

Research Synthesis: Mark-ups, taxes, supply-chain costs

v1.0 researched and written by Elise Erickson, edited by Suerie Moon, last updated June 2018

Introduction

The literature on pharmaceutical markups, taxes, and supply-chain costs is considerable.* However, many of the studies are related to the WHO/Health Action International Project on Medicine Prices and Availability, which developed a low-cost survey methodology to measure the price of medicines that takes price components into account. While many of the reports using this methodology focused on LMICs, there are also a handful of studies looking at HICs. The bulk of the literature and reports appeared around the time of the release of the WHO/HAI methodology (2003 and 2008), with less literature published in recent years.

Search terms

Markups; tariffs; taxes; value-added tax (VAT); distribution costs; supply-chain costs

Synthesis of the literature

The distribution chain of pharmaceuticals is fragmented and complex (Management Sciences for Health 2012) and therefore obtaining information regarding the costs added along the supply chain is difficult. The WHO/HAI Project on Medicine Prices and Availability developed an approach that attempted specifically to capture these components.

An overview of the approach can be found in the 2nd edition of the survey manual, *Measuring Medicine Prices, Availability, Affordability and Price Components* (World Health Organization and Health Action International 2008).

Chapter 9, “Measuring Price Components,” discusses mark-ups, tariffs, and supply-chain costs, and outlines the price components found in the medicine price chain including: manufacturer’s selling price (MSP); insurance and freight; port and inspection charges; pharmaceutical import duties; mark-ups by importers, wholesalers and retail distributors; value added tax (VAT) or goods and services tax (GST); and dispensing fees. An online repository of the reports that have used the WHO/HAI methodology can be found at <http://haiweb.org/survey-related-reports/>. Chapter 9 (‘Pharmaceutical Pricing Policy’) of *Management Sciences for Health’s MDS-3: Managing Access to Medicines and Health Technologies* also provides a useful 5-stage overview of pricing throughout the supply chain from the manufacturer’s price to the dispensed selling price (Management Sciences for Health 2012).

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Papers examining these price components reveal that there can be excessive markups along the pharmaceutical chain, and that various types of taxes and duties have been applied to pharmaceuticals (Ewen and Dey 2006), which have been referred to as “hidden costs” that can contribute to higher prices (Levison and Laing 2003). The four main topics of discussion include:

1. **Mark-ups:** Ball (2011) provides a thorough review of the literature on the regulation of pharmaceutical distribution mark-ups in LMICs, and finds wide-ranging cumulative mark-ups between 17-84% in the public sector, and 11-6,894% in the private sector in LMICs, and wholesale mark-ups between 2-21% and retail mark-ups between 4-50% in OECD countries. Ball concludes that there is little evidence regarding mark-up regulation in LMICs, there is no dependable information on the effect of mark-up regulation alone on prices, and that markup regulation can help to control expenditure only when part of a comprehensive plan. The review includes several useful appendices: Appendix 2: Distribution markups applied to pharmaceuticals in OECD countries; Appendix 3: Potential strategies in regulation distribution markups; Appendix 4: Summary of data on wholesale and retail markups in LMICs identified in the literature. A policy brief based on the review provides a useful overview.

Other studies focus on single countries. For instance, Babar et al. (2007) evaluated medicine prices, availability and affordability in Malaysia and found high markups applied by dispensing doctors (up to 50-76% for innovator brand drugs, and up to 316% for generics); and by retail pharmacies (25-38% for innovator brands, and 100-140% for generics). Ball and Tisocki (2008) found retailer markups of generics in the Philippines to range from 5-355%, and distributor markups ranging from 18-117%. In an analysis of 36 developing and middle-income countries, Cameron et al. found the range of private sector wholesale markups to be between 2- 380%, and retail markups between 10-552%. A mapping of the distribution chain in EU Member States found that there exist significant variations between countries with regards to the type and degree of distribution margin regulation, and type and use of wholesale and pharmacy margins (P. Kanavos, Schurer, and Vogler 2011).

2. **Taxes/VAT:** Studies have also identified various taxes and duties on pharmaceuticals in LMICs. These types of taxes have been called “a tax on the sick” (Cameron et al. 2009). Ball and Tisocki (2008), for example, found that VAT (12% at the time in the Philippines) can have a significant impact on the price of medicines, especially when markups are based on a price that includes VAT. While VAT tends to be lower (even 0%) in EU countries, a study of nine European countries found that those that still applied VAT ultimately had higher medicines prices, even with comparatively lower wholesale prices (Martikainen, Kivi, and Linnosmaa 2005).

