Research Paper 19/04

The Future of Global Health Procurement: Issues around Pricing Transparency

March 2019

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Please cite this paper as:

Berdud, M., Chalkidou, K., Dean, E., Ferraro, J., Garrison, L., Nemzoff, C., Towse, A. (2019). The Future of Global Health Procurement: Issues around Pricing Transparency. Research Paper 19/04, Office of Health Economics.

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Abstract

This paper focuses on the role that price transparency may play in the efficient and effective procurement of medicines by Middle and Low Income Countries. Will making prices publicly available make procurement more efficient and cost-effective medicines more accessible? We conclude that transparency of the procurement *process* significantly lowers costs by encouraging bidders. We do not recommend price transparency for on-patent medicines as the effect will be to slow the diffusion of innovative products to low income countries. Differential pricing is important and can best be achieved in the current environment via confidential discounts. Developing country markets are, however, dominated by generic products. Price transparency for off-patent products could improve market efficiency if capacities are there to use the data to inform procurement decisions whilst protecting against supplier collusion. We recommend consideration of one-sided disclosure of multi-source prices, i.e. buyers should share price data for off-patent medicines amongst themselves.

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Funding and Acknowledgements

This study was commissioned and funded by The Center for Global Development (CGD) as research to support its Working Group on the Future of Global Health Procurement.

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Glossary

DIFD	Department for International Development
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
HIC	High Income Countries
ICER	Incremental Cost-Effectiveness Ratio
IRP	International Reference Pricing
IDA	International Development Association
MLIC	Middle- and Low-Income Countries
OECD	Organization for Economic Cooperation and Development
PAHO	Pan American Health Organization
PEPFAR	President's Emergency Plan for AIDS Relief
UHC	Universal Health Coverage
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
WHO	World Health Organization
WTO	World Trade Organization

1. INTRODUCTION

1.1 Context

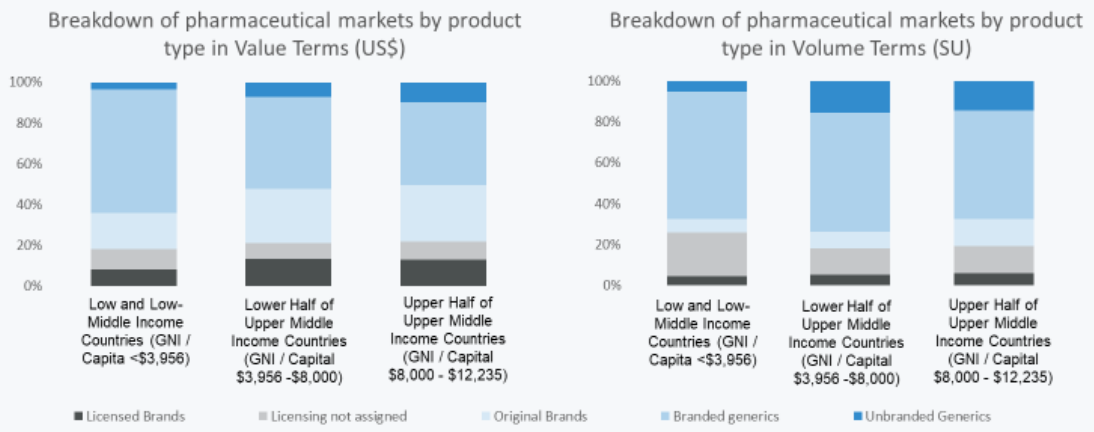
How global health mechanisms can adapt to the changing landscape for public procurement is a topic that has gained traction in recent years and is currently subject to new thinking and analysis[1].

The context for this is as follows:

- Making lifesaving health commodities, including medicines, vaccines, diagnostics, devices and vector control tools, accessible to Middle and Low Income Countries (MLICs) is a major challenge for global health policy. In many MLICs, especially the poorest, access to health commodities such as vaccines and treatments and diagnostics for TB, malaria and HIV, as well as family planning, has improved in recent decades in large part due to investments carried out by international health partnerships, such as UNICEF, UNFPA, IDA, GAVI and Global Fund, and bilateral aid programs such as those undertaken by PEPFAR, DFID and USAID. These funders have used centralised procurement mechanisms (e.g. PAHO's strategic and revolving funds, UNICEF's vaccine independence initiative, GFATM's procurement tool Wambo[2] and the Stop TB Partnership's Global Drugs Facility) to purchase drugs, vaccines and other health commodities and provide them where most needed at subsidized prices or as donations. As a result, access to lifesaving and life transforming health commodities in MLICs especially for infectious diseases currently depends strongly on international funders/donors and hence on the eligibility criteria they impose for program inclusion, which is typically linked to GDP per capita.
- Over the next few years, many Middle Income Countries (MICs) will increase their GDPs such that they lose their eligibility for aid. Some Low Income Countries (LICs) will also grow rapidly and lose eligibility. Countries co-financing obligations rise as their national income grows until they reach a threshold after which support is phased out (i.e. when countries "graduate")[3]. Countries have then to implement strategies to increase the domestic resources allocated for health, manage their resources more effectively, and make wise purchasing decisions.
- In addition, as countries become richer, they will strive to achieve Universal Health Coverage (UHC) to increase the provision of high-quality and affordable healthcare services to all citizens. In this context, a general expectation is that most countries will want to increase the pharmaceutical benefits their population can access through some form of within-country pooled purchasing including public or private insurance. Consequently, national demand for pharmaceuticals will become less elastic. Governments will however gain more bargaining power as they are buying more. Initial work on the markets in MLICs indicates that most pharmaceuticals currently purchased are off-patent. A summary of the breakdown is set out in Figure 1 below.

[1] The Center for Global Development (CGD) launched a Working Group in 2017 with the idea of developing critical thinking on adapting global health mechanisms to the current public procurement: https://www.cgdev.org/working-group/working-group-future-global-health-procurement. This paper was commissioned to support the work of the Group.
[2] https://www.theglobalfund.org/en/sourcing-management/wambo/
[3] See https://www.cgdev.org/publication/projected-health-financing-transitions-timeline-and-magnitude and https://www.cgdev.org/blog/budget-cuts-looming-again-can-pepfar-keep-gas-its-acceleration-strategy

FIGURE 1: HEALTH COMMODITY MARKETS IN LOW- AND MIDDLE-INCOME COUNTRIES BY BRAND AND LICENSING STATUS



Source: IMS Health MIDAS Database. Low and Low Middle Income = French West Africa, India, Philippines. Lower half of Upper Mid-Income = Tunisia, Serbia, Thailand and South Africa. Upper half of UMIC = Mexico, Malaysia, Turkey, Romania and Brazil. Fr. West Africa is an aggregation of 10 Francophone countries from the West African Region and contains: Cote d'Ivoire, Senegal, Cameroon, Burkina Faso, Benin, Togo, Chad, Mali, Guinea and Niger

Note: Licensed brands are products that are licensed out by an originator company to a company located in another region or country. Licensing not assigned refers to products specific to that country or region (e.g., locally manufactured branded generic medicines) where the brand is not recognized in the global IQVIA system or the data has not been recorded properly by the distributors supplying IQVIA with data. Original brands are products developed by originator/innovator companies. Branded generics are off-patent medicines sold under a brand name. Unbranded generics are marketed as the international non-proprietary name (INN) of the active ingredient(s).

