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Trade Treaties and Access to Medicines: What Does the Evidence Tell Us?

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Introduction

Intellectual property rights (IPR) provisions have become a staple of modern free trade agreements since the 1995 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which set minimum standards for IPR protection for World Trade Organization (WTO) members. TRIPS requires members to provide an intellectual property legal structure encompassing patents, trademarks, copyrights, other provisions such as geographical indications as well as IPR enforcement and dispute resolution.[1] Because implementing an IPR regime- including supporting robust patent protection- may reduce the number of generic medicines available and increase the price of medicines, compliance with the TRIPS requirements has been controversial in low and middle income countries concerned about ensuring access to medicines, particularly those countries with small domestic pharmaceutical industries or a large burden of disease requiring essential medicines. Since the establishment of TRIPS and the WTO, there has been a proliferation of preferential regional and bilateral trade agreements that have deeper intellectual property provisions than under TRIPS and are commonly referred to as TRIPS PLUS provisions (Smith, Correa and Oh, 2009).

There is an extensive literature on the impact of trade on access to medicines from the fields of health, economics and law. In this policy brief, we focus exclusively on presenting and understanding the findings from empirical studies that estimate the impact of changes to trade policy on price, consumption, expenditure, availability and other indicators of access to medicines. We also make suggestions for future research.

1 The text of the TRIPS agreement is available at https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm

Empirical studies are either *ex-ante* projections or *ex-post* assessments

The majority of empirical studies estimate effects on access to medicines in low or middle income countries, although several studies focus on the impact in high income countries (e.g. Grootendorst and Hollis (2011) examine the impact in Canada) or undertake a cross-country approach (e.g. Kyle and McGahan (2012), Kyle and Qian (2014)). Because the imposition of trade policies, such as the implementation of TRIPS or a free trade agreement (FTA) that requires stricter IPR protection than currently exists, can trigger changes in domestic IPR regimes, many studies base their analysis on the impact of the changes to domestic regimes necessary to become compliant with TRIPS or an FTA.

The empirical studies we highlight in this policy brief take one of two approaches to analyzing the impacts of compliance with trade policy changes: ex-ante projections or ex-post assessments. Ex-ante studies evaluate the potential impacts of proposed policy changes before any changes are made, and thus deploy largely theory driven modeling and methodological approaches. Ex-post studies are more empirically driven analyses that evaluate the actual performance of a policy once implemented.

Ex-ante studies and the role of economic theory in driving findings

Table 1 lists ex-ante studies in the literature by author and year and provides a short description of what the study does and its main findings. The ex-ante studies listed in Table 1 use a variety of methods representative of the differences in their fields. Several studies use scenario modeling, including Kessomboon et al. (2012), IFARMA (2009), Moir et al. (2014) and Chavez et al. (2017). Chauduri et al. (2006) is an econometric analysis, while Akaleephan et al. (2009) combines econometrics and out-of-sample forecasting. Grootendorst and Hollis (2011) use molecule level data to estimate costs and benefits of proposed policy changes. Regardless of method used, all the studies listed in Table 1 estimate that there are negative impacts on pharmaceutical markets from proposed trade policy changes, generally in the form of higher medicine prices, increased expenditure on medicines or less availability of necessary medicines or generics.

It is not surprising that all ex-ante studies predict restricted access to medicines. The outcomes that ex-ante studies predict reflect the models' underlying assumptions, which are rooted in economic theory. When a firm is granted a patent, economic theory predicts the firm will supply a restricted quantity at a higher price because the patent grants the producing firm a temporary monopoly over the product (Hicks (1935), Meiners and Staff (1990)). Patents also may result in higher prices because they affect the treatment options available to patients by prohibiting the sale of generics or other medicines that violate the patent (Baker (2016)).

Ex-ante studies using models reflective of economic theory generally start with the assumption that patents or other IPR provisions will result in higher prices or reduced generic access then estimate the effects of higher prices on expenditure, consumption and other indicators of access (e.g. Akaleephan et al. (2009), Chauduri et al. (2006), IFARMA (2009), among others). Ex-ante studies relying on this assumption will predict increased medicine expenditure even if the volume of medicines procured is kept constant. If governments, national health agencies or consumers are projected to be unable to afford higher prices, ex-ante studies further predict a negative impact on access to essential or non-essential medicines.

