ACE SOAS Consortium Anti-Corruption Evidence
Making Anti-Corruption Real

Working Paper 012

Pakistan's pharmaceutical sector: issues of pricing, procurement and the quality of medicines

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August 2019

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Executive summary

Pakistan's pharmaceutical sector has not seen the growth and dynamism one would expect from industries with an upward growth trajectory. It has also not been competitive internationally, with limited exports. Further, the pharmaceutical industry in Pakistan has developed a top-heavy structure in terms of market share, where the top 100 firms, out of a total of around 750, cater to 97% of the market. It follows that approximately 650 firms survive on only 3% of the market.

Together, the poor competitiveness and the skewed industry structure suggest that there are factors preventing this sector from contributing to economic growth and public health. This paper, published as part of the Anti-Corruption Evidence research consortium (SOAS ACE) led by SOAS University of London, investigates private corruption in the pharmaceutical sector – understood as the capture of rents – as a possible factor harming development.

The paper focuses on three issues in particular that have been highlighted through preliminary research on the pharmaceutical industry in Pakistan as restricting development. These are pricing, poor quality drugs and government procurement of medicines. For each of these issues we have examined the processes over time that have resulted in the creation of rents and that encourage rent-seeking. The study used key informant interviews and data from the government on testing and procurement for its analysis.

On pricing, we found that the regime of strictly enforced price controls and extended price freezes has created incentives for registering drugs at very high margins. Over time, these margins are squeezed and drugs become unprofitable to produce. This results in rents for importers, the registration by producers of more advanced (and more expensive) versions of the same medicine, the production of alternative medicines, and hoarding and smuggling of medicines.

The presence of poor-quality medicines – sub-standard, spurious and counterfeit drugs – is not evident in significant numbers in the data from government drug testing laboratories. While prominent incidents highlight that this issue exists, it is not as widespread as is portrayed to the public. However, some key informants suggest that this issue is prevalent in rural markets and possibly in low-income urban settlements also. To more conclusively assess the extent of poor-quality medicines, the next phase of the research project will collect and test samples of medicines from various markets.

Finally, the process for procurement of medicines by various provincial governments has greatly improved in recent years as a result of the competition induced since Pakistan's transition to a democracy in 2008. Khyber Pakhtunkhwa, Punjab and Sindh provinces have used slightly different models of procurement, but the rents that previously went to small firms to secure supplies to government hospitals have now reduced significantly across the board. This has resulted in better quality medicines in the public sector.

Analysing the underlying drivers of the rents generated by pricing policies, the manufacture and sale of poor-quality drugs, and government processes for the procurement of medicines is an important step in designing strategies to curtail irregular practices. Follow-on work will frame these rents within the wider political settlement in Pakistan, which will then inform stakeholders on the feasibility of particular anti-corruption strategies.

List of Acronyms

CPI	Consumer price index
DRAP	Drug Regulatory Authority of Pakistan
DTL	Drug testing laboratories
GDP	Gross domestic product
KP	Khyber Pakhtunkhwa
MNC	Multinational company
MNHSRC	Ministry of National Health Services, Regulation and Coordination
MRP	Maximum retail price
PCP	Pharmacy Council of Pakistan
PIC	Punjab Institute of Cardiology
PPMA	Pakistan Pharmaceutical Manufacturers Association
USFDA	United States Food and Drug Authority
WHO	World Health Organization

1. Introduction

Human welfare directly relates to health. In addition to the normative importance of focusing on public health, there is also a positive relationship between a population's health and economic development of a country (Bloom and Canning, 2008). An important component of public health is access to quality medicines, which account for a significant proportion of health expenditure.

Total pharmaceutical expenditure as a share of total (public and private) health expenditure in low-and lower-middle-income countries is approximately 30% (WHO, 2011). Moreover, for low-income households in developing countries, expenditures on medicines are particularly high, compared to the global average of around 50% (Hammond et al., 2008). Although no statistics are available for Pakistan, in India it is even higher, with 76% of total health expenditure for low-income households going to medicines (ibid). The pharmaceutical sector is thus particularly important to public health outcomes in developing countries.

The pharmaceutical industry is also an important contributor to the economy. Globally, the pharmaceutical market was estimated at US$1,105 billion in 2016 (IFPMA, 2017). While North America and Europe dominate the market in terms of sales, many developing countries have seen double-digit growth in their pharmaceutical sector in recent years. Pakistan's total industry size is estimated at US$3 billion. The Pakistani pharmaceutical sector contributes approximately 1% to Pakistan's gross domestic product (GDP) and employs 150,000 individuals directly and 300,000 indirectly (Ahmed and Batool, 2017). Although only 0.3% of the global market, IQVIA,[1] a company that collects global healthcare data, has categorised Pakistan as a 'pharmemerging' country, projecting it to have significant growth potential (IFPMA, 2017).

Despite its significant size, however, Pakistan's pharmaceutical sector has historically not seen the growth and dynamism associated with industries on an upward growth trajectory. No backward linkages have been created, with 95% of the raw materials being imported (PRIME, 2017). Further, Pakistan's pharmaceutical exports currently amount to approximately US$200 million. In contrast, India's pharmaceutical exports totalled US$14 billion in 2015, and Jordan's exports are worth approximately $800 million (despite having a population of only 9 million people). Moreover, India has 201 plants certified by the United States' Food and Drug Authority (USFDA), and Jordan has 4 plants. This enables them to export to the US, which comprises 60% of the global market. Pakistan's low exports and the absence of any USFDA-approved firms, which is the international gold standard, illustrate the country's poor competitiveness and low-quality products.

Due to the importance of the pharmaceutical sector to public health and economic development, it is important to understand what is holding this sector back from providing

[1] Formerly known as QuintilesIMS Institute.

quality medication to people and from contributing to economic growth. In particular, this paper examines private corruption in the sector.

In line with the Anti-Corruption Evidence research consortium (SOAS-ACE) led by SOAS University of London, which this study forms a part of, we understand corruption as rents and, in particular, developmentally harmful rents. Following the approach laid out by Khan et al. (2016), we seek to identify and understand the underlying drivers of rents in Pakistan that are damaging developmentally but that could be curtailed through horizontal anti-corruption strategies. Our scope is limited to private-sector corruption, and so this excludes corruption by public officials, such as theft and absenteeism.

In the following section we describe the context of the pharmaceutical sector in Pakistan, including its history, the regulatory structure and the relationships between relevant stakeholders. In section 3 we provide justification for examining three issues in particular – pricing, low-quality drugs and government procurement of medicines – and the rents generated within them. Based on our field research, we analyse the rents relating to these three issues in sections 4, 5 and 6 respectively, before presenting our concluding remarks in section 7.