Qualifier: Data obtained for this figure comes from IMS Health, the gold standard in health commodity data, but the data is only as good as the sources IMS Health are able to use. In addition, pricing is typically done at list pricing for distributor sales. This means that prices often include mark-ups for importation, tax and wholesale while excluding discounts. To counter these factors assumptions have to be made on average mark-up and discounting for each country, which will not perfectly capture in-market price dynamics.

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In such a context, there is a growing concern to design and develop efficient product selection and procurement mechanisms for MICs purchasing health commodities that were previously procured via international health partnerships. Effective purchasing of both off-patent and on-patent medicines will be crucial to extending UHC.

1.2 The Issue of Transparency

An important aspect of the discussions around the future of global health procurement is whether price transparency can have a positive influence on the effectiveness of procurement mechanisms in terms of their ability to deliver prices and volumes that enable governments to provide access to affordable and high-quality health commodities for their citizens. Will making prices publicly available make procurement more efficient and cost-effective medicines more accessible? This paper focuses on the role that transparency in pricing – and in related procurement processes – may play in the efficient and effective procurement of medicines by MLICs.

The WHO, for example, in its 2017 Fair Pricing Initiative considered: (i) the lack of transparency in drug development costs (ii) the lack of transparency of prices and processes by which prices are set and (iii) the resulting variation in amounts charged for

the same medicines in different countries (or even across different sectors in the same country) to be obstacles towards achieving Fair Pricing. It argued that transparency was vital to provide evidence for future action.[4] The US administration and Congress[5] and the Italian[6] Minister of Health recently also called for more transparency in the prices of patented products.

We begin by noting that the balance of argument about price transparency may differ between products with and without patent protection. On the one hand, we have markets for off-patent multi-source products (generics), and markets for intermediate goods, such as those of Active Pharmaceutical Ingredients (APIs[7]), which go into the generic products; on the other hand, we have markets for on-patent innovative drugs. Price transparency is more likely to be of value for increasing global access to generics and APIs, given that the barriers to entry are low in these markets. It may expand access through increased competition and lower prices. Concerns may remain about price transparency as to (i) the tendency to drive down prices and quality to the bottom in the absence of enforced quality standards and (ii) whether or not price disclosure increases the risks of collusion among suppliers which would lead to higher, not lower, prices.

The balance of argument about price transparency may also differ as between (i) transparency between buyers, versus transparency that is also visible to sellers; (ii) out-of-pocket purchases by patients versus third-party pooled procurement on behalf of patients; (iii) ex manufacturer (ex-factory or import) price versus the mark-ups added in distribution and retailing.

Procurement *process* transparency is another form of transparency, with potentially positive implications for procurement outcomes. In tenders and/or auctions, improved transparency in the bidder qualification process may result in more bidders participating. The competitive effect of attracting an additional bidder on final prices (i.e., lower prices) could potentially overcome the investment required to improve process transparency. Additionally, the use of electronic procurement (e-procurement) could also be a source of process efficiency and transparency resulting in more competition and less costly public contracting. Opaque procurement processes and rules are likely to be inefficient as they generate distrust among bidders who may decline the invitation to the tender.

For context, we note that transparency in procurement is often proposed for a wide range of industrial and service sectors, as a means of tackling corruption, boosting competition, and improving market access and welfare. There is also a widespread view that transparency is, by definition, a "good thing." We need however, to distinguish between transparency as a general attribute of government decision processes – allowing citizens or international observers to know more about what governments are doing, perhaps increasing trust – and transparency as a means of improving public

[4] WHO argues that value-based pricing is not feasible for indispensable products. See "WHO wants transparency, market revamp for fairer drug pricing" at: https://www.reuters.com/article/us-pharmaceuticals-pricing/who-wants-transparency-market-revamp-for-fairer-drug-pricing-idUSKBN1872PD and http://www.who.int/medicines/access/fair_pricing/fair_price_report/en/ and http://www.who.int/medicines/access/fair_pricing/fair_price_report/en/

[5] https://www.ft.com/content/2061c974-3651-11e9-bb0c-42459962a812/

[6] https://www.statnews.com/pharmalot/2019/03/12/italy-drug-prices-transparency-resolution/

[7] An API is a substance used in a finished pharmaceutical product, intended to furnish pharmacological activity or to otherwise have direct effect in the diagnosis, cure, mitigation, treatment or prevention of disease, or to have direct effect in restoring, correcting or modifying physiological functions in human beings.

procurement outcomes. It is possible that, in some circumstances, there is a trade-off between these two objectives. Making prices transparent and common knowledge for all countries could result in a uniform price, paid by all, which will be higher than the price previously paid in some countries. Countries paying higher prices are likely to include the poorest countries. Less transparency, and in turn less knowledge of the prices that different governments are paying, may enable some LIC governments to get lower prices. This implies less citizen knowledge of the prices paid by their own governments as prices cannot be kept confidential across countries if they are made public by governments to their own citizens. But it is also true that more citizen knowledge of prices paid in their own countries makes government more accountable for decisions and hence more motivated to negotiate cheaper prices and avoid any temptation to engage in corrupt behaviour.

A pre-condition of quality assurance (particularly in terms of the active ingredient) needs to accompany the procurement process, especially for off-patent products where loss of reputation may not be sufficient to dissuade a manufacturer or shipper from delivering low quality products. Without assurance that these medicines meet acceptable standards of quality, safety and efficacy, health commodity procurement is potentially compromised.

In this paper we will seek to separate these several aspects of the debate, whilst we focus on providing clarity around when – and under which conditions – transparency of prices may help MLICs better achieve procurement objectives and when it may not, drawing on experiences from sectors outside healthcare.

In natural resource contracting, for instance, there has been a push to increase transparency in the contractual agreements between MLICs and global companies. This may serve to (i) reduce likelihood of corruption by government officials and (ii) put pressure on companies to be reasonable – i.e. transparency increases the bargaining power of MLICs – partly because they can see what deals have been done elsewhere, but also because civil society and Non-Governmental Organisations (NGOs) in High Income Countries (HICs) will put pressure on multinational companies. However, we have not seen any literature that documents how price (as opposed to process) transparency in the resource sector leads to better deals for governments[8].

In pharmaceutical pricing we often see claims of positive effects from transparency in pricing, as we noted from the WHO[9]. The biggest single problem is the possibility that some HICs and higher income MICs will seek to exploit price transparency by insisting on paying the prices offered to governments buying for poorer population groups in MLICs. In this situation, prices between LICs, MICs and HICs become linked, and transparency works against LIC governments buying for the poorest populations. They will not obtain

[8] The CGD Working Group on Principles on Commercial Transparency (CGD, 2019) highlights the importance of transparency "in the extractive sectors, where the ownership of natural resources by citizens, the irreversible sale of non-renewable public goods, the often-significant revenue generation potential, the associated corruption risks, and the information asymmetries between government and companies mean that full disclosure is likely to be in the public interest." (page 9)

[9] The WHO (WHO 2018) also notes that "there is limited context-specific evidence that improving price transparency has led to better price and expenditure outcomes. Nonetheless, improving price transparency should be encouraged on the grounds of good governance." (para 37)

significant discounts if price transparency and price referencing mean that manufacturers also have to offer these same discounts to richer payers[10].

For this reason, concerns have been raised about transparency for on-patent innovative medicines, where differential or tiered pricing could play a key role in maximising access and rewarding innovation. This would be challenged by price disclosure (Danzon & Towse, 2003).