Ex-ante studies therefore serve an important purpose of projecting what the negative impacts to access could be if prices of medicines rise or the number of treatment options available declines. The projections of ex-ante studies, however, might not necessarily reflect the actual paths of variables such as prices after a change in trade policy because economic theory generally does not take into account all the possible

factors that can impact medicine prices (e.g. pricing intervention mechanisms, changes to national procurement or health policy). If prices do not rise, or do not rise by as much as ex-ante studies predict, the projected impacts from ex-ante studies may not be a good indication of actual outcomes. Ex-ante studies, however, do serve an important purpose in policy analysis by providing an indication of the potential consequences of a policy change.

TABLE 1: EX-ANTE STUDIES

Study	Year	Description	Finding
Akaleephan et al.	2009	Evaluates proposed US-Thailand FTA with TRIPS-Plus provisions	Increased medicine expenses, delayed generics
Chauduri et al.	2006	Estimates effects of TRIPS patent requirement on quinolones market in India	Consumer welfare loss from reduction in variety of products, even if pricing intervention tools available
Kessomboon et al.	2010	Impact assessment of patent extension and data exclusivity provisions in proposed US-Thai FTA	Increased medicine expenditure, increased price, smaller domestic industry
IFARMA	2009	Impact assessment of patent extension and data exclusivity in EU-Andean FTA on Peru	Increased medicine expenditure, increased price, decreased consumption
Chaves et al.	2017	Impact analysis of patent extension and data exclusivity in Mercosur-EU FTA on HIV and Hepatitis C medicines in Brazil	Increased medicine expenditure, decreased sales of domestic producers
Grootendorst and Hollis	2011	Analysis of impact of patent extension and data exclusivity provisions in Canada-EU CETA on Canadian market	Increased medicine expenses likely outweigh potential for enhanced innovation incentives
Moir et al.	2014	Impact on HIV treatment in Vietnam of alternative patent regimes in TPP proposed by US	Increased cost of medicines, fewer eligible patients treated

Ex-post studies find a smaller negative impact on access

Table 2 lists ex-post studies, which aim to prove a correlation or causal relationship exists between trade policy changes and indicators of access to medicines, using realized outcomes in the data. Although the conceptual framing of the question is different from ex-ante studies, the majority of ex-post studies also find implementing TRIPs or TRIPS Plus provisions can negatively impact indicators of access to medicines. The impact, however, is smaller than in theory driven ex-ante models, suggesting the negative impacts of implementing IPR provisions are not as drastic as ex-ante projections concluded.

The ex-post studies listed in Table 2 are econometric exercises or analyses of trends based on detailed data collection. Among the studies that find harmful impacts on prices, expenditure or access to generics from the implementation of TRIPS or TRIPS-Plus FTAs are Abbott et al. (2012), Alawi and Alabbadi (2015), OXFAM (2007) and Shaffer and Brenner (2009). Additionally, Palmedo (2018) finds that unit values, a proxy for the price of imported medicines, rise faster in countries with data exclusivity.

Ex-post studies, however, also show more nuanced results. In a panel of 60 countries, Kyle and Qian (2014) finds beneficial effects from patent protection, such as earlier product launch, higher sales and lower medicine prices. The results from Duggan et al. (2016) and Kyle and Qian (2014) both highlight the role pricing intervention mechanisms may play in keeping medicine prices low in low and middle income

countries implementing IPR regimes. Results also vary by the income level of the country implementing IPR policies. In a cross-country analysis, Kyle and McGahan (2012) show that patent protection increases R&D, which they measure by new clinical trials, in high income countries but lowers or has no effect on R&D in low or middle income countries.

In a study on the impact of the strength of the IPR provisions in Chile's FTAs on imports of biologics, Trachtenberg et al. (2018) find that while the unit value- a proxy for price- of imported medicines increases the volume of imported biological medicines also increased, potentially increasing availability of biologics.

While a rigorous ex-post study may provide more accurate or nuanced results than an ex-ante study, the findings in Trachtenberg et al. (2018) illustrate one of the many grey areas in conducting an ex-post analysis of the impact of trade treaties on access to medicines. If prices are increasing but the availability of medicines is also increasing, how do we qualify the impact on access? Furthermore, ex-post studies can suffer from several flaws, including unreliable data, statistical or econometric errors and improper framing of an empirical question. In the next section, we describe some suggestions for undertaking and interpreting future research in this area.