3. **Tariffs/duties:** While they may be a small proportion of a medicine’s total price, Olcay and Laing have argued that tariffs can significantly increase the price paid by consumers since many markups are based on the base price, which includes tariffs (Olcay and Laing 2005). Although tariffs can impact prices in this way, it has been suggested that other factors including the manufacturer’s price, VAT and markups are likely to have a larger impact (Olcay and Laing 2005). Nevertheless, tariffs are often described as targeting the sick, and therefore their removal is thought to increase access (Bate, Tren, and Urbach 2006), without adverse effects on the economy (Olcay and Laing 2005).

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4. Role of manufacturer's selling price (MSP): Part of the discussion in this issue area is what price component ultimately has the potential to contribute most to the price of a medicine. In an analysis of 36 developing countries, Cameron et al. (2009) found that although in some countries taxes or markups can add considerably to the cost of a medicine, in other countries the MSP mattered more. Similarly, Ball and Tisocki (2008) found wide-ranging markups in the Philippines, but highlighted that the MSP is the most important component (that is, a low-priced drug can still be affordable with markups). Studies examining HICd also found that the distribution chain and taxes had an impact on medicine prices (P. G. Kanavos and Vandoros 2011), but that the impact varied according to the different policies in place, and the ex-factory price level (P. Kanavos, Schurer, and Vogler 2011). On the other side of the discussion, others challenged the assumption that the MSP matters most, and stress the need to understand local markets, margins, and markups that can be just as important in contributing to the high price of a medicine in LICs (Russo and McPake 2010).

To improve medicine affordability, the following policies relevant to mark-ups, taxes, and supply chain costs have been recommended:

- Removal of value added tax (VAT) for essential medicines (Ball and Tisocki 2008; Ewen and Dey 2006)
- Use of regressive mark-ups (to incentivize dispensing of cheaper generics) (Ball and Tisocki 2008). Maximum percentage mark-ups can actually incentivize selling higher-priced medicines that yield a higher return, and therefore should be avoided (Cameron et al. 2009)
- Removal of taxes, import tariffs/ duties on medicines (Bate, Tren, and Urbach 2006; Management Sciences for Health 2012; Olcay and Laing 2005)

Research gaps

- More data and analysis from different countries on the impact of increases or decreases of taxes, mark-ups, and other costs that accrue through the supply chain on the final price of a medicine
- Additional research to determine what level of mark-ups can support a viable supply chain while maximizing affordability

Cited papers with abstracts

Babar, Zaheer Ud Din, Mohamed Izham Mohamed Ibrahim, Harpal Singh, Nadeem Irfan Bukahri, and Andrew Creese. 2007. "Evaluating Drug Prices, Availability, Affordability, and Price Components: Implications for Access to Drugs in Malaysia." *PLOS Medicine* 4 (3): e82. <https://doi.org/10.1371/journal.pmed.0040082>.

Abstract: Background: Malaysia's stable health care system is facing challenges with increasing medicine costs. To investigate these issues a survey was carried out to evaluate medicine prices, availability, affordability, and the structure of price components.

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Methods and Findings: The methodology developed by the World Health Organization (WHO) and Health Action International (HAI) was used. Price and availability data for 48 medicines was collected from 20 public sector facilities, 32 private sector retail pharmacies and 20 dispensing doctors in four geographical regions of West Malaysia. Medicine prices were compared with international reference prices (IRPs) to obtain a median price ratio. The daily wage of the lowest paid unskilled government worker was used to gauge the affordability of medicines. Price component data were collected throughout the supply chain, and markups, taxes, and other distribution costs were identified. In private pharmacies, innovator brand (IB) prices were 16 times higher than the IRPs, while generics were 6.6 times higher. In dispensing doctor clinics, the figures were 15 times higher for innovator brands and 7.5 for generics. Dispensing doctors applied high markups of 50%–76% for IBs, and up to 316% for generics. Retail pharmacy markups were also high—25%–38% and 100%–140% for IBs and generics, respectively. In the public sector, where medicines are free, availability was low even for medicines on the National Essential Drugs List. For a month's treatment for peptic ulcer disease and hypertension people have to pay about a week's wages in the private sector.

Conclusions: The free market by definition does not control medicine prices, necessitating price monitoring and control mechanisms. Markups for generic products are greater than for IBs. Reducing the base price without controlling markups may increase profits for retailers and dispensing doctors without reducing the price paid by end users. To increase access and affordability, promotion of generic medicines and improved availability of medicines in the public sector are required.