In many MLICs, published list prices of on-patent innovative medicines are set at similar levels to those in the US. These are usually prices for out-of-pocket purchase by high income groups within those countries. Most worryingly, the CGD's Working Group on the Future of Health Procurement has found that prices for generic/off-patent products, whether at the patient level or those charged to national health insurance authorities, can also be higher than those secured by wealthier and larger markets. This is driven by several factors including post import mark ups, limited competition and perceived quality lapses in weakly regulated markets. In highly fragmented markets there is a high risk that companies supplying on-patent products would respond by refusing to offer low prices to the public procurer if it jeopardised their high priced and substantive out-of-pocket market. Price transparency within a country for generic products may also pose challenges for government procurement through enabling collusion as we discuss later.

The remainder of the paper is structured as follows:

- Section 2 covers the findings from the literature on price and process transparency, for on-patent and off-patent drugs.
- Section 3 draws out the implications for global procurement arrangements, recommendations and challenges.

2. PRICE TRANSPARENCY: WHAT DOES THE LITERATURE SAY?

We seek to separate two aspects of the debate that people often get mixed up. Whether transparency is (i) a good thing in itself (i.e., should we be open in what we do?); or (ii) a means to the end of more cost-effective procurement, and greater health gain.

We do not address the first point in this paper. This is because it is not an economic issue but a preference that a society may or may not have. We concentrate on evidence related to the second point. For this purpose, a non-systematic targeted literature review was carried on with the aim to help to identify trends and better understand the current state of the field. It is meant to be an informative, rather than all-encompassing, review of the literature on price transparency.

The targeted literature review was done by looking at the following different sources: authors' knowledge of key references, google searches of grey literature, and academic literature. Searches of academic articles published in scientific journals have been performed through google scholar, EconLit via OvidSP 8, JStor, and ScienceDirect.

[10] Germany included Greece in its reference pricing group even though it had a GDP per capita of less than half that of Germany and had implemented special measures to reduce prices. The OECD (OECD 2018, page 12, footnote 3) reported that Greece has been temporarily excluded. However, the Slovak Republic is still included, which also has a GDP per capita of less than half that of Germany.

It is important to distinguish between many dimensions that arise when analysing price transparency:

- First, there is a clear distinction between transparency of procurement process and transparency of the prices obtained from that process. By process transparency we include not only the rules which aim to prevent opaque and discretionary procurement practices, but also the transparency of preliminary results inside the procurement process, in other words, the degree of information revealed throughout the tender process.
- Second, regarding pricing transparency, we discuss how disclosing information of the prices that result from the procurement process might affect future tenders in the country, and, more important, how it might affect tenders in other countries. On this last point, we differentiate the effects of tenders on on-patent products (which are often bought through negotiations) and on off-patent products (which can also be purchased using procurement auctions).

2.1 Transparency of process: reducing corruption and improving competition.

Transparency of process is often cited as a crucial principle of high-quality public procurement because it helps reduce costs and improve competition.

Waste and corruption are two important reasons that explain high prices for government purchases. There are many papers that study how inefficiencies and corruption increase the prices paid by public bodies.

In a paper by Di Tella and Schargrodsky (2003), the authors showed how corruption increases prices paid by public bodies. They studied prices paid for a number of basic inputs by hospitals in Buenos Aires, Argentina, in the mid-nineties when there was a crackdown on corruption involving hospital audits. The authors estimate that the average prices paid by hospitals went down 10% as a result of the crackdown.

Corruption can be the product of either capture or extortion in public purchases. Capture occurs when a firm bribes a public official to obtain a trading advantage, termed "active" bribery in the OECD Convention. Extortion occurs when a firm complies with a demand for a bribe to avoid being excluded from trade. This is referred to as a "facilitation payment" in international legislation. Using data from federal US procurement, Auriol (2006) showed that capture obstructs allocative efficiency and yields a dead-weight loss while extortion does not, because extortion represents a transfer of rent from the bidder to the agent, which does not necessarily affect the price of the bid. Using modelling, Auriol estimated that the loss from capture, however, represented between 4% and 10% of global procurement spending.

The extra information provided by price transparency may expose obvious issues of corruption, negligence, or inefficiency by government officials or purchasers. There are, however, a number of ways of exposing or tackling corruption without disclosing prices publicly (Søreide, 2002).[11]

[11] It is of course possible that, in the extreme, even if price transparency linked markets in a way that made new entrants less willing to offer low prices, the elimination of corruption would mean

Transparency of process can also have the effect of improving competition as well as reducing corruption. Opaque and discretionary procurement practices typically reduce incentives for firms to enter the market and actively pursue new contracts and expand sales. A robust, transparent regime enables better efficiency in the management of public resources: it improves competition, increases efficiency and reduces corruption.

Ohashi (2009) examined the extent to which the improved transparency in the bidder qualification process in procurement practices in Japan enhanced competition and reduced government expenditure. His analysis reveals that suppliers bid more aggressively under a transparent process than under a discretionary one, and therefore supports the view that transparency of process improves competition.

Others have argued that process transparency increases competition in auctions. When the government has the option either to negotiate or to put a project up for auction, Bulow and Klemperer (1994) show that if the government expects at least one extra serious bidder[12] to take part in the auction, then it should directly begin an auction instead of negotiating with bidders. In Chile, Singer et al., (2009) showed how electronic procurement (e-procurement) helped improve the efficiency of government's purchases. In theory, e-procurement, which entails a more transparent procurement process, reduces administrative costs and bureaucracy by helping the State avoid repeating tasks such as the registration and certification of contractors, allowing for more efficient control mechanisms and reducing paperwork. The authors showed that the implementation of the e-procurement system in Chile resulted in a reduction in prices paid for products and services by the Chilean government of almost 3% in 2006, together with a reduction in the government's administrative costs. Results suggest that the price savings were the product of e-procurement improving competition by increasing the number of serious bidders[4].

Poor public procurement processes could also be characterized by delays in preparing technical specifications, scope of work or terms of reference, a failure to start the process, or delays in contract negotiations. This might affect not only the final price paid by the government, but also the quality of the goods provided. Lewis-Faupel, Neggers, Olken, and Pande (2016) studied how e-procurement impacted road infrastructure provision in India and in Indonesia. They found no evidence that e-procurement reduced prices paid by the government, but they did find that it was associated with quality improvements, suggesting that e-procurement facilitated entry from higher quality contractors. Quality improvements, however, materialized in different dimensions. Whereas in India e-procurement led to higher quality roads, in Indonesia there was a significant decline in time-overruns with the quality of roads remaining at similar level.

Lewis-Faupel et al. (2016) also found that e-procurement increased the probability that the winning bidder comes from outside the region granting the contract. This could be explained by the fact that the absence of information on procurement opportunities and a lack of "due process" may impede the ability of foreign or "out of region" firms to bid for contracts. Evenett and Hoekman (2005) found a similar theoretical result when

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that prices were still lower than with non-disclosure. However, it makes more sense to separate policy mechanisms to tackle corruption from those for getting value from a non-corrupt procurement process. If the same instrument achieves both, then no trade-off is required, but the literature does not suggest that pricing transparency is that instrument, or, a priori, that any other single instrument can achieve both.

