cause of death in Mexico in 2021 and caused 73,615 deaths. In 2022, DM caused 59,996 deaths, representing a decrease of approximately 18.5% compared to the previous year [3].

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In addition, the OOP health expenditures in Mexican households for the purchase of drugs for diabetes is one of the proportionally higher [4]. Thus, this paper aims to analyze economic factors, especially unethical ones such as collusion, and their impact on reducing drug access.

2. Material and method

Information on OOP drug expenditures in Mexican households was obtained from national income-expenditure surveys, which are published biannually by the National Institute of Statistics and Geography (NISG) with representative data at local and national levels corresponding to the 2020 and 2022 series [4, 5].

2.1. Data and methods

A descriptive analysis was carried out based on the information from the portal of the Mexican Social Security Institute (MSSI) [6] and the WhoIsWho.Wiki portal [7]. Drug purchase data of the MSSI to the leading companies in the pharmaceutical sector were used, both in value and units, and a well-being changes analysis was carried out using the Harberger triangle method [8].

2.2. Harberger triangle

This concept refers to the deadweight loss occurring in the trade of a good or service due to the market power of buyers or sellers or government interventions that take the shape of a curvilinear triangle in the graph involving the demand curve and supply curve, where two sides of the triangle are usually segments of the demand curve and the supply curve respectively. The third side is a straight line determined by the nature of market power and the type of government intervention. A Harberger triangle can be right-pointing, when fewer trades occur than is ideal, or left-pointing, when more trades occur than is ideal [8].

2.3. Prescribed daily dose

We used the recommended or prescribed daily dose (PDD) to evaluate and compare the costs of drugs to treat DM. It is essential to underline that the PDD does not necessarily correspond to the daily dose defined (DDD), a fixed unit of measurement. The average dose prescribed according to a representative sample of prescriptions is the prescribed daily dose (PDD). The PDD can be determined from studies of prescriptions in medical or pharmacy records, and it is essential to associate the PDD with the diagnosis on which the drug is used. The PDD will give the average daily amount of a drug prescribed. When there is a substantial discrepancy between the PDD and the DDD, it is essential to consider this when evaluating and interpreting drug utilization figures [9].

Three theoretical scenarios from 2008-2018 were used to observe how government purchases were carried out in a cartelized drug market. Moreover, these purchases were carried out under anti-competitive conditions and in collusion with government officials [10].

3. Results

3.1. Household drug expenditure

The percentage of monthly expenditure on antidiabetic drugs concerning total prescribed drugs was obtained using information from ENIGH 2020 and 2022 [4, 5]. It was observed that the highest percentage was allocated to the purchase of diabetes drugs in (14.6%), and after (15.2%) of the COVID-19 pandemic [4, 5].

3.2. Harberger triangle

Three theoretical settings were characterized in the acquisition of the drug metformin by the MSSI a government health system in 2008 – 2018, as shown in Tables 1-3. In the first setting, a comparison price of MXN 2.97 was established. This reference price of metformin corresponded to those of the US market and was used to evaluate the sales price offered by pharmaceutical companies to the MSSI.

The MSSI is one of the prominent government healthcare organizations. If the international price of the drug in the North American market is considered, that is, MXN 3.0, it is observed that the drugs were purchased with overpricing that caused a significant loss of well-being according to calculations using the Harberger triangle [11]. These hefty surcharges for metformin imply collusion by pharmaceutical companies, without government control measures being applied.

Table 1 Calculation of the loss of well-being using the Harberger triangle due to the acquisition of overpriced drugs by the Mexican Social Security Institution in 2000 -2018

Company (Period)		Total sells (MXN millions)	Unit (millions)	Sale price (MXN)	International price(MXN)	Social welfare loss in MXN	Social welfare loss in millions of units	Social welfare loss in millions of doses
A	(2009 – 2018)	75.87	10.45	7.26	2.97	22.41	7.54	3.77
B	(2009 – 2015)	38.78	5.47	7.09	2.94	11.37	3.87	1.94
C	(2009 – 2016)	8.53	0.86	9.9	2.95	2.99	1.01	0.51
D	(2010 – 2013)	17.66	2.52	7.01	3.04	5.02	1.65	0.82
E	(2009 – 2015)	2.15	0.1	20.55	3.02	0.92	0.3	0.15
F	(2010 – 2013)	6.12	0.8	7.69	3.03	1.85	0.61	0.31

Company (n contracts): A. Inter Meds Eq Med Distributor (315); B. Alpharma Laboratories (143); C. Drug Fragrances Distributor (115); D. Pharmaceutical Ago Pacific (32); E. Business Pharmacist Martínez (21); F. Baluarte 33 (21).