2. Industry context

This section outlines the structure of the pharmaceutical sector in Pakistan, including the related historical background and a map of the relevant stakeholders.

2.1. Market structure

In 1947, when Pakistan was created, there were no manufacturing facilities for pharmaceuticals nor was there any legislation to govern this sector. By the 1960s, some multinationals had started operating in Pakistan and there was a small number of local manufacturers, but by and large medicines were imported (Naseemullah, 2010). The industrial landscape has transformed markedly since then.

Presently, there are conflicting figures as to the number of manufacturing firms in Pakistan. According to IQVIA, there are 759 active manufacturers (PRIME, 2017). But according to the list of registered firms with the Drug Regulatory Authority of Pakistan (DRAP) – the governing body for the pharmaceutical sector – there were 637 firms in September 2018, the majority of which are located in Punjab and Karachi, Sindh.[2] Industry experts tend to agree that there are more than 700 firms in Pakistan, however, therefore we use the figure from IQVIA throughout this paper as our reference number.

Of the approximate US$3 billion pharmaceutical market in Pakistan, 80% of medicines in their final dosage form are manufactured in Pakistan, while the remaining 20% are imported. The market is highly skewed; the top 50 firms have 89% of the market share and the top 100 firms have 97% of the market share. This means that more than 650 firms compete for 3% of the market – a remarkable concentration, which we return to in section 3.

Within the pharmaceutical manufacturing firms in Pakistan, there is a division between multinational companies (MNCs) and local manufacturers. Until around 2010 there were 38 MNCs operating in the pharmaceutical sector, which had a majority (60%) of the market share. However, recent years have seen these firms exiting the market, leaving 22 MNCs, which cater to 40% of the market.

The divide between MNCs and local firms also leads to another division in the product market, and it is important to distinguish between these. The MNCs primarily produce 'originator drugs' that have been developed using their own research and for which they have or had a patent. Local firms, on the other hand, produce generic drugs that are primarily sold as 'branded generics'. This is contrary to practice in the developed world, where off-patent drugs are sold by their generic (or molecule) name. Because producing these requires less investment than researching drugs, there are usually numerous producers of generic drugs who then compete in the market on price. In Pakistan, however, because of the 'branded generic' market, off-patent drugs compete on price as well as their

[2] Data downloaded on 27 September 2018 from www.dra.gov.pk.

brand and reputation. This reduces price competition, and is similar to the market structure in India (Dean, 2018).[3]

Further, within local firms there are those that are large in size and that produce good-quality medicines – firms that belong in the top 100 – and those that are small and produce mostly for the immediately local market – these fall in the roughly 650 firms that compete for 3% of the market.

2.2. Current regulatory structure

From licensing to registration, to pricing and then finally retail, the pharmaceutical sector in Pakistan is fully regulated by the state. This section describes the legal and institutional structure that governs the sector.

The fundamental legislation that governs the sector in Pakistan is the Drugs Act, 1976. Prior to this, even though some MNCs had already established manufacturing facilities, there was no legislation in Pakistan related to the pharmaceutical sector. This Act empowered the federal government's health ministry to regulate the sector.

Following the Constitution (18th Amendment) Act 2010, health was devolved to the provinces and was removed from the concurrent list. All functions under the Drugs Act, 1976 were then transferred to the Cabinet Division as the Ministry of Health was dissolved.

Subsequently, the Drug Regulatory Authority of Pakistan Act, 2012 was enacted, which led to the creation of the DRAP. Although this is an autonomous body headed by an appointed Chief Executive Officer, it is under the administrative control of the relatively newly created Ministry of National Health Services, Regulation and Coordination (MNHSRC).

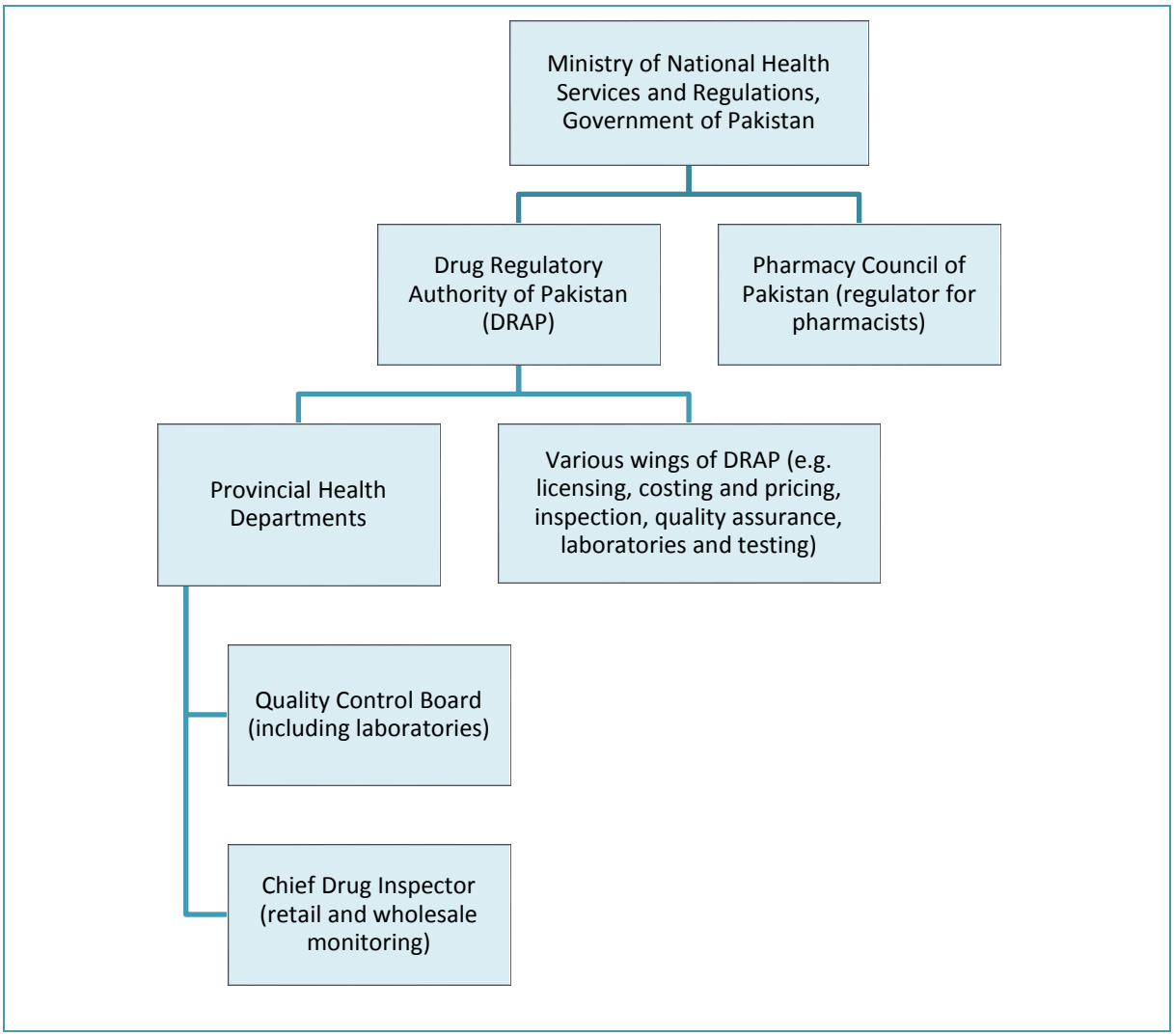
As shown in Figure 1 below, the MNHSRC also controls the Pharmacy Council of Pakistan (PCP), the professional body responsible for the registration of pharmacists and the promotion and regulation of pharmacy education in the country.