[12] A serious bidder is defined as an agent whose valuation and bid are higher than the seller's valuation. In other words, it is a bidder whose entry into the auction will exert a competitive pressure on its rivals.

modelling the potential impact of a change in WTO rules. In a theoretical situation where a government does not make the investments necessary to run a transparent procurement regime, potential suppliers might be uncertain of the demand curve they are facing and so be reluctant to enter the market. To the extent that acquiring information about demand levels in potential markets requires incurring fixed costs that affect future prices, improving process transparency would help reduce these costs, which in turn would increase the likelihood of a supplier bidding and lower the prices paid by government.

Overall, it seems that there is a common agreement that process transparency reduces purchase costs and that it can shape public procurement into a powerful tool. Nevertheless, under certain circumstances, there might be some undesirable effects.

First, the organization of the process - such as publishing and agreeing on procurement policies and on evaluation criteria, advertising, publication of contract awards and prices paid, and monitoring - is costly, and these costs can outweigh the benefits, although Goldberg (1977) argues that the case against regulation has been overstated.

Second, for nonstandard complex transactions, the use of simple transparent auctions may prevent the exchange of important precontract information risking less informed bids leading to higher prices, lower quality performance, or non-viable bids. Sealed-bid auctions stifle communication between the buyer and the contractor, whereas in negotiations, which may involve some element of confidentiality of information exchange, the buyer usually discusses the project in detail with the seller before the contract is signed reducing the likelihood of uninformed bids.

Third, there may be an effect of reducing product quality if quality is not properly regulated or barriers to entry in the market are high.[13] Mechanisms to assure quality and remove barriers must accompany process transparency, although these mechanisms can be hard to introduce. Manelli and Vincent (1995) develop a theoretical model that shows that when the buyer of a good cares about both quality and costs, then sequential take-it-or-leave-it offers, which they call negotiations, are better than an auction. This is because quality is unverifiable, and, in such a setting, auctions provide high-powered incentives for price reduction at the expense of quality. This theoretical result was empirically tested by Bonaccorsi, Lyon, Pammolli, and Turchetti (2000) using data on the procurement of medical devices by Italian hospitals. They confirmed that auctions are less likely to be optimal procurement mechanisms when quality is important but difficult to verify.

Fourth, process transparency facilitates government scrutiny that may inadvertently discourage the use of these processes altogether. Gerardino, Litschig, and Pomeranz (2017) found that audits of auction processes in Chile, introduced to enhance transparency, perversely led to a decrease in the use of auctions and a corresponding increase in the use of direct (non-competitive) contracts. The national procurement legislation tried to promote the use of more transparent and competitive auctions rather than discretionary direct contracts. However, auctions are significantly more complex and, as the audit protocol mechanically led to more scrutiny and a higher probability of further investigation for auctions than for direct contracts, officials responded by avoiding auctions altogether.

[13] An example of this issue of low quality in relation to generic drugs in India is presented in next section.

Finally, the optimal degree of process transparency is not clear, given that it affects the results in both positive and negative directions. In ascending auctions for multiple items, Ausubel and Cramton (1998) argue that making too much information available to bidders during the process can facilitate collusion. An ideal auction attempts to allow information that facilitates a competitive process (e.g., the reporting of high bids), but limits the information that is more apt to support collusion, such as details on the bidding of each supplier.

Overall, even though transparency of process may have some drawbacks in certain circumstances, there is agreement that it is a good instrument to attract more bidders and get lower prices, provided there is a way to guarantee product quality and that barriers to entry in the market are low. The choice of auction versus a process including negotiation depends in part on how the issues above are addressed. Importantly, information disclosure during the process about bids needs to be managed in a way that is pro-competition rather than allowing collusion between suppliers.

2.2 Price transparency: effects on market access and welfare

We consider first the effect of price transparency within and then across different markets.

2.2.1 Intra-country price transparency

In the previous section we mentioned that the extent of revelation of information *during* the auction (*i.e.* in intermediate rounds within an ascending auction) affects bidders' bidding behaviour. The revelation of information *after* the auction would also affect the results of future procurement auctions, as it would bidders' behaviour in future auctions.

The most undesirable effect of price transparency is that it facilitates collusion of suppliers. The OECD guidelines for public procurement states that "disclosing information such as the identity of the bidders and the terms and conditions of each bid allow competitors to detect deviations from a collusive agreement, punish those firms and better coordinate future tenders" (OECD, 2008). If prices are fully transparent, then firms have more tools to maintain collusion given that it is easier for the rivals to detect any deviation.

The analysis of collusion in modern industrial economics is based on exploring incentives and constraints for collusion. A profit maximising firm compares the immediate gains it makes from breaking an agreement with fellow suppliers on price by undercutting them and winning market share, with the profits it makes if it keeps colluding. In the worst case the company could end up with both a lower price and a lower market share over time from abandoning collaboration. In general, collusion is more likely to be sustained: the lower the profit that a firm would obtain from deviating from the price agreement; the lower the expected profits it would make once punishment by other cartel members starts; and, on the assumption that there are short term gains, the more weight firms attach to future profits (Motta, 2004)[14].

In a theoretical model, Stigler (1964) argued that collusive agreements would break down if price cuts are secret or non-observable. Green and Porter (1984) also emphasize

[14] There is also the risk of being caught by antitrust authorities, which could lead to very large fines based on turnover, although if penalties are reduced or waived for those who collaborate with the authorities in revealing the existence of the cartel, then the penalties from defecting may be reduced.

the role of observability of prices, showing that if actual prices are not observable, collusion would be more difficult to sustain. The existence of confidential discounts makes list prices unreliable, and sellers lose confidence in rivals' willingness to cooperate (Scherer, 1997; Tetteh, 2009). An OECD report on corruption and collusion in public procurement (OECD, 2010) concludes: "The principle of transparency – which relates to the availability of information on contract opportunities, the rules of the process, decision-making and verification and enforcement – is of critical importance in preventing corruption. In certain instances, however, transparency is inconsistent with the need to ensure maximum competition within the procurement process. Transparency requirements can result in unnecessary dissemination of commercially sensitive information, allowing firms to align their bidding strategies and thereby facilitating the formation and monitoring of bid rigging cartels. Transparency may also make a procurement procedure predictable, which can further assist collusion." (page 11)

Empirical evidence and experimental results are consistent with the theoretical predictions. For example, in 1993 the Danish antitrust authority decided to gather and publish firm-specific transactions prices for two grades of ready-mixed concrete in three regions of Denmark. Following initial publication, average prices of reported grades increased by 15-20 percent within one year and, at least locally, prices converged significantly across firms serving the same market. Albæk, Møllgaard, and Overgaard (1997) studied this case and they found that publication of prices allowed firms to reduce the intensity of price competition and, hence, led to increased prices.

Cason, Kannan, and Siebert (2011) used a laboratory experiment to show the effect of coordination in procurement auctions. They modelled a procurement auction as a sequential private value auction in which winners do not drop out for subsequent auctions. They use a model to study two policies: one in which only the winner's bid is revealed at the end of every auction, and another in which all bids are made public at the end of every auction. Analysis of the experimental data showed that bidders pool with others with similar costs significantly more often under a complete information revelation policy, which suggests the existence of tacit collusion. Also as predicted, the procurer pays less when employing an incomplete information policy, provided the market is highly competitive.