TABLE 2: EX-POST STUDIES

Study	Year	Description	Finding
Abbott et al.	2012	Examines impact of higher IPR protection in US-Jordan FTA on prices and pharma market in Jordan	Increased expenditure, delayed market entry of generics
Alawi and Alabbadi	2015	Analyzes data on originator and generic availability in Jordan after the implementation of the US-Jordan FTA	Limited generic availability because of data exclusivity, increased expenditure because of limited generics
Duggan et al.	2016	Analyzes effect of 2005 patent reform in India on price, quantity and number of firms	Small price increases, no change in quantity sold or number of producing firms
Kyle and McGahan	2012	Analyzes effect of increased patent protection on R&D efforts in a multi-country dataset	Patent protection associated with increased R&D in high income countries but not in low and middle income countries
Kyle and Qian	2014	Estimates effect of patent protection on price, quantity and speed of drug launch in a panel of 60 countries	Patented drugs have higher prices and quantities sold. New drug launch unlikely without patent protection.
OXFAM	2007	Analyzes impact of stricter IPR protection in US-Jordan FTA on prices, expenditure and generics market in Jordan	Increased prices and expenditure, delayed market entry of generics
Palmedo	2018	Examines impacts of data exclusivity in import prices using cross-country empirical study	Price per kilogram of imports for countries with data exclusivity grew faster than in countries without the policy
Shaffer and Brenner	2009	Examines availability of drugs in Guatemala after implementation of data exclusivity provision in CAFTA	Reduced access to generics already on the market, delayed entry of other generics
Trachtenberg et al.	2018	Analyzes impact of implementation of FTAs with strong IPR provisions in Chile	Increased volume imported, increased unit value of imports

Recommendations for future research

Two overarching findings are clear.

Ex-ante studies consistently predict negative impacts from trade-related IPR provisions on price and availability of medicines. Ex-post analyses are largely consistent with ex-ante predictions, but the magnitude of the impacts is smaller than predicted, likely due to institutional factors and policy interventions that remained largely unstudied.

RECOMMENDATION: We can improve both the predictions made by ex-ante studies and the ability of ex-post studies to accurately capture the impact of trade policies through (1) greater awareness of the mechanisms affecting price and availability of medicines; and (2) enhanced, high quality data collection efforts. A better understanding of mechanisms involves understanding the effects of national institutions, laws, regulations and healthcare systems on the availability and quality of treatment, and along which margins these country-specific factors interact with international trade policy to affect access to medicines. The more we understand about these mechanisms, the more we can tailor our ex-ante projections and understand what ex-post data we need to include in our analyses.

Better collection and harmonization of data is important. Because many factors affect the availability and price of medicines in a market, it is important to have high quality sources of data so statistical analyses can differentiate the impacts of changes in trade policy from other confounding factors. Moreover, we need to be able to link medicine or molecule-level data to information on patents, procurement and end-use consumer prices to accurately estimate the impact. Expanding the type of data we collect could allow us to focus on the impacts of less often-analyzed IPR provisions. For example, a thorough analysis of provisions such as patent linkage and data exclusivity requires data on how often these provisions are used, what products they are used for and the number of potential generic or competitor medicines not on the market because of these provisions – none of which currently is readily available information. Our analyses are only as good as our understanding of the mechanisms at play, which drive the assumptions behind our models, and the quality of data we have available.

There is no established analytical framework for undertaking a comprehensive analysis of the effects of trade policy on price, consumption, availability and other indicators of access to medicines.

RECOMMENDATION: The empirical studies in Tables 1 and 2 differ not only in their methodologies, but in their choice of outcome variables, data sources, scope of analysis and particular research questions. There is no established method to analyzing the impact of trade policy on access to medicines, likely because of the difficulty in conceiving and undertaking a study.

In this regard, Shadlen, Sampat, & Kapczynski (2019) outline the conceptual and methodological challenges, including the framing of analytical questions, the choice of outcome variables and the importance of incorporating the context of negotiation and the implementation of any trade agreements. The authors note that not all IPR provisions are likely to affect the various domains of access; the provisions with the highest potential to do so are related to patents, data exclusivity and limiting the use of compulsory licensing. Similarly, not all medicines are equally likely to be affected by IPR protections; new medicines are more likely to be affected by data exclusivity, new patents and patent linkage, while

older medicines might be affected by patent term extension (Shadlen et al. (2019)). Shadlen also notes the timing of the implementation of the agreement or of the expiration of patents should be carefully considered when constructing an analytical framework.

To improve our analyses, we need to carefully consider all the parameters of analysis and identify key methods and data that address the current gaps in implementing an analysis. To do so requires thinking beyond the repeated discussions regarding IPR, TRIPS flexibilities and access to medicines. Future analyses should not be focused around the typical question of whether trade affects access, but should bring new approaches to the table, e.g. tracking specific 'marker' medicines such as patented biologics in countries through the industrial and healthcare 'ecosystems' before and after, for example, the imposition of a compulsory license. Future work should make use of a variety of indicators of equitable access to medicines, such as measures of accessibility across income groups, mark-ups, discounts, rebates, medicine quality, availability of generics and prices along the supply chain including wholesale prices. Additionally, new methods of quantifying the changes in trade-related IPR provisions, as in the indicators of IPR strength in Trachtenberg et al. (2018), are necessary.