DRAP functions with three administrative boards at the federal level – the Policy Board, the Licensing Board and the Registration Board – which are responsible for implementing the guidelines laid out by the Drugs Act of 2012. DRAP is further facilitated by 14 divisions that ensure adherence to the decisions of the administrative boards and that are responsible for providing direction for the provincial health departments, while ensuring that performance standards are being met (Rashid, 2015). These divisions include those related to licensing, registration, pricing, quality assurance and laboratories.

[3] An interesting question is why a branded generic market exists in an economy dominated by low-income consumers who are generally price-sensitive. We briefly address this in section 4.

In addition to the federal-level regulation of drugs through DRAP, each of the four provincial health departments also plays an important role through their respective Provincial Quality Control Boards. These provincial boards are responsible for regulating the wholesale and retail markets through regular drug inspections and laboratory testing.

Figure 1: Regulatory structure of the pharmaceutical sector in Pakistan



Source: The authors

2.3. Relevant stakeholders

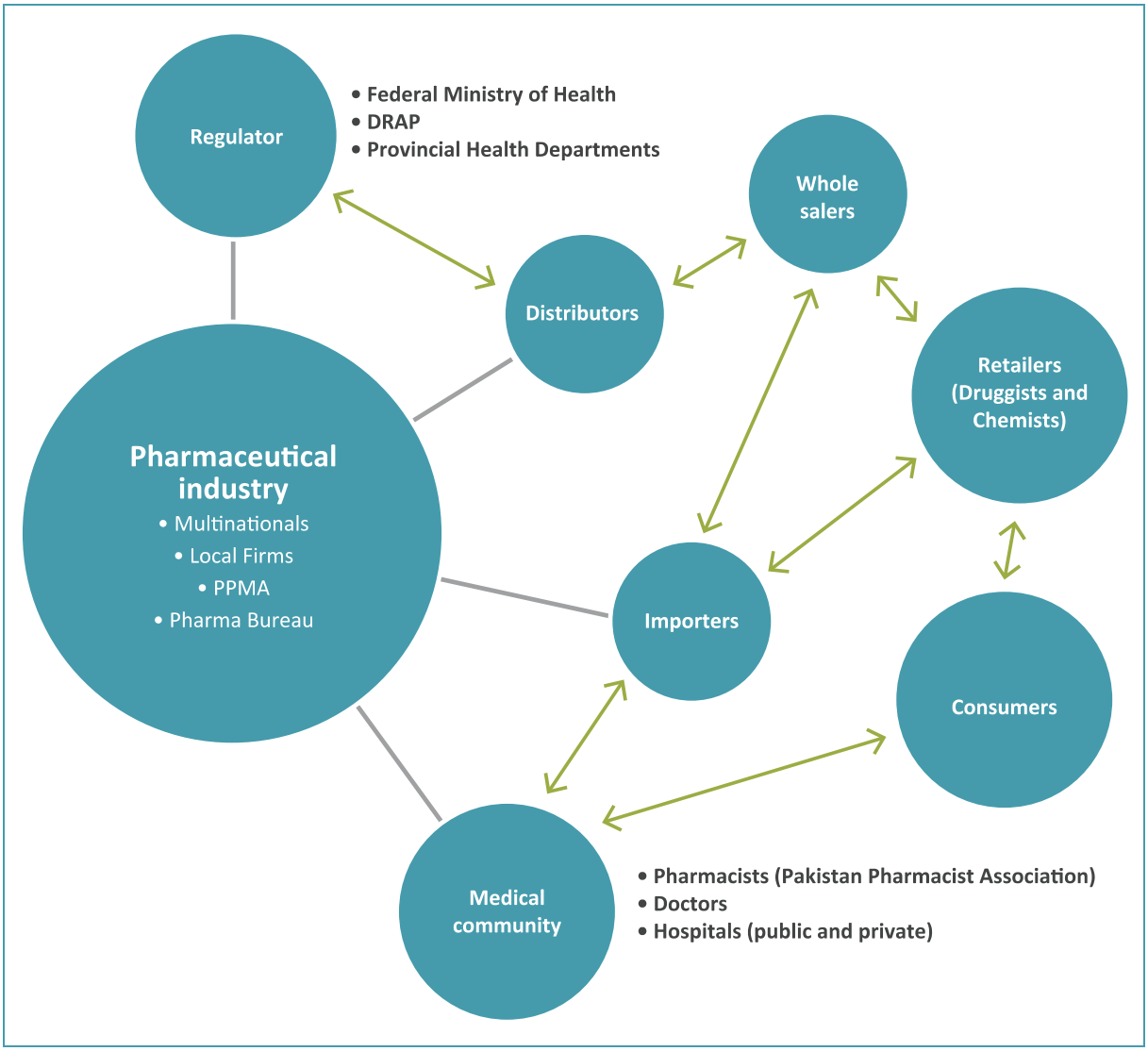
So far, the key actors we have identified in the pharmaceutical sector are the regulators (DRAP and PCP) and the producers, comprising of MNCs and local firms. The producers have two further associations: Pharma Bureau, which primarily represents MNCs, and the Pakistan Pharmaceutical Manufacturers Association (PPMA), which represents local firms. Collectively, we identify them in Figure 2 below as the 'pharmaceutical industry'. The government regulatory agencies are referred to as 'the regulator'.

Once a drug is manufactured or imported, there are importers, distributors, wholesalers and retailers involved in the process also. Each has their own interests, and some, such as the retailers, have their own association (for retailers this is the Druggists and Chemists Association).