Link: <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0040082>

Ball, Douglas. 2011. "WHO/HAI Project on Medicine Prices and Availability, Review Series on Pharmaceutical Pricing Policies and Interventions – Working Paper 3: The Regulation of Mark-Ups in the Pharmaceutical Supply Chain." World Health Organization and Health Action International. <http://haiweb.org/wp-content/uploads/2015/07/Working-Paper-3-Regulation-of-Mark-ups.pdf>.

Abstract: Not available

Link: <http://haiweb.org/wp-content/uploads/2015/07/Working-Paper-3-Regulation-of-Mark-ups.pdf>

Ball, Douglas, and Klara Tisocki. 2008. "Medicines Price Components in the Philippines." Health Action International. haiweb.org/wp-content/uploads/2015/07/Philippines-Report-2008-Price-Components-Pricing-Surveys.pdf.

Abstract: Not available

Link: www.haiweb.org/wp-content/uploads/2015/07/Philippines-Report-2008-Price-Components-Pricing-Surveys.pdf

Bate, Roger, Richard Tren, and Jasson Urbach. 2006. "Still Taxed to Death: An Analysis of Taxes and Tariffs on Medicines, Vaccines and Medical Devices." Joint Center: AEI-Brookings Joint

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Center for Regulatory Studies.

https://www.researchgate.net/profile/Richard_Tren/publication/46454258_Still_Taxed_to_Death_An_Analysis_of_Taxes_and_Tariffs_on_Medicines_Vaccines_and_Medical_Devices/links/0a85e52dfd805af9b0000000.pdf.

Abstract: Not available

Link: https://www.researchgate.net/profile/Richard_Tren/publication/46454258_Still_Taxed_to_Death_An_Analysis_of_Taxes_and_Tariffs_on_Medicines_Vaccines_and_Medical_Devices/links/0a85e52dfd805af9b0000000.pdf

Cameron, A., M. Ewen, D. Ross-Degnan, D. Ball, and R. Laing. 2009. "Medicine Prices, Availability, and Affordability in 36 Developing and Middle-Income Countries: A Secondary Analysis." *The Lancet* 373 (9659): 240–49. [https://doi.org/10.1016/S0140-6736\(08\)61762-6](https://doi.org/10.1016/S0140-6736(08)61762-6).

Abstract: Not available

Link: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(08\)61762-6/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(08)61762-6/abstract)

Ewen, Margaret, and Dalia Dey. 2006. "Medicines: Too Costly and Too Scarce - Briefing Paper." World Health Organization and Health Action International Project on Medicine Prices. <http://www.haiweb.org/medicineprices/2005/PricingbriefingpaperFINAL.doc>.

Abstract: Not available

Link: <http://www.haiweb.org/medicineprices/2005/PricingbriefingpaperFINAL.doc>

Kanavos, Panos G., and Sotiris Vandoros. 2011. "Determinants of Branded Prescription Medicine Prices in OECD Countries." *Health Economics, Policy and Law* 6 (3): 337–67. <https://doi.org/10.1017/S1744133111000090>.

Abstract: This paper investigates the determinants of the prices of branded prescription medicines across different regulatory settings and health care systems, taking into account their launch date, patent status, market dynamics and the regulatory context in which they diffuse. By using volume-weighted price indices, this paper analyzes price levels for a basket of prescription medicines and their differences in 15 OECD countries, including the United States and key European countries, the impact of distribution margins and generic entry on public prices and to what extent innovation, by means of introducing newer classes of medicines, contributes to price formation across countries. In doing so, the paper seeks to understand the factors that contribute to the existing differences in prices across countries, whether at an ex-factory or a retail level. The evidence shows that retail prices for branded prescription medicines in the United States are higher than those in key European and other OECD countries, but not as high as widely thought. Large differences in prices are mainly observed at an ex-factory level, but these are not the prices that consumers and payers pay. Cross-country differences in retail prices are actually not as high as expected and, when controlling for exchange rates, these differences can be even smaller. Product age has a significant effect on prices in all settings after

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having controlled for other factors. Price convergence is observed across countries for newer prescription medicines compared with older medicines. There is no evidence that originator brand prices fall after generic entry in the United States, a phenomenon known as the 'generics paradox'. Finally, distribution and taxes are important determinants of retail prices in several of the study countries. To the extent that remuneration of the distribution chain and taxation are directly and proportionately linked to product prices this is likely to persist over time.