Further evidence that price transparency increases the risk of collusion comes from Bergemann and Hörner (2018), albeit looking at a market of many buyers and one seller. They analyse repeated first price auctions under three distinct disclosure regimes regarding the bid and award history. In the minimal disclosure regime, each bidder only learns privately whether they won or lost the auction. In the intermediate regime, the winner's bids are public; and in the regime with most disclosure, all bids are public[15]. The theoretical result shows that, under certain circumstances, a less transparent auction process with no bids revealed is more efficient than the other two specifications modelled. Less transparency in this context therefore results in higher revenue for the seller and ensures that the buyer with the highest valuation wins. We do not know whether, in practice, this result carries over to procurement auctions with only one buyer but with multiple sellers – rather than only one seller and multiple buyers[16]. The intuition

[15] The authors call this "process transparency" but as they show the effects of information revelation on prices, we term it "price transparency".

[16] De Castro and de Frutos (2010) study and show the conditions under which statements from auctions can be applied to other procurement models.

seems to go in the same direction, which would mean that the seller with the lowest price wins and the buyer's savings (surplus) are maximised.

Where there is more than one market within a country – for example there may be an out-of-pocket market for high income citizens or private insurance cover for them, but with government buying drugs for low income citizens – then transparency of the price in one market will impact the price obtained in the other. The effects are as for inter-country price transparency which we discuss below.

2.2.1 Inter-country price transparency

In this section, we focus on explaining how pricing transparency facilitates comparisons *between* countries (inter-country) and how this might have different effects on market access and welfare when procuring on-patent and off-patent drugs.

One way to assess the performance of a process of procuring drugs in a particular country is by comparing the price of drugs obtained in that country with the price paid in other countries. This method of measuring performance is known as "yardstick competition" (Shleifer, 1985). However, it presupposes that we know what a good procurement outcome is. Many argue (Morgan, Vogler, and Wagner, 2017; Vogler and Paterson, 2017) that price transparency might be good—not only as a piece of information to assess the efficiency of a procurement process, but also as an *input* to that process. Knowing what others had paid would facilitate negotiations with pharmaceutical firms, who were, of course, well aware of the prices they had agreed with other payers.

Although the evidence on the positive value of process transparency is clear, price transparency might *not* be desirable. It is important in considering the impact of price transparency to look at two different types of pharmaceutical purchase:

(i) on-patent innovative drugs; and

(ii) off-patent drugs which are often multi-source supplied, and APIs which are the key input to drug manufacture.

APIs are an intermediate product sold on a business-to-business basis. Whilst most innovator companies and some generic companies make APIs in-house (or have exclusive out-sourcing arrangements) the APIs used by most multi-source suppliers are bought in the open market. We are not aware of any regulatory or competitive issues[17]. It is not clear to us that requiring price transparency in this market would be helpful. We therefore focussed the literature review on final products, on-patent and off-patent drugs.

2.3 On-patent innovative drugs

2.3.1 Static Efficiency

Price transparency makes international price comparisons easier, producing more price uniformity across countries, as is also the case with reference pricing or parallel trade. In some industries, price comparisons across countries are particularly useful, because they

[17] We note that other issues, such as a desire for local production, are important, see for example http://www.newagebd.net/article/41935/pharma-ingredient-makers-to-get-corporate-tax-holiday-till-2032)

induce competition among firms promoting what is called *static efficiency*[18]*.* This is the logic behind trade agreements including the move of the European Union to create a Single Market for goods and services.

Static efficiency is concerned with the most efficient use of existing resources at a given point in time, and it is achieved in two ways. First, for any given level of production, competition induces firms to reduce mark-ups, setting prices closer or equal to the marginal cost of production. Competition helps to achieve *productive efficiency*, which means that the good is produced with an optimal combination of inputs at the lowest possible cost. But it also helps to achieve *allocative efficiency*, where resources are efficiently distributed between their best uses as far as consumers are concerned. This is termed the *first-best solution*.

For the innovative pharmaceutical industry, however, an industry with large fixed R&D costs, achieving first best static efficiency jeopardises sustainability. When prices are equal to short-run marginal costs the industry cannot recover sunk fixed R&D costs.

2.3.2 Dynamic Efficiency and Price Differentiation

Patents, which allow prices to be set above marginal cost of production for the period of protection, are the most commonly used instrument for allowing firms to recover R&D costs and achieve *dynamic efficiency*. In the case of innovative products, it is crucial to agree on how prices should be set to maximise access during patent protection and minimise the impact of a price well above marginal cost.

Price differentiation is one option, which could guarantee greater access to medicines worldwide (consistent with standard norms of equity) without threatening innovation and sustainability. This is the reason by which differential pricing based on Ramsey pricing has been seen as the *second-best solution.* It guarantees dynamic efficiency by enabling developers of innovative pharmaceutical products to recoup the costs of R&D, while minimises the damage caused to the static efficiency as a consequence of setting prices above the marginal cost (P. M. Danzon, 1997; P. M. Danzon and Towse, 2003). A subsequent paper, P. Danzon, Towse, and Mestre-Ferrandiz (2015) demonstrated that second-best static efficiency and dynamic efficiency were achieved when each payer set a willingness to pay threshold for buying pharmaceuticals that reflected the preferences for health gain of those they were buying for, given the relevant budget constraint and other competing demands on that budget, and permitted firms to price up to that threshold.

Of course, price discrimination, as compared to uniform pricing, typically harms some consumers but benefits others. Countries facing relatively high prices under international price discrimination tend to ignore the gains to consumers in low-price countries when they reference prices for their own market.[19] Price transparency tends to lead to uniform prices which, for innovative products, might not be desirable when the objective is to maximize market access. International reference pricing (IRP) whereby price transparency leads to other countries referencing that price in setting their own price, incentivises marketing authorisation holders to launch new products in countries with high drug

[18] In highly concentrated oligopolistic markets where firms have greater ability to collude, price transparency may act to reduce competition as any deviation from the collusion price is immediately seen by others. This aspect will be discussed later in the paper.

[19] As we noted earlier, Germany did decide temporarily to exclude Greece from its reference country basket to protect Greece's lower prices due to the financial crisis. However, the Slovak Republic is still included, which also has a GDP per capita of less than half that of Germany. (OECD 2018, page 12, footnote 3) https://www.oecd.org/els/health-systems/Pharmaceutical-Reimbursement-and-Pricing-in-Germany.pdf

prices and to delay, and even refrain, from entering the market in lower-priced countries to avoid reducing the average price (P. M. Danzon, Wang, and Wang, 2005; M. K. Kyle, 2007; Persson and Jönsson, 2016). It is also worth noting that some lower income countries may be willing to accept some delay in these circumstances to ensure a lower price, as noted in Lanjouw 2005.

Pharmaceuticals are unusual economic goods in part because of the role of third-party payers. We set out the economic theory for consumer markets and then consider third party purchase of medicines.

The classic theory of third-degree price discrimination says that the optimal price-discriminating prices are found by applying the inverse-elasticity rule to each market separately (this is the second-best solution of differential pricing based on Ramsey mentioned above). In other words, optimal pricing implies that the monopolist should charge more in markets where consumers are less price sensitive (Tirole, 1988). The effect of price discrimination in a typical consumer market on overall social welfare is, however, ambiguous. On the one hand, the innovator should be better off with the option of price discrimination[20]. On the other hand, consumers/purchasers in markets that are less price sensitive face higher prices under price discrimination, but those consumers/purchasers in markets that are more price-sensitive face lower prices than under uniform pricing. Price discrimination therefore increases welfare if and only if it increases the total volume consumed. In consumer markets[21], if price discrimination means access for patients who have none in a single-pricing regime, then price discrimination is unambiguously better than a single-price regime. The critical issue for social welfare is therefore the impact on volumes. An unambiguous benefit to welfare exists in the case where, under the uniform price regime, only the more inelastic (or higher value) market is served. In this case, price discrimination leads to a Pareto improvement since profits increase, consumer surplus in the previously unserved market is positive, and consumer surplus in the more inelastic market remains unchanged (Church & Ware, 2000; Tirole, 1988, Kremer & Snyder, 2018).