Finally, the remaining two relevant stakeholders are the consumers and the medical community, which comprises of pharmacists, doctors and (public and private) hospitals.

These stakeholders are mapped in Figure 2 below, along with their relationships. As is evident from the diagram, this is a complex landscape with each actor having multiple relationships with other actors.

Figure 2: Mapping of key stakeholders in Pakistan's pharmaceutical sector and their linkages



Source: The authors

3. Identifying rents in Pakistan's pharmaceutical sector

Having described the context of the pharmaceutical sector in Pakistan, we now provide justification for investigating three particular issues relating to the nature and extent of rents. These three issues are: (1) pricing, (2) poor-quality medicines, and (3) government procurement of medicines. We analyse rents for these three issues in particular because, ex ante, relative to other issues where rents may be generated, we consider them to be most amenable to an anti-corruption strategy (keeping in mind political feasibility).

A feasibly anti-corruption strategy is one that will create incentives for firms such that (a) following the incentives is profitable for producers, and (b) not following the rules will impose a cost on producers, which does not arise from vertical enforcement (Khan et al., 2016).

One factor that makes this sector stand out in Pakistan is the fact that the universe of products has price controls, and by and large these controls (in the form of price ceilings) are enforced. In a country with weak regulatory capacity, and where administered prices of industrial products are not the norm, this regulatory practice stands out. Additionally, between 2001 and 2013 there was a virtual price freeze (except for a few hardship cases) enforced for almost all medicines. Both price controls and the price freeze suggest that rents are generated which are subsequently captured by rent-seekers.

Along with indicating allocative inefficiency and dispersed capital, the concentrated market share among a few firms also presents a puzzle: how do the bottom 650 firms survive on a miniscule share of 3% of the market (approximately US$90 million)? There are two possible explanations for this. First, these firms may be producing poor quality (substandard, spurious or counterfeit) drugs which are much cheaper to produce. Indeed, there have been major scandals in Pakistan in recent years relating to such practices; for example, in 2012 more than 200 patients died as a result of a contaminated medicine at the Punjab Institute of Cardiology (Chaudhry, 2013). Second, these firms may be surviving through rents from government procurement, which makes up approximately a third of the market. An additional possibility is that they may be smuggling their products out of Pakistan to other countries, such as Afghanistan.

Of course there are other issues prone to rent-seeking in the pharmaceutical sector, but which are not suitable for anti-corruption strategies given the existing political settlement. For instance, with public marketing of products banned, pharmaceutical firms primarily market their products to doctors. This has resulted in the pharma–physician relationship developing into a transactional one, whereby in return for prescribing their branded medicines, the doctor is rewarded in the form of perks, such as trips abroad, or gifts, such as cars and air conditioners (Asif and Amin, 2012). This practice benefits doctors and pharmaceutical representatives, resulting in over-prescription, increased drug resistance and increased out-of-pocket expenditures for patients. While this may perhaps be the largest

rent in the sector, developing a politically feasible anti-corruption strategy is not possible because this practice is too decentralised and entrenched to tackle through horizontal anti-corruption strategies (de Andrade et al., 2018). We have not investigated this rent for these reasons.

Similarly, there exist other issues prone to rent-seeking, which are not feasible to address for various reasons, such as smuggling to Afghanistan, sale of medicines without prescriptions, and ownership of firms by politically connected families. Thus, we restrict our study of rents to the three issues identified above.

Using insights from key informant interviews and secondary data where appropriate, we have investigated the nature of rents within pricing, poor quality medicines and government procurement, respectively. Our analysis is presented in the next three sections. A full list of (anonymised) interviews conducted is provided in Annex 1.

4. Health at what cost? Pricing issues in Pakistan

All pharmaceutical products sold in Pakistan have to be first approved by DRAP and a maximum retail price (MRP) set before they are sold. These price ceilings have been established and enforced by the Government of Pakistan since 1976, when legislation regulating this sector was first introduced.

While controlling prices for industrial products is certainly uncommon in Pakistan, price controls for drugs have been used elsewhere globally as an instrument to reduce out-of-pocket expenditures for cost-conscious consumers and, in particular, for low-income countries to increase access for patients (Lee et al., 2017; Dean, 2018). These price controls (either as ceilings or through reference pricing) have been used in diverse contexts such as Colombia (Prada et al., 2018), India (Dean, 2018), and more than 20 countries in Europe (Puig-Junoy, 2010). Therefore, Pakistan is certainly not unique in this regard.

Standard economic theory suggests that in competitive markets state intervention should not be necessary because prices will stabilise at an optimal equilibrium level (Reiffen and Ward, 2005). This has indeed been found in developed countries, where price regulations have diminished dynamic price competition (Danzon and Chao, 2000; Puig-Junoy, 2010). In Canada, instead of lowering prices, the prices 'clustered' around the ceiling with 'little price dispersion' (Anis et al., 2003: 1). So, what is the rationale for price controls in Pakistan?

While price competition in the generic drug market in high-income countries increases consumer surplus, there are two important reasons why developing countries like Pakistan may still regulate prices. First, to increase access, affordability and to control expenditure on pharmaceuticals, which, as identified earlier, makes up a significant proportion of total health expenditure for many households. Second, the generics drug market not only competes on price but on brand too. Because firms are competing on price and brand value, price competition is reduced. A branded generic market exists in low-income countries because, in settings where manufacturing quality may be questionable due to weak enforcement of regulations,[4] brand names can be used to signal quality and to differentiate products (Danzon et al., 2015; Dean, 2018).

Both situations thus provide compelling reasons for price controls in developing countries. Remarkably, there was a price freeze in Pakistan from 2001 to 2013, despite high levels of inflation and devaluation in the domestic currency (the Pakistani Rupee) (Lee et al., 2017). With these distortions in the market, there are clearly rents to be captured and rent-seeking opportunities. These rents are identified below, after we first describe the pricing regime in more detail.

[4] This includes regulations for meeting bioequivalence of the originator brand, studies for which may never be undertaken, and also poor testing of drugs for substandard and counterfeit products.

4.1. Price regulation

Price ceilings used to be set on an individual basis by the regulator, without a transparent mechanism, based on the Drugs Act, 1976. The price freeze from 2001 to 2013 was also under this Act (Rashid, 2015).

The freeze was lifted after DRAP was operationalised by the new government that was elected in 2013. However, the government reversed the decision following public outcry on the increased prices that were immediately implemented by the manufacturers. The producers took the matter to court and managed to get a stay on the new prices, and the court then ordered DRAP to come up with a pricing policy, which resulted in the Drug Pricing Policy 2015. This policy outlined in detail the government's procedure for setting and updating prices, although industry professionals have labelled it as 'oppressive' (*Daily Times,* 2017) and 'irrational' (Mansoor, 2016).