Link: <https://www.cambridge.org/core/journals/health-economics-policy-and-law/article/determinants-of-branded-prescription-medicine-prices-in-oecd-countries/E5C46ADACB9136EDCA287BD9F66764FE>

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http://eprints.lse.ac.uk/51051/1/Kanavos_pharmaceutical_distribution_chain_2007.pdf.

Abstract: Not available

Link: http://eprints.lse.ac.uk/51051/1/Kanavos_pharmaceutical_distribution_chain_2007.pdf

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<http://apps.who.int/medicinedocs/en/d/Js4941e/4.8.html>.

Abstract: Not available

Link: <http://apps.who.int/medicinedocs/en/d/Js4941e/4.8.html>

Management Sciences for Health. 2012. "Pharmaceutical Pricing Policy (Chapter 9)." In MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health. <http://apps.who.int/medicinedocs/en/m/abstract/Js19585en/>.

Abstract: In a market economy, the interaction of producers and consumers determines the price of goods and services. Understanding the theory of supply and demand helps explain how prices are determined, and this theory also explains how responsive (elastic) both supply and demand are to changes in price. For example, medicines that are not considered essential and that the buyer could credibly refuse to purchase will have more elastic prices, whereas the prices of medicines that are considered essential and that the buyer must obtain will be inelastic, meaning buyers will be less sensitive to higher prices.

Factors that interfere with the ability of the market to efficiently produce and allocate goods and services are said to result in "market failure." An example of market failure is when buyers do not have the same level of knowledge; for example, some buyers might pay more than others for the same medicines because they are unaware of what everyone else is paying.

When buyers or sellers have market power (monopoly or monopsony), they can distort how the market price mechanism works. For example, in absolute monopolies (one seller) and

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oligopolies (a few sellers), the seller has significant ability to set prices, because the consumer has limited choices. This distortion allows the seller to command a price that is higher than would have prevailed under more competitive situations. In a monopsony, where the government has market power as the only large buyer in the market, the government acts on behalf of consumers to obtain better prices. In addition to these economic theories of price determination, prices for medicines are influenced by the fact that medicines have certain traits that set them apart from other consumer products. For example, consumers need expert advice to make rational choices between using and not using a medicine and about what kind of medicine to use. This advice is provided by prescribers, who may not know or even care about the price of medicines. Medicines also serve as an investment in future health, which may be difficult for the consumer to value.

The literature unanimously concludes that medicine price differences exist between countries, even when comparing between or within the strata of industrialized, middle-, and low-income countries. Price variation within countries is more likely in less price-regulated markets, such as the United States; however, prices vary in other countries, where public, private, and nongovernmental (not-for-profit) sectors procure medicines separately. Variable prices for medicines within and between countries often result from –

The pharmaceutical manufacturer selling the same product for different prices

Intra- and intercountry differences in the margins charged in the post manufacturing supply chain by wholesalers, distributors, and pharmacists, as well as taxes and co-payments levied by the state

Conducting pharmaceutical price comparisons is challenging, but such assessments can identify price variations and provide valuable information on their source and on interventions that can help reduce medicine prices. For example, margins and taxes charged along the pharmaceutical supply chain can add significantly to the final price of medicines; however, governments can control these markups by enacting price-control policies and eliminating tariffs and taxes. In addition, buyers of pharmaceuticals should assess their own position in the marketplace and use tactics such as price negotiations, pooled procurement, and information sharing to increase their market power.

Link: <http://apps.who.int/medicinedocs/en/m/abstract/Js19585en/>

Martikainen, Jaana, Ismo Kivi, and Ismo Linnosmaa. 2005. "European Prices of Newly Launched Reimbursable Pharmaceuticals – a Pilot Study." *Health Policy* 74 (3): 235–46. <https://doi.org/10.1016/j.healthpol.2005.01.005>.

Abstract: High prices of new pharmaceuticals play an important part in rapidly rising pharmaceutical costs. Many countries try to curb these rising costs through control of the price of reimbursable medicines. There is, however, little internationally comparable information on prices. This study aimed to examine the prices of new, reimbursable pharmaceuticals in the EU member states. Price data were collected from eight products authorised by the EC in 2000. The prices of these products varied considerably. Wholesale prices were highest in those countries

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where manufacturers are free to set the prices of their products. Pharmacy margins and taxes, however, change the ranking of the most expensive or the cheapest countries.

Link: [http://www.healthpolicyjrn.com/article/S0168-8510\(05\)00009-6/fulltext](http://www.healthpolicyjrn.com/article/S0168-8510(05)00009-6/fulltext)

Olcay, Müge, and Richard Laing. 2005. "Pharmaceutical Tariffs: What Is Their Effect on Prices, Protection of Local Industry and Revenue Generation?" The Commission on Intellectual Property Rights, Innovation and Public Health. <http://apps.who.int/medicinedocs/en/d/Js21843en/>.