To put these points in the context of pharmaceuticals. Third-party payers typically choose and pay for the treatments used. Inelasticity of demand is a proxy for the degree of patient health benefit. The more incremental health gain, the higher the price the payer is willing, in principle, to pay[22]. If differential as compared to uniform pricing results in access for patients to a product that offers them a better efficacy/safety profile than the product they are currently using, then price discrimination is unambiguously better than a uniform-pricing regime. Hausman and MacKie-Mason (1988) showed that price discrimination may lead to static welfare gains when it allows patent holders to open new markets and to achieve economies of scale or learning. Hence, if this is the case, price transparency which prevents price discrimination might be detrimental to

[20] Uniform price is a particular case of differential pricing where the same price is charged to all countries. Therefore, with differential pricing, the firm will always be at least as well as with uniform pricing.

[21] Which include out-of-pocket purchase of medicines by patients.

[22] This is explicitly the case in systems using HTA or value-based pricing approaches. However, demand elasticity is constrained by income. For LICs, elasticity of demand could also be a proxy for income level and the cost of opportunity of buying health (measured in other basic goods), and this effect could dominate the inelasticity due to health benefit. This argues in favour of using differential pricing (charging less where the demand is more elastic), as it increases access in LICs, which otherwise cannot afford to buy medicines.

both static and dynamic efficiency. When price discrimination does not, however, lead to the opening up of new markets (i.e. total output is the same under both uniform and differential pricing regimes), then total social welfare results to be lower.[23].

The opening up of new markets when price discrimination is allowed, depends on the degree of demand dispersion (meaning variance in the range of payers willingness to pay[24]). Malueg and Schwartz (1994) show that for a continuum of markets (multiple markets), uniform pricing yields lower global welfare than price discrimination if demand dispersion across markets is large. The reason is that with uniform pricing the larger the market dispersion, the higher the number of these markets that are likely to remain unserved. Consequently, the resulting negative effects of uniform prices on welfare would be larger than the negative effects of price discrimination on output misallocation.

2.3.3 Price Transparency and Access to Medicines

Calls for price transparency are usually for payers to have better information on the ex-factory pharmaceutical prices in other countries to improve their ability to control the prices of their own reimbursed prescription drugs through either international reference pricing (IRP) or direct negotiation (Hill, Barber, & Gotham, 2018). Further, prices at different stages of the supply chain tend to differ for reasons that have nothing to do with the exercise of producers' market power. It is particularly important to reveal to payers such mark-ups in the supply chain because it might be the case that these are unnecessarily high reflecting inefficiency or the local market power of distributors or retailers. There is evidence that average supply chain mark-ups are significantly higher in LMICs than in HICs (Rosen & Rickwood, 2014; WHO, 2015).

Kaló, Annemans, and Garrison (2013) explained the implications of increased price transparency on the accessibility of new medicines in Central and Eastern European countries with lower-incomes than Western European countries within the EU Single Market that allows the physical movement of products across borders (parallel trade) as well as the use of IRP. IRP may appear to be more efficient than direct negotiation because it avoids bargaining costs. Nevertheless, with the aim to reduce the costs for public payers, IRP produces a tendency towards 'race to the bottom' over time as each country attempts to get a better deal than the others.[25] For this reason, pharmaceutical firms have an incentive to keep the ex-factory price of their new drugs within a relatively high and narrow price corridor to prevent the erosion of their global average price even if this means the product is not reimbursed by the public health systems of the poorer countries within the EU. In addition, policy-makers in some countries have been reluctant to publish ex-factory prices of pharmaceuticals and prefer the publication of retail prices, which helps to mitigate the harmful effects of price transparency on their ability to get low prices. The authors state price transparency can only help if it is accepted by all participants as designed to help lower income populations; for example, GAVI has

[23] This is because differential prices fail to equate consumers' marginal valuations. This occurs, for example, if two different consumers in different markets have the same willingness to pay for the medicine, or the same ability to benefit in terms of health gain, but one might have access to it when the other does not (because of differential pricing). This is known as inter-consumer misallocation and it is inefficient in economic terms. For a discussion of this point in the context of the retail electricity market see Simshauser & Whish-Wilson (2015).
[24] Or the willingness to pay of the third-party payers acting on behalf of patients and enrolees.
[25] As we previously mentioned, whether a 'race to the bottom' is good or bad for public welfare depends critically on two things: (1) whether quality is regulated, and (b) whether the barriers to entry for the manufacture of a specific drug are low.

developed tiered co-financing according to the GDP level of low-income countries. In the same vein, Tetteh (2009) argues that differential pricing should be implemented via country-specific bilateral negotiated discounts.[26]

However, Vogler and Paterson (2017) oppose the use of confidential discounts as a way to achieve price discrimination and affordable patient access to medicines. They argue that price transparency can better contribute to this aim. The authors want partners in negotiation to meet on equal terms to avoid an imbalance caused by information asymmetry that weakens the purchasing power of the procurers. They argue that the acceptance of confidential discounts creates negative externalities, impacting procurement and price negotiation in other health systems, and hampering cooperation among countries that could ultimately benefit all payers in the long term.

From the consumers' perspective, Kyle and Ridley (2007) differentiate between two cases. The first one is when a buyer is unaware of the price for treatment *before* receiving it. Here price transparency can inform consumers of expected costs and reveal when sellers are charging high prices. The second one is when a buyer knows the price the seller offers, but is unaware of the price offered to *others* by the same seller. In this latter case, the authors suggest that the effects of requiring price transparency are less clear because – for the reasons we have set out above (viz., of market linkage) - it could (i) increase prices paid by poorer consumers and (ii) deter business entry in poorer markets, reducing competition.

We already mentioned that implementing price transparency is not costless. Likewise, price differentials are not easy to keep in practice either. A successful policy of price differentials is the one that can prevent other measures that might revert its effects, such as parallel trade or IRP. Kyle (2011) found empirically that, in order to maintain the ability of pharmaceutical companies to price discriminate across countries, firms in the EU took a variety of non-price measures which had the effect of limiting parallel trade, such as product and package differentiation, refusing to sell certain products to some countries, etc. She found that, while such measures worked to inhibit parallel trade, they impose costs on both companies and consumers that might reduce total welfare as compared with 'clean' price discrimination.[27] [28]

2.4 Off-patent drugs with multiple suppliers

Achieving dynamic efficiency is not an issue in generics markets as long as patents have already expired. If appropriately designed, patents should have ensured enough reward to innovators. Static efficiency should therefore be the only concern for maximizing social welfare under generic competition, and price transparency seem to be a good

[26] It could be argued that vaccines are a special case, with a small number of products, most of them generic, a small number of manufacturers, and guaranteed/predictable volumes per country as whole cohorts usually will get it. GAVI publishes vaccine prices for its own countries, and the UNICEF revolving fund has tiered pricing for later vaccines which are on-patent and/or harder to manufacture such as PCV.