As the court case proceeded, moving from the Sindh High Court to the Supreme Court of Pakistan, the revised and updated Drug Pricing Policy 2018 was introduced after due consultation with relevant stakeholders. Due to the court orders, all price setting and price increases have to be approved by the Federal Cabinet, with DRAP's Drug Pricing Committee only making recommendations.

The 2018 policy divides medicines into two categories: (1) drugs and biologicals on the National Essential Medicines List, and (2) all other drugs. This list is revised every three years or earlier, and is based on the World Health Organization's (WHO) list of essential medicines.

The pricing policy takes away discretion in establishing prices by using reference pricing (Lee et al., 2017). This is done by taking the average of the price of the same drug in Bangladesh and India. If the drug is not available in those two countries, then they use the price in other developing countries or in a developed country such as the United Kingdom. The last two options are to establish the retail price with a 15% markup on the landed cost (the cost of importing) or to accept the price demanded by the producer.

Once a price is established for a particular drug, it can be updated every year by firms themselves. Essential drugs are updated equal to 70% of the consumer price index (CPI) for the year (with a cap of 7%), while prices for all other drugs can be increased up to the CPI for the year (with a cap of 10%).

Even so, manufacturers complained about the price regulation because of rising costs of production as a result of rapid depreciation of the Pakistani Rupee. Given the high dependence on imports for their raw materials, this has hurt manufacturers, who assert that the price increase granted once a year is not enough. In January 2019, on the Supreme Court's order, the prices of essential medicines were increased by 9% and for all other drugs by 15% on account of this.

4.2. Identification of rents in pricing

The price ceiling of a drug is set at its registration stage. That is, before it enters the market, the drug has to be licensed by DRAP and then the Drug Pricing Committee sets the MRP. The setting of prices was an obvious source of rent-seeking in the past because there was no transparent mechanism to set prices, and bureaucrats did this in an ad hoc manner (Zaidi et al., 2013). While this process may take time (some respondents said it takes one to two years), there are several ways in which this process generates significant rents for manufacturers despite the new pricing policy.

Price setting is critical for manufacturers, given the price freeze(s) and the resultant uncertainty in price increases. Manufacturers want the highest possible price ceiling so as to maximise their margins, and in turn the rent. While the officials in charge may be bribed to aid this process, the manufacturer also has another trick to secure a higher price. In submitting their sources for the raw material, they will quote prices from the most expensive and highest quality source possible (such as from a USFDA-approved plant in China). This inflates their claimed cost. But when manufacturers actually start production, they usually procure much cheaper and lower quality raw materials from sources other than those specified in their original application. Through such means, they manage to secure MRPs that yield high margins, sometimes up to a 1000%. This ensures that manufacturers can continue to produce the drug at a profit for many years even in the face of a price freeze. However, it must be noted that with the pricing policy brought into force since 2018, this rent has largely been eliminated because prices are now set through reference pricing.

Nevertheless, there remains a large disparity between prices for the same generic molecule across producers because of the way prices were set before 2015, when it was a 'free for all.[5] The rents thus continue to accrue, with older manufacturers getting higher rents and newer firms receiving lower rents due to lower margins. In the price increase in 2013, this disparity was reduced over time through the way that prices were updated. The increase by DRAP in 2013 allowed a price increase of 15% on the originator brand's price, which usually had the highest value. This meant that local firms with lower prices got a higher increase than those that already had a high price, thereby reducing the gap over time. The price increase granted in January 2019, however, allowed a percentage increase of the brands' own MRP.[6] The rent due to the original disparity persists.

The consequence of a price freeze is that, with rising production costs, the manufacture of drugs becomes unprofitable over time and so firms cease to produce certain drugs. In Pakistan, this has often lead to shortages in essential drugs (Zaidi et al., 2013; Mansoor, 2016; Lee et al., 2017). In fact, Zaidi et al. (2013) estimate that of a basket of essential medicines, only 15% are available in the public sector and 31% in the private sector.

[5] Key informant interview 30.

[6] Ibid

This begs the question why is there a price freeze for such a long duration in Pakistan and who benefits from this? It cannot simply be a populist measure because there is a perverse consequence to citizens: consumers may get essential drugs for a cheaper price initially, but then many of these drugs disappear from the market because, inevitably, if prices aren't increased for a long time, producers' margins are squeezed to a point that producing the drug is no longer profitable. The non-availability of essential drugs has a clear negative impact on health.

Our investigation into this process yields four potential beneficiaries of a price freeze. First are importers of drugs, which include some pharmaceutical companies also. When production of a drug ceases as a result of it not being profitable any more, the gap in supply is filled by importing it and then selling the drug at many multiples of the original price. Thus, those in the business of importing drugs stand to benefit from a price freeze. For example, *nitrofurentine*, an antibiotic, was produced by GlaxoSmithKline in Pakistan. However, they stopped producing it due to the losses they were suffering. This was replaced in the market by a Turkish brand at approximately three times the price.[7]

Second, producers also stand to benefit. Drugs that have become too expensive to manufacture are often first-generation drugs and are replaced by more expensive second- or third-generation drugs over the medium term.[8] As identified earlier, producers can secure very high margins initially when drugs prices are set. For example, *penicillin*, which is a first-generation antibiotic, became unprofitable to produce at a retail price of approximately Rs.3 per pill. As a consequence of no increase in its MRP, this has now been replaced by a third-generation antibiotic which is nine times the price.

Third, price freezes can also benefit producers of alternative medicines. One respondent, who owned a firm producing alternative medicines in Lahore, illustrated this well:

> *Folic Acid* is an essential drug for pregnant women. Its retail price set by the government is 34 paisa per tablet. Globally prices increased, and in Pakistan the cost of producing it shot up to Rs.1.25, but the government never increased its price and as a result there were shortages. Now doctors prescribe the substitute to it, which is less effective and is an alternative medicine (not allopathic). *Folic Acid* is called an 'orphan drug' – an essential drug which is not available [because of price].[9]

In fact, there are firms that have long produced allopathic drugs and have recently set up production of alternate medicines under a different manufacturing name. In these instances, they produce the same drugs at higher prices by taking advantage of how DRAP categorises medicines (pharmacopial and non-pharmacopial). Using the same example of *Folic Acid*, a senior government official in Sindh clarified this rent:

[7] Key informant interview 1.

[8] Key informant interview 1 and 32.

[9] Key informant interview 19. See also Ilyas (2015).