With this setting, it can be seen that the cost overrun in drugs brings a reduction in the well-being of the families entitled to the MSSI. The reduction in well-being is calculated through the number of doses that could have been administered to the patients and that were not provided due to the surcharge of the drugs. It was equivalent to more than 7.5 million doses during these nine years. It should be noted that the welfare loss is calculated on the parameter proposed in the Harberger triangle. Furthermore, the magnitude of this loss of well-being is proportional to the setting of prices higher than those that would be had in a market with perfect competition.

Table 2 Calculation of the loss of well-being using the Harberger triangle due to the acquisition of overpriced drugs by the Mexican Social Security Institute in 2000-2018 considering an average price of MXN 2.0

Company (Period)		Total sells (MXN millions)	Unit in millions	Sale price in MXN	Social welfare loss (MXN millions)	Social welfare loss (millions of units)	Social welfare loss (millions of PDD)
A	(2009 – 2018)	75.87	10.45	7.26	27.49	13.74	6.87
B	(2009 – 2015)	38.78	5.47	7.09	13.93	6.96	3.48
C	(2009 – 2016)	8.55	0.86	9.9	3.4	1.7	0.85
D	(2010 – 2013)	17.66	2.52	7.01	6.31	3.16	1.58
E	(2009 – 2015)	2.15	0.1	20.55	0.97	0.48	0.24
F	(2010 – 2013)	6.19	0.8	7.69	2.26	1.13	0.57

Company (n contracts): A. Inter Meds Eq Med Distributor (315); B. Alpharma Laboratories (143); C. Drug Fragrances Distributor (115); D. Pharmaceutical Ago Pacific (32); E. Business Pharmacist Martínez (21); F. Baluarte 33 (21).

The second setting was based on the price of MXN 2.00 per metformin tablet offered by some of the leading drug distributors nationwide, according to Consumer Federal Procuracy statistics (see Table 2). In the same way, some

studies [10] indicate that the sales margin over the marginal cost is approximately 15-30%, which implies that when performing the calculation using the previous setting, it would be approximately MXN 2.0. In this setting, the loss of well-being in units is almost 14 million doses.

Finally, a third setting is drawn up where the price was MXN 0.50, see Table 3. This price was a reference since it is the average metformin price in the generic drug market in Mexico. Considering this price setting, more than 70 million additional doses could have been obtained for those purchased by the IMSS.

Table 3 Calculation of the loss of well-being using the Harberger triangle due to the acquisition of overpriced drugs by the Mexican Social Security Institute in 2000-2018, considering an average price of MXN 0.5

Company (Period)		Total sells (MXN millions)	Unit in millions	Sale price (MXN)	Social welfare loss (MXN millions)	Social welfare loss in millions of units	Social welfare loss in millions of PDD
A	(2009 – 2018)	75.87	10.45	7.26	35.32	70.65	35.32
B	(2009 – 2015)	38.78	5.47	7.09	18.03	36.05	18.03
C	(2009 – 2016)	8.52	0.86	9.9	4.043	8.09	4.04
D	(2010 – 2013)	17.66	2.52	7.01	8.2	16.4	8.2
E	(2009 – 2015)	2.15	0.1	20.55	1.05	2.09	1.05
F	(2010 – 2013)	6.12	0.8	7.69	2.86	5.72	2.86

Company (n contracts): A. Inter Meds Eq Med Distributor (315); B. Alpharma Laboratories (143); C. Drug Fragrances Distributor (115); D. pharmaceutical Ago Pacific (32); E. Business Pharmacist Martínez (21); F. Baluarte 33 (21).

4. Discussion

The loss of social welfare related to drug purchasing is directly related to the inefficiency of the drug acquisition system price-fixing above those that correspond to a perfectly competitive market. The distortions of an anti-competitive market can be measured using the Harberger triangle.

Collusion in the pharmaceutical market. The Federal Economic Competition Commission (FECC) has sanctioned companies from 2017 to 2020 for collusion or anti-competitive practices within the drug market or in other activities that are directly related to them [12]. In Mexico, the FECC is responsible for monitoring, promoting, and guaranteeing competition and free competition so the markets work efficiently for consumers. Among the most common illegal practices within the Mexican drug market are collusion and the formation of cartels with the aim of price-fixing and thereby manipulating the drug market.

Collusion results from company agreements and is an illegal practice in most countries. The behavior of companies under a collusive scheme is like an oligopolistic structure where these companies obtain a lower benefit than that of a monopoly, and for this reason, the companies try to establish agreements to act as if they were one and obtain the benefit that is obtained. The consumer is finally affected by high drug prices [13].

Regarding normative economics, the drug market must get closer to perfect competition since it is in this market structure that consumers and producers benefit from lower prices. Like the general health market, the drug market is far from being competitive. In these markets, with high product differentiation and asymmetric information between patients and doctors, oligopolistic prices occur [14].