Abstract: The objective of this study was to examine tariffs levied on medicines. This paper provides data on the tariff rates levied and revenue generated by over 150 countries around the world on different categories of pharmaceutical products. These categories include active pharmaceutical ingredients, finished products and vaccines for human medicines. Data for selected sub-categories of pharmaceutical products is also provided. The analysis has shown that many countries (41% for active pharmaceutical ingredients and 39% for finished products) for which data are available do not levy duties on pharmaceutical products. Fifty-nine percent of countries for which data are available levy tariffs on pharmaceutical active ingredients. Sixty-one percent of countries levy tariffs on finished pharmaceutical products. A total of 35% of countries still levy import duties on vaccine imports. Ninety percent of countries apply less than 10% tariff rates on medicines. Pharmaceutical tariffs generate less than 0.1% of Gross Domestic Product (GDP) in 92% of countries for which data is available. Furthermore, pharmaceutical tariffs generally do not appear to be structured to protect local pharmaceutical industries. Factors other than tariffs such as manufacturer's prices, sales taxes including value-added tax (VAT), mark-ups and other charges are likely to impact the price of medicines more than tariffs do. Nonetheless tariffs are a regressive form of taxation which target the sick. We conclude that pharmaceutical tariffs could be eliminated without adverse revenue or industrial policy impacts.

Link: <http://apps.who.int/medicinedocs/en/d/Js21843en/>

Russo, Giuliano, and Barbara McPake. 2010. "Medicine Prices in Urban Mozambique: A Public Health and Economic Study of Pharmaceutical Markets and Price Determinants in Low-Income Settings." *Health Policy and Planning* 25 (1): 70–84. <https://doi.org/10.1093/heapol/czp042>.

Abstract: It has been suggested that medicines are unaffordable in low-income countries and that world manufacturing and trade policies are responsible for high prices. This research investigates medicine prices in urban Mozambique with the objective of understanding how prices are formed and with what public health implications. The study adopts an economic framework and uses a combination of quantitative and qualitative methods to analyse local pharmaceutical prices and markets. The research findings suggest that: (a) local mark-ups are responsible for up to two-thirds of drugs' final prices in private pharmacies; (b) statutory profit and cost ceilings are applied unevenly, due to lack of government control and collusion among suppliers; and (c) the local market appears to respond effectively to the urban population's diverse needs through its low-cost and high-cost segments, although uncertainty around the quality of generics may be inducing consumers to purchase less affordable drugs. We conclude that local markets play a larger than expected role in the determination of prices in Mozambique, and that more research is needed to address the complex issue of affordability of medicines in low-income countries. We also argue that price controls may not be the most

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effective way to influence access to medicines in low-income countries, and managing demand and supply towards cheaper effective drugs appears a more suitable policy option.

Link: <https://academic.oup.com/heapol/article/25/1/70/625932>

World Health Organization, and Health Action International. 2008. "Measuring Medicine Prices, Availability, Affordability and Price Components - 2nd Edition."
http://www.who.int/medicines/areas/access/OMS_Medicine_prices.pdf.

Abstract: Not available

Link: http://www.who.int/medicines/areas/access/OMS_Medicine_prices.pdf

** For the purposes of this review, we have established three categories to describe the state of the literature: thin, considerable, and rich.*

- *Thin: There are relatively few papers and/or there are not many recent papers and/or there are clear gaps*
- *Considerable: There are several papers and/or there are a handful of recent papers and/or there are some clear gaps*
- *Rich: There is a wealth of papers on the topic and/or papers continue to be published that address this issue area and/or there are less obvious gaps*

Scope: While many of these issues can touch a variety of sectors, this review focuses on medicines. The term medicines is used to cover the category of health technologies, including drugs, biologics (including vaccines), and diagnostic devices.

Disclaimer: The research syntheses aim to provide a concise, comprehensive overview of the current state of research on a specific topic. They seek to cover the main studies in the academic and grey literature, but are not systematic reviews capturing all published studies on a topic. As with any research synthesis, they also reflect the judgments of the researchers. The length and detail vary by topic. Each synthesis will undergo open peer review, and be updated periodically based on feedback received on important missing studies and/or new research. Selected topics focus on national and international-level policies, while recognizing that other determinants of access operate at sub-national level. Work is ongoing on additional topics. We welcome suggestions on the current syntheses and/or on new topics to cover.

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