> On the claim of making alternate medicine, [firm name redacted] makes *Folic Acid*. There is a new license given to them and under a separate facility, the medicine is manufactured. *Folic Acid* used to cost Rs.30 [for 100 tablets] and then after a long delay the price was increased to Rs.85 instead of [the] Rs.100 [producers were demanding]. This was a 5 mg tablet. The new manufacturers include just 0.5 mg and the price is about Rs.400. They are able to do this because the price of alternate medicines is decontrolled.[10]

In fact, the alternative medicine market has been infiltrated by pharmaceutical firms, who either have set up their own divisions or who contract out production to other producers. They now make up 10% of the market and are aggressively increasing their share by using their existing network and relationships with doctors who prescribe these alternative medicines (also called nutraceuticals). The existing producers of nutraceuticals don't have this infrastructure, and one producer of alternative medicines projected that pharmaceutical companies would capture 50% of this market over the next few years.[11]

There is also a fourth type of rent, which is illegal. Drugs in short supply can be hoarded, or smuggled into the country, and then sold on the black market. For example, Mansoor (2016) documents that a blood pressure medicine, *Amplodipine*, was available for 50 times its original price in the black market.

There are thus three legal and one illegal avenues for rent capture associated with price controls in Pakistan's pharmaceutical sector. The underlying driver of these rents is the strict price controls enforced by the state. The price ceiling, which increases infrequently and leads to squeezed margins, results in rent-seeking by producers, importers and those in the informal economy. The loser ends up being the consumer, for whom the cost is either their health (through unavailability of key medicines) or financial expense (through higher out-of-pocket expenditures) or both. This is a case of misaligned incentives: the government wants to keep prices low to increase access and affordability of medicines to patients, but it has created a structure that results in increased costs to consumers. An incentive restructuring strategy that leads to firms benefiting from clear and transparent price increases would decrease rent-seeking and benefit the consumer.

One anti-corruption strategy that would potentially yield benefits to both consumers and producers is the deregulation of prices for non-essential drugs. By introducing dynamic price competition – which is possible with more than 750 firms – prices can be expected to be kept low without leading to shortages in the market. Producers that we interviewed seemed to favour this model, where prices for essential drugs can be regulated based on a transparent mechanism with regular increases based on inflation, and non-essential drugs can be left to market competition. One Lahore-based manufacturer gave a pertinent example of a drug for diabetes, highlighting why this would work:

[10] Key informant interview 2.

[11] Key informant interview 32.

> Take the example of *Sitagliptin*. Its MRP is Rs.1600, but it is sold around Rs.380, without any government intervention. This means that firms due to competition are setting a price way below the ceiling themselves.[12]

However, such a strategy requires changes in regulation, which are beyond the domain of horizontal anti-corruption strategies.

Another potential strategy to reduce the influence of nutraceutical firms is to leverage the relationships that firms have with doctors by asking them to stop prescribing herbal medication. This will be challenging, however, because it will require significant collective action and some sort of monitoring mechanism to prevent free-riding on the part of firms. Negative consequences of this, such as particular doctors increasing prescriptions of herbal medication, will also need to be avoided.

[12] Key informant interview 17.

5. Bitter pills: sub-standard, spurious and counterfeit drugs

Firms may be surviving price freezes by producing poor(er) quality medicines, which can be sub-standard, spurious or counterfeit. The Drugs Act 1976 has specific definitions for each of these, and we use the umbrella term of 'poor-quality medicines' because all three are unfit for consumption. In fact, poor-quality medicines can lead to serious harm for consumers because they could be contaminated, have the wrong ingredients or none of the required ingredients, may be labelled incorrectly and so on.

Although poor-quality medicines are also found in developed countries (WHO, 2003; Zaman 2018), the problem is particularly acute in low- and middle-income countries. A systematic review of the literature estimated that the 'median prevalence of substandard/counterfeit drugs was 28.5%' (Almuzaini et al., 2013: 4). For the five studies included for South Asia, there was a wide-ranging prevalence of substandard/counterfeit drugs, from 11–44%, while the median was 22% (ibid). Another study in 17 low- and middle-income countries found that 15% of medicines failed at least one quality test (Bate et al., 2011). On the other hand, the Indian government has reported 'lower estimates of "non-standard quality" drugs' of around 6% (Dean, 2018: 5). However, this is likely an underestimate as there is some evidence that Indian manufacturers produce drugs of differing quality based on the consumer; Bate et al. (2016) estimate that almost 11% of Indian manufactured medicines in Africa were of poor quality.

To our knowledge, no studies have been conducted of poor-quality medicines in the Pakistani medicines market. Periodic incidents often bring this issue up, but no systematic data exists to understand the extent of the problem. For example, in 2012, more than 200 people died at the Punjab Institute of Cardiology (PIC) in Lahore as a result of contamination by the manufacturer of an antihypertensive drug with deadly quantities of an antimalarial ingredient (Chaudhry, 2013). Only a few months after the PIC contamination another incident occurred in Gujranwala relating to a cough syrup, which resulted in the deaths of 40 people (*Express Tribune,* 2012). Investigations yielded the presence of spurious ingredients, but there was no follow-up to understand the root cause or the extent of the problem (Zaman, 2018).

Despite these incidents, and contrary to the global picture, data reported by the Pakistani state provides very low estimates of the presence of poor-quality medicines on the market. Citing drug testing by DRAP, one newspaper reported that substandard and spurious medicines constituted 1.8% of total sampled drugs in 2015, 1.2% in 2016 and less than 1% for three quarters of 2017 (Maqsood, 2018). In our interviews with the Government of Punjab, officials quoted results from the drug testing laboratories (DTL) and put the figure at around 2–3%.[13] In Khyber Pakhtunkhwa (KP), a senior official said that their testing revealed

[13] Key informant interviews 21 and 22.

that 3–5% of the medicines may be of poor quality. However, a senior pharmacist at a hospital in Peshawar said that this is likely to be an underestimate because of insufficient drug inspectors and sampling.[14] It may also be an underestimate because of bribing of drug inspectors, a form of petty corruption which has been reported in the Pakistani media and is likely to be widespread (Chaudhry, 2017).

In addition to the low estimates of poor-quality medicines by Pakistani officials, the manufacturers that we interviewed did not think that any of the 750-plus licensed firms would deliberately produce poor-quality medicines. According to these manufacturers, while some firms may cut corners – for example by using cheaper packaging or less sugar in syrups – none of them would intentionally use lower quantities of the active pharmaceutical ingredient than the minimum specification.