These collusive practices occur in Mexico even though the United Mexican States Political Constitution in Article 28 establishes monopolies, monopolistic practices, and any concentration or hoarding; agreement, procedure, or combination of producers are prohibited. Likewise, the Federal Economic Competition Law through the Federal

Economic Competition Commission regulates Article 28, which is the autonomous constitutional body of Mexico responsible for monitoring, promoting and guarantee free competition [15].

Similarly, drug distributors in Mexico, such as the Nadro, Marzam, and Genomma Lab corporations, have moved to concentrate the drug distribution market. For example, in 2015, Nadro bought Marzam, which Nadro took 37.5% of the market [16]. Another case occurred in 2016 Marzam, Nadro, Saba Home, National Pharmacy (Fanasa), and Warehouse of Drugs, as well as 21 individuals, carried out drug market concentration actions. In this second case, FECC set a fine of MXN 903.5 million, estimating that the damage to the drug market was MXN 2,359 [16].

Similarly, FECC detected atypical variations in 2017-2020 in the prices of several drugs and the exchange of information between companies, particularly drug distributors. Since 2006, these companies implemented collusive agreements establishing commercial relationships to restrict supply through setting, manipulating, or raising the price of distributed drugs [16].

Harberger triangle and the loss of well-being. In a simulation exercise about the concentration and elasticity of the various markets of the Mexican economy [17], it was found that the price elasticity of the demand for drugs for urban households is -1.842; with this data Ibarra [18] performs the relevant calculations for each of the markets according Urzúa [17] and determines a premium in the drug market of 54.3% and a net social loss of 27.1% measured through the Harberger triangle that measures the loss of well-being or inefficiency of markets due to anti-competitive practices.

In Mexico, the practice that has to do with colluding institutional behaviors is widespread, which has allowed pharmaceutical companies to take over almost the entire drug market. Unlike what happens with the structural factors in which the collusion scheme is formed by reducing the number of companies or the market size in Mexico, the so-called “facilitating practice” has been promoted in which companies form a cartel, or collusive scheme, by allowing the acquisition of a good or service from a single company or group of companies chosen by governments or public sector institutions. This situation allowed a group of companies linked to politicians to benefit from the purchases of drugs from the health sector, as shown in Figure 1.

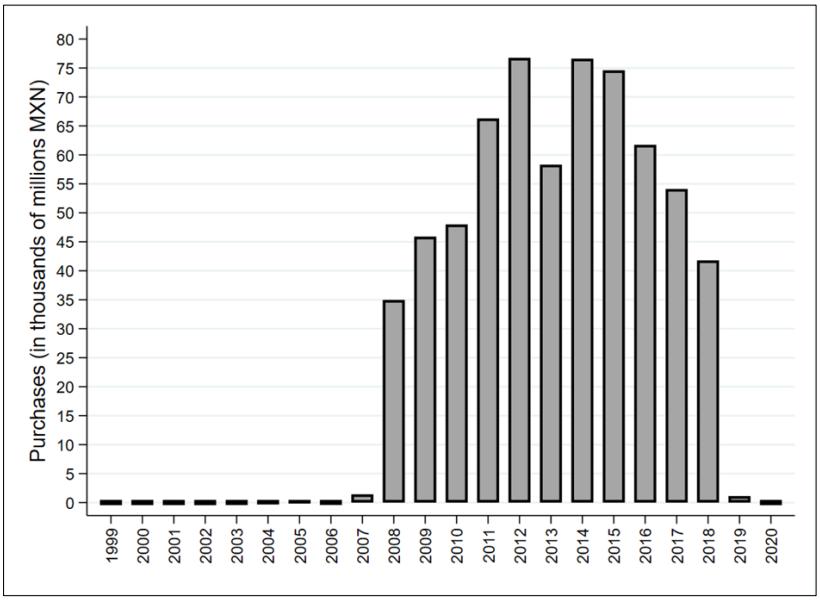

Figure 1 Variation in the total drug purchases in the Mexican Social Security Institute in 1999-2020. Source: Author’s calculation based on [6, 7].

According to this graph, the rapid growth in purchases of drugs by government organizations, in this case, the MSSI, is observed. The purchases of drugs by the government were made from less than ten pharmaceutical companies, but three of them stand out from which the most significant number of supplies used in the health sector was purchased: MAYPO, Specialized Drugs and International Distributor of Drugs and Equipment Medico, SA of CV.

5. Conclusion

Large pharmacy chains have recently benefited from the high drug prices offered to consumers, including purchases from the state sector. Even the overpricing in some cases was greater than 1,000%. These practices primarily result from regulatory authorities not promoting competition and facilitated collusion between manufacturers and pharmacy chains. Besides, the authorities also facilitated the transfer of government funds to the private economic sector.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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