[27] A "clean" price discrimination is understood as a situation where price discrimination is permitted and firms don't need to use other instruments (such as package differentiation, refusing to sell, etc.) to make it effective.

[28] We do not discuss price differentials within as well as across countries. Where there are significant income inequalities it would make sense for prices to vary depending on health system structure and purchasing authorities' structure. For example, public procurement and provision for low income patients might be at much lower prices than those paid by high income citizens whether they were paying out-of-pocket or covered by private insurance schemes.

instrument to attain this objective.[29] Price transparency for buyers could unambiguously improve off-patent market efficiency, both when purchasing is by third party payers and when it is by individual patients paying out-of-pocket. As we previously mentioned, comparing the price of drugs obtained in a country with the price paid in other countries is also a way to measure performance, known as "yardstick competition".

In countries where most drugs are purchased by patients out-of-pocket and quality assurance regulation is unreliable, price transparency might have unintended consequences when products are quality differentiated in a way that is hard for buyers to assess ex ante. In 2013, India set price ceilings on a set of – largely generic – essential medicines using an internal reference pricing regime, with the aim to improve affordability for patients, as most drugs are paid for out-of-pocket. While this was about price ceilings not price transparency, the effect was to constrain the price dispersion between different generic versions of the same medications – a similar outcome to that of introducing price transparency. Within India, generic producers cannot be viewed as equals due to lack of effective regulatory quality assurance. Multinational generic producers are of higher average quality than local generic producers who export (and they of higher quality than domestic generics producers with no export capacities) and, correspondingly, price their products higher. As a result, there is often large price dispersion between different generic producers of the same product. Price ceilings can, in principle, avoid high quality, high reputation suppliers from making excess profits.

A study of this legislation by Dean (2018) showed that these price ceilings had both positive and negative effects for patients paying out-of-pocket. Consumers benefitted from price decreases – even products priced ex-ante below the price ceilings decreased their prices in response to the legislation. However, lower margins on price-controlled medicines caused some producers to pull out of rural areas, due to the high supply chain costs to reach these areas. For this reason, sales of price-controlled medicines *decreased* after price ceilings were implemented, suggesting the legislation prevented trade that otherwise would have occurred and therefore access to needed medicines in rural parts of the country. Another impact of the legislation was a shift in market share to higher-quality firms. Lower-quality local firms experienced both decreased market-share and increased market exit. As a result, the legislation led to higher average drug quality on the market, but reduced access in rural areas.

In India, given that most patients pay for medicines out-of-pocket, the market price paid by consumers – including supply chain and retailer mark-up on top of ex-factory prices – is what is most important for patient access. Consumers who pay out-of-pocket are more sensitive to price changes, so a price reduction has a greater impact on market access in comparison with systems of universal coverage or with co-payments. Price transparency, making visible price differentials, produces greater consumer response to lower prices. There is much higher price elasticity of demand than for third party payer purchases. On the supply side, this price sensitivity has the potential to stimulate price competition between producers for final consumers, leading to price compression and potentially to

[29] However, we are disregarding other actions or effects that might arise after price comparisons are implemented. For example, Prada et al. (2018) show that, after direct price controls were enacted in Colombia in 2011, price inflation decreased almost 43%, but real pharmaceutical expenditure almost doubled due mainly to an increase in units sold. Such disproportionate increase in units sold maybe attributable to better access to drugs due to lower prices, and/or to an increase in marketing efforts by the pharmaceutical industry to maintain profits.

lower profit margins for producers. However, there is always a risk that supplier knowledge of each other's prices reduces price competition.

Seeking to achieve lower prices by regulation using price ceilings may lower margins too much, making it harder for firms to serve high-cost areas, such as rural neighbourhoods. More generally, price ceilings may create monopolies with only the largest and most efficient manufacturers supplying[30]. Increased competition in other parts of the supply chain, or interventions to ensure access to rural areas, may be needed to encourage competitive supply in harder-to-reach areas.

3. RECOMMENDATIONS

3.1 A series of challenges

As we noted above, it is important in considering the impact of price transparency to look at two different types of pharmaceuticals: i) on-patent innovative drugs; and (ii) off-patent drugs and APIs. As shown in Figure 1 above, most pharmaceutical expenditure by both value and volume in MICs and LICs is off patent branded and unbranded generics. A lot of global policy focus however tends to be on prices in the on-patent market.

It is also important to distinguish between the "ex-factory" price, i.e. the price at which the product is supplied into the distribution channel, and the final price to the patient or the provider or the payer, which may include mark-ups by distributors or retailers and taxes. We can also note that there is a difference when a patient is buying a medicine themselves (out-of-pocket) or will be reimbursed by a third party payer (public or private), in which case the third party payer is the buyer. Finally, when discussing price transparency, it is worth distinguishing between visibility to buyers alone or both buyers and suppliers.

Below we set out a series of questions and use the results of the literature review to answer them. We then present our recommendations.

Does price transparency increase payer bargaining power?

The case of on-patent medicines

Price transparency links markets. Suppliers can see that the buyer in market A can see the price paid by the buyer in market B. If buyer A is likely to insist on the same or a better price than that paid by buyer B, then the supplier will adjust their price in market B accordingly. If the markets are significantly different, and market B is much poorer, then B may end up not being supplied. This is because it is more profitable for the supplier to only supply A at the price A is willing to pay, than to supply B at a price B can afford, but also have to supply A at the lower price offered to B. The optimal solution for the company is to supply both A and B but at different prices. This is also in the interest of B. Insistence on a uniform price by country A means that a supplier is likely to delay launch or not launch at all in market B if this means they must forego the price premium in market A. In the long run, if A were successful in paying prices for health gain that are below its ability to pay given its healthcare budget allocation, then suboptimal levels of innovation may occur to the detriment of its citizens (i.e., there will be a loss of dynamic efficiency.)

[30] Of course, in the short run prices are lower because they are controlled, and quality goes up. However, fewer suppliers will make it more likely that the price ceiling is raised in the future.

Of course, if buyer A accepts that market B should pay a lower price, then disclosure does not directly link markets. However, it is hard to see the point of price transparency in these circumstances if the purpose was to enable buyer A to reference market B to get a lower price. Greater price transparency for on-patent innovative products would only work (increase access to drugs for low income populations) if there were an agreed global tiered pricing structure based (say) on GDI per capita, the size of current and planned healthcare expenditure, and disease burden, such that buyer A did not demand the same price as was available for market B. Then, price transparency would be fine as it would be a means of policing such an agreement. Markets are linked, but in a way that is agreed and accepted by buyers. Reaching such an agreed structure of agreed price differences is likely to be difficult.

We need to separate the role of price transparency from that of increased buyer bargaining power arising from combining the purchasing power of A and B. This is usually the basis of an argument for regional (cross-country) pooled procurement arrangements. If buyers A and B combine forces to offer a higher volume, then the price is likely to be lower than the price in market A. However, it may still not be lower than that which would have been offered to payer B in the absence of any requirement for price transparency. On the other hand, smaller markets which are less attractive to a supplier may suffer from either disproportionate (given their wealth levels) prices or no supply. In such a case, a small country joining a purchasing group with a large wealthier market may well result in access and a better price than the former could have secured on its own. But even in such a setting, it could be that the poorer/smaller market is getting, by virtue of associating itself with a large market which insists on a single price, a price worse than it should have gotten, given its limited ability to pay. In this case it could well be that the smaller market is overpaying and may have been better off without the product. Bargaining power comes from purchasing large volumes, but also from not having any more money to put on the table.[31]

In many instances, there may be several on-patent substitute products available within a therapy area competing in the market. In this case, given that the number of competitors in the same therapy area is usually low, price transparency introduces the additional potential problem of tacit price collusion. The availability of several on-patent substitute products also introduces the potential for price competition—for example, through tendering for use in those patient groups for which similar clinical effects are achieved by more than one competing on-patent product in the same therapy area. As we have noted however, it is not efficient to disclose the prices of the winning bids when tendering is a repeated activity.