Counterfeit (fake) drugs are definitely produced in Pakistan, but this is likely a localised phenomenon happening on a small scale. Many respondents suggested that poorer quality medicines, including counterfeits, may be more prevalent in rural markets and possibly in low-income urban settlements. In fact, one leading manufacturer described how they train their marketing team to look out for potential counterfeiting, and regularly test samples from markets.[15] When they find fake drugs, they work with Pakistani law-enforcement agencies to carry out 'raids' to trace and shut down the shop and the manufacturer behind the counterfeit drug. The last time they did this, however, was over a year ago in January 2018, suggesting that the prevalence of such counterfeiting is limited. Other firms also carry out similar raids, but we have no data to suggest this is a widespread and organised phenomenon.[16]

Given prominent incidents such as that at the PIC and suggestions from respondents and in the literature of poor-quality medicines being prevalent particularly in rural markets, we cannot rule out this rent completely. However, the evidence for poor-quality medicines is minimal at present. As such, in the next phase of this research project we intend to collect samples of medicines from rural markets and have them tested by an accredited laboratory. This will enable us to make a more robust claim about the extent of poor-quality medicines (or lack thereof) in Pakistan and whether this has public health consequences.

Thus far there is limited evidence of any *systemic* rents being captured through the production of poor-quality medicines in the Pakistani market. Similarly to India, there may be higher rates of poor-quality medicines being manufactured in Pakistan that are then sold in markets with weak regulatory regimes, such as in Afghanistan. Indeed, one manufacturer told us that many of the producers in Peshawar sell their medicines informally in neighbouring Afghanistan so as to avoid taxation. Without systematic testing of the medicines we can only speculate on this trade and the quality of the medicines.

[14] Key informant interview 26.

[15] Key informant interview 31.

[16] Key informant interview 24.

It follows from this analysis that scope for anti-corruption strategies is limited in this area because of the low potential benefits for development. While a strategy that scales up the ad hoc private 'raid' model would be politically feasible, this approach is not worth pursuing because of the restricted rents. The sector does, however, require more robust inspection, testing and data reporting, therefore a strategy that increases incentives for better regulation may be worth exploring.

6. Government procurement of medicines

Procurement of medicines by provincial governments is worth approximately US$1 billion (PRIME, 2017). This is a significant amount and is in addition to the $3 billion market estimated by IQVIA. Importantly, it is also the medium through which the poorest patients access medicines.

Broadly, corruption in government procurement used to be widely prevalent across provinces in the form of poorer quality medicines which were procured at higher costs. However, this practice reduced significantly following democratisation from 2008 onwards (although at varying rates across provinces) as provincial governments experimented with different modes of procurement. The competition induced between provinces from 2008 and the greater provincial autonomy brought about through the 7th National Finance Commission Award in 2009 have improved government procurement of medicines.

Below, we outline how the procurement processes have changed over time and the associated rents for the three provinces – KP, Punjab, and Sindh – before analysing them comparatively.

6.1. Khyber Pakhtunkhwa (KP)

Procurement in KP has improved markedly over the years. Until 2015, medicines were purchased based on the lowest-price bid, with no criteria for the quality of medicines. In recent years, there has been a significant shift in the procurement process, with quality now an explicit focus in their hybrid model of procurement.

A Medicine Coordination Cell looks after the purchase of medicines, with responsibilities shared between two committees: 1) the Technical and Evaluation Committee, which monitors bids and prepares a comparative statement of bids; and 2) the Rate Contracting Committee, which negotiates and prepares the rate contracts.

The rate contract establishes the price and supplier of a drug centrally, but the purchasing entity, from whose budget the payment is made from, remains decentralised. Thus, the District Health Officer (who looks after primary care) purchases medicines for Basic Health Units and Tehsil Headquarter Hospitals. For secondary care, the Medical Superintendent of District Headquarter Hospitals purchases medicines, while for tertiary care this responsibility falls under the Chief Pharmacists of teaching hospitals.

In KP drugs are procured directly from manufacturers or importers. Until 2009, middlemen could also bid for public tenders, however government officials we interviewed

acknowledged that there was often corruption in this process and so these individuals were eliminated from the procurement chain.[17] The middlemen would quote the price for a high-quality drug in their bid, but would supply a cheaper and lower quality medicine if they won the tender. In addition, they would also undersupply and sell the remainder in marketplaces. One official in KP's health department said there is no chance of poor-quality medicines being procured since the use of middlemen had been abolished:

> There used to be a mafia of middlemen and distributors. When procuring from them there was usually substituted or partial supply. By procuring directly from manufacturers and importers, this possibility has been eliminated. There is now also a 0% chance of counterfeit or spurious drugs in publicly procured drugs. Maybe sometimes there can be substandard drugs, such as mislabeling, but even MNCs can do this.[18]

Bidders for government procurement of medicines submit two separate bids: a technical bid, which has 70% weightage, and a financial bid, with 30% weightage. The latter is not opened unless the supplier meets the minimum quality specified in the KP Procurement Rules. This quality assessment includes such things as raw material source, declaration certification for imported products, licensing by DRAP, and a physical evaluation of the manufacturing facility.

The possibilities of rent-seeking have thus been reduced over time through changes in the procurement processes, such as the elimination of middlemen and introducing a quality component for bid evaluations. However, there may exist other rent-seeking opportunities: for example in Sindh, decentralised payments can lead to delayed disbursements, which can act as a disincentive for firms to participate in this procurement process.

6.2. Punjab

Punjab's procurement process has also changed over recent years, moving from a hybrid model from 2009, to a centralised model in 2017–18, and following the recent change in government to a decentralised model in the fiscal year 2018–19.

In the hybrid model, similarly to KP, the Government of Punjab conducts a pre-qualification of firms before securing a 'framework contract' with firms based on a fixed price for a fixed quantity of medicines, which is based on establishing demand from the districts. Pre-qualification is assessed on a firm's turnover; initially firms had to have a minimum annual turnover of Rs.2 billion, but this was reduced to Rs.600 million after many firms protested. With the contract established, districts then purchase from their own budget and thus act as the procuring entity.

The above model was in practice from 2009 to 2017, when procurement rules were legislated. After pre-qualification, medicines were selected on a least-cost basis. The quality

[17] Key informant interviews 27 and 28.

[18] Key informant interview 28.

of medicines was only ensured implicitly through the minimum annual turnover requirement, with the assumption being that manufacturers with a high volume of business would meet certain quality standards. According to one Government of Punjab official, they would get 'all sorts of garbage' before from small firms.[19] Another official agreed with this, and said 'public procurement was the oxygen for survival of small firms'.[20] This improved, however, after audits of suppliers were introduced in 2016 and the turnover requirement was introduced also. As noted in section 5, the results from Punjab's DTLs indicate a low rate of poor-quality drugs in public hospitals (2–3%).