REFERENCES

Abbott, R. B., Bader, R., Bajjali L., ElSamen T. A., Obeidat T., Sboul, H., Shwayat, M. & Alabbadi, I. (2012). The price of medicines in Jordan: The cost of trade-based intellectual property. Journal of Generic Medicines, 9(2) 75–85.

Akaleephan, C., Wibulpolprasertb S., Sakulbumrungsilc R., Luangruangrongd P., Jitraknathee A., Aeksaengsrif A., Udomaksorng S., Tangcharoensathiena V. & Tantivessa S. (2009). Extension of market exclusivity and its impact on the accessibility to essential medicines, and drug expense in Thailand: Analysis of the effects of TRIPs-Plus proposal. Health Policy, 91, 174-182.

Alawi, R. & Alabbadi, I. (2015). Investigating the effect of data exclusivity on the pharmaceutical sector in Jordan. Jordan Journal of Pharmaceutical Sciences, 8(2), 70-81.

Baker, B. K. Trans-Pacific Partnership Provisions in Intellectual Property, Transparency, and Investment Chapters Threaten Access to Medicines in the US and Elsewhere. PLoS Med 13(3): e1001970. doi:10.1371/journal.pmed.1001970

Chauduri, S., Goldberg P.K. & Jia P. (2006). Estimating the effects of global patent protection in pharmaceuticals: A case study of quinolones in India. American Economic Review, 96(5), 1477-1514.

Chaves, G.C., Gaspar, W.B., & Vieira, M.F. (2017). Mercosur-EU Free Trade Agreement: Impact analysis of TRIPS-plus measures proposed by the EU on public purchases and domestic production of HIV and Hepatitis C medicines in Brazil.

Duggan, M., Garthwaite C. & Goyal A. (2016). The market impacts of pharmaceutical product patents in developing countries: Evidence from India. American Economic Review, 106(1), 99-135.

Grootendorst, P. & Hollis, A. (2011). The 2011 Canada-European Union Comprehensive Economic and Trade Agreement: an economic impact assessment of the EU's proposed pharmaceutical intellectual property provisions. Journal of Generic Medicines 8(2): 81-103.

Hicks, J.R. (1935). Annual Survey of Economic Theory: The Theory of Monopoly. Econometrica 3(1): 1-20.

IFARMA. (2009). Impact of the EU-Andean trade agreements on access to medicines in Peru. Health Action International (HAI) Europe Paper Series Reference 010-2009/01.

Kessomboon, N., Limpananont J., Kulsomboon V., Maleewong U., Eksaengsri A. & Paothong P. (2010). Impact on access to medicines from TRIPS-Plus: A case study of the Thai-US FTA. Southeast Asian Journal of Tropical Medicine and Public Health, 41(3), 667-677.

Kyle, M. K. & McGahan, A.M. (2012). Investments in pharmaceuticals before and after TRIPS. The Review of Economics and Statistics, 94(4), 1157-1172.

Kyle, M. & Qian Y. (2014). Intellectual property rights and access to innovation: Evidence from TRIPS.

Meiners, R. E. & Staaf, R.J. (1990). Patents, Copyrights, and Trademarks: Property or Monopoly. Harvard Journal of Law and Public Policy 13(3): 911-947.

Moir, H. V. J., Tenni, B., Gleeson, D. & Lopert, R. (2014). Assessing the impact of alternative patent systems on the cost of health care: the TPPA and HIV treatment in Vietnam. Asia-Pacific Innovation Conference paper.

OXFAM. (2007). All costs, no benefits: How TRIPS-plus intellectual property rules in the US-Jordan FTA affect access to medicines. OXFAM Briefing Paper 102.

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Palmedo, Mike. (2018). Pharmaceutical imports prices rise more rapidly after countries enact data exclusivity. http://infojustice.org/archives/40729

Shadlen, K., Sampat, B.N., and Kapczynski, A. (2019). Patents, Trade, and Medicines: Past, Present and Future. Review of International Political Economy (Forthcoming).

Shaffer, E. R. & Brenner, J. E. (2009). A trade agreement's impact on access to generic drugs. Health Affairs, 28(5).

Trachtenberg, D., Kaplan, W.A., Wirtz, V.J. & Gallagher, K. (2018). The effects of trade agreements on imports of biologics: evidence from Chile. GEGI Working Paper 21.