[31] Thus PAHO is a powerful and effective vaccine purchaser. PAHO publishes its vaccine prices online. It is a sufficiently powerful purchaser to be able to insist that it is offered the lowest price a supplier will offer anywhere in the world. Whether some lower income countries might get a better deal outside of PAHO, if PAHO did not insist on no-one being offered a lower price than it pays, is a difficult question to answer. It depends on the costs of supplying the country (i.e. of doing business in the country) and how much lower the price could go relative to marginal cost, and whether in practice companies would be willing to supply at a lower price, given that they wouldn't have to offer the same price to Brazil and other large middle income PAHO members. It is understandable, therefore, why small low income PAHO region countries support the PAHO process. It is not clear to us, however, that price transparency, as opposed to bargaining power, helps PAHO get a low price. PAHO may get a good deal in spite of price transparency and not because of it.

The case of off-patent medicines

In the case of multi-source products (i.e. off-patent medicines), there is no further R&D cost to recover.[32] Differential pricing is not needed for dynamic efficiency reasons or to achieve second-best (i.e. given patents) static efficiency. On the assumption that there is no product quality differentiation and that prices at competitive levels are effectively at long-run marginal cost (including recovery of the fixed costs of manufacturing and the set-up costs of doing business including getting product licenses), then there is no reason for ex-manufacturer prices to vary by market other than to reflect differences of the "in market" costs of doing business in a particular country or region.

Whilst price transparency will lead to market linkage on the part of suppliers, it is not apparent to us that this will lead to differences in pricing behaviour for generics as a consequence. There is therefore a stronger case for price transparency for generics, albeit with the proviso of the need to avoid collusion. We discuss this possibility below.

One major reason why off-patent prices do vary is because of differences in real and perceived quality.[33] Manufacturers who have guaranteed high quality (for example the off-patent brands of the innovator or some makes of branded generics) are often able to command a premium price in the market. The way to increase price competition is to raise quality. This can be most readily accomplished by improving medicines regulation including manufacturing GMP inspections and closing down substandard facilities or revoking the licenses of low quality suppliers whilst avoiding aggressive price minimisation behaviour by monopsonistic buyers which drive quality and/or supply down.[34] The key point is that substandard generics should be eliminated from the market (and buyers' trust in generic suppliers enhanced) reducing the ability of high-quality suppliers to charge premium prices.

***Does price transparency increase the likelihood of collusion*?**

The theory suggests that repeat purchases of homogenous products creates the circumstances for tacit collusion. Price transparency increases the opportunity for collusion by enabling the colluders to observe any deviant behaviour on the part of fellow suppliers.

If prices are transparent, the first entrant (or the leader of a cartel) could signal the collusive price to other subsequent potential entrants (followers) through the first price set. Followers then will only need to replicate that price to collude and avoid a price war. If prices are not transparent however, there is always a fear for followers that offering too high a price will mean not getting any market share. As a result, it will be more likely that prices offered by all sellers, the leader and subsequent followers, are lower as a result of wanting to avoid the risk of offering a too high price.

Is there a case for one-sided disclosure of multi-source prices, i.e. between buyers?

One route forward is to have one-sided disclosure of multi-source prices, i.e. between buyers alone. This offers the potential benefits of increased competition, with buyers having a better understanding of what is on offer, whilst avoiding the potential problems of encouraging tacit collusion by enabling suppliers to more easily collude in the prices

[32] Strictly, there will be significant clinical development costs in the case of biosimilars.
[33] Referred to as an example of vertical differentiation in the literature.
[34] We show in Section 2 the example of use of price control to drive out low quality producers. In this case costs were similar for all suppliers, and, instead of charging a premium, high quality suppliers gained market share forcing low quality suppliers to exit the market.

they offer. Databases could be constructed of, for example, ex-factory off-patent prices, by INN to ensure anonymity, and which were not accessible to suppliers. Ensuring no supplier access would be important. If some suppliers were to obtain access to these prices (via sympathetic buyers or through corrupt payments), this would influence how those suppliers behaved. This could have the effect of reducing effective price competition, if a company were able to observe the prices it had to match to win business. Disclosure of prices to all suppliers (e.g. by posting the database of prices on the internet) would raise, again, the possibility of tacit collusion amongst suppliers.

Does price transparency of distributor and retail mark-ups increase efficiency?

A major reason for relatively high prices for medicines in many MLICs is the inefficiency of mark-ups in the distributor and retail sector. Transparency of distributor, retailer, and tax mark-ups can be helpful (though much more context sensitive than product prices) because it enables governments to understand the efficiency of the supply chain beyond the ex-factory price. It could again be argued that margin disclosure could lead to collusion, but given that the final retail prices are, by definition, transparent, this is unlikely. Where governments contract for distribution services to deliver drugs and vaccines to hospitals and clinics, the main factor impacting the efficiency of the price obtained is likely to be the transparency of the procurement process. However, it is important that the scale of added cost is understood. If government distribution contracts are "winner takes all" and come about only every few years, then the opportunities for collusion from price transparency are limited.

3.2 Our conclusions

We summarise our conclusions/recommendations as follows:

<u>Off-patent pharmaceutical products</u>

- In the absence of collusive supplier behaviour, transparency of the procurement process significantly lowers the cost to purchasers of off-patent medicines by increasing efficiency and thereby attracting more suppliers;
- In generic markets, patents have expired and dynamic efficiency is not an issue. Price transparency could improve market efficiency. However, price transparency increases the opportunity for collusion by enabling generic suppliers to observe one another's prices. Any consideration of price transparency must take this possibility into account.
- We recommend consideration of one-sided disclosure of multi-source prices, i.e. buyers should share price data among themselves. Databases could be constructed of ex-factory off-patent prices (e.g. export or pre-tax import prices) which were not accessible to suppliers. We recommend that such databases employ strong security protocols to prevent supplier access.
- Since ex-factory price reductions could be entirely offset by monopolistic or collusive behaviour further along the supply chain to the ultimate consumer, the above transparency recommendations for generic products can be generalized to apply at each stage along the entire supply chain. On the one hand, price sharing among buyers at any stage is likely to improve market efficiency. On the other hand, members of a cooperating group of sellers can use transparent prices to punish

members who attempt to improve their market share by undercutting the cartel price thus sustaining supplier cooperation and high prices.

On-patent pharmaceutical products

- We do not recommend price transparency for on-patent medicines. In the absence of global agreement on tiered pricing by region and market, the effect of price transparency will be to both slow the diffusion of innovative products to low income countries, thereby reducing access, and, consequently, to reduce the returns to innovation. Differential pricing based on an HTA assessment of value and the country's/payer's ability to pay for health gain, given budgetary constraints, is important and can best be achieved in the current environment via confidential discounts. That is, for on-patent products, buyers would not benefit from sharing prices among themselves.

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