In 2017–18, the province switched to a centralised model, where the Primary and Secondary Healthcare Department of the Government of Punjab was responsible for all procurement. This included paying for the supply and storage of medicines centrally, as well as the distribution of them to primary and secondary health facilities. Moreover, this model also explicitly introduced a criterion to assess the quality of medicines: in evaluating a bid, quality was weighted at 70%, while price was weighted at 30%.

According to interviews with officials, this process was reformed after the then Chief Minister discovered a shortfall in *Paracetamol* on inspecting a hospital in Lahore.[21] The centralised model, according to them, was much better than the hybrid model because not only did it improve the quality of medicines, but it also increased the availability of medicines. In fact, when we interviewed Government of Punjab officials in January 2019, they told us that the medicines being used in the province were those procured in the previous fiscal year (2017–18).[22]

For 2018–19, the process has been decentralised completely and each district procures medicines themselves. Not only do they not have the capacity for this, it is also a much more cumbersome process for manufacturers to have to bid for several different tenders for the same drug in the same province, where they only had to bid once the previous year. In addition, payments also require more time and involve more steps. Because of these higher transaction costs and low capacity, as of January 2019 many of the districts had not procured any medicines. The officials also told us that the supply from the previous year would run out by the end of March 2019. Sure enough, there were reports in April 2019 in the media that there was a medicine shortage in public health facilities in Punjab.

The decentralised model has thus clearly not worked well in Punjab and was introduced due to the deep political fissures that developed between the government that came into power in 2018 and the previous government. The centralised model was successful in ensuring adequate access to medicines, due to the lower transaction costs of dealing with one bureaucratic entity for firms, and the economies of scale associated with having one large supply of medicines. The decentralised model takes away both of these key efficiencies.

[19] Key informant interview 20.

[20] Key informant interview 22.

[21] Key informant interviews 21 and 22.

[22] Ibid.

6.3. Sindh

Sindh's hybrid model for procuring medicines is similar to that in KP. The price and specification of a drug and whom to procure it from is set centrally, but District Health Officers purchase medicines directly for their district's primary and secondary health facilities. Pre-qualification of firms was only established in 2015, on a minimum annual turnover requirement of Rs.1 billion.

However, the former Secretary Health of the Government of Sindh admitted that Sindh's model is missing explicit criteria to assess the quality of a drug, such as the source of raw materials and clinical trials.[23] The other important issue pointed out in Sindh is the exclusion of many of the big pharmaceutical manufacturers from the public procurement process because of the long delay (5–6 months) and petty corruption within the payment process. Because these firms are large enough to have significant market share, they don't need to bid for public tenders. The consequence of this is that there may be many small firms who would have been capturing the rent from public procurement, but this rent will have diminished for many of them because of the minimum turnover requirement.

6.4. A comparative perspective on provincial medicine procurement

It is apparent from the above descriptions of the three provincial procurement processes that there has been a marked improvement in the medicines accessible to patients through government healthcare facilities. While small firms, distributors and middlemen may have been capturing rents from government procurement in the past, a focus on quality (implicitly at first and then explicitly) has meant that these players have been largely driven out from rent-seeking here.

Sindh lags behind other provinces in this regard as KP and Punjab have been able to establish more robust systems of procurement. Table 1 summarises the systems of the three provinces for 2017–18.

[23] Key informant interview 25.

Table 1: A comparison of provincial procurement processes (2017–18)

	Khyber Pakhtunkhwa (KP)	Punjab	Sindh
Type of procurement (centralised/decentralised/hybrid)	Hybrid	Central[24]	Hybrid
Budget expenditure, 2017–18	Rs.3 bn[25]	Rs.28.3 bn	Rs.8.3 bn
Purchasing entity	Primary, secondary, and tertiary healthcare facilities purchase individually	Primary and Secondary Healthcare Department, Government of Punjab purchased for entire province	District Health Officers purchase for their respective districts
Bid selection process	70% quality; 30% price	70% quality; 30% price	Pre-qualification and then lowest price
Physical evaluation of firms	Yes	No	No

Punjab has the highest budget expenditure, but this is broadly in line with its larger population. While Punjab's centralised system has worked well and supplies have been sustained into the third quarter of next year, KP has reportedly managed to design a system that procures medicines at a lower price.

In 2016–17, a comparison by the Punjab Pharmacists Association (PPA) reported in the press highlighted that Punjab purchased the same medicine from the same producer at a higher per-unit cost (Yusufzai, 2017). Officials from KP shared a comparative analysis of prices for KP and Punjab that they had conducted on 38 medicines – this document shows that prices of the same generic molecule were lower in KP for most of the medicines (and almost all have different suppliers for the two provinces). Only one product had the same supplier: a *polypropylene suture*, which KP had procured from Sind Medical Stores for Rs.82.91 per unit and Punjab had procured at Rs.99. However, it may be possible that Punjab procures other medicines beyond these 38 for a lower per-unit cost than KP.

To investigate this, we took a random sample of 10% of the medicines featured on the National Essential Medicines List 2016 (DRAP, 2016). Set by the government in coordination with the WHO, this is a list of priority medicines that public-sector healthcare facilities are expected to stock. A 10% sample – 42 of 415 medicines – was considered reasonable. The lists of medicines procured by KP and Sindh were publicly available, and the Government of Punjab shared their list with us. For each province, we were able to tabulate the price per unit and the supplier for each drug to compare. However, while data for KP and Sindh is for 2018–19, for Punjab we only have data from 2017–18 when the latest procurement was done. Nevertheless, the comparison is still useful in highlighting any differences.

Of the sample of 42 medicines, 35 were either procured by none or only one province, rendering a comparison impossible. In Table 2, we compare the seven medicines that were procured by more than one province. The full sample is provided in Annex 2.

[24] It is no longer central. The government decentralised procurement to the district level in 2018.

[25] Estimated by interviewee 28. KP's budget documents indicate expenditure of Rs.0.6 billion, which is unlikely, with the actual expenditure being documented under some other budget head.

Our analysis shows that there is no clear pattern across provinces. All three provinces have procured medicines at cheaper and higher rates than others. In fact, for one medicine, *hydrocortisone*, which is procured by KP and Punjab from the same supplier, there is a differential across potencies. Punjab secured a cheaper rate for the 100 mg drug, but a higher rate than KP for the 250 mg potency. Further, for the only medicine procured by all three provinces, *Vancomycin*, Sindh paid the cheapest rate while Punjab paid the highest rate.

Despite there being no discernible pattern, what is clear is that there is significant scope for competition among provinces to act as an incentive for anti-corruption. That is, provinces will compete to provide better delivery to their populations. This competition is built into the design of democracy, and we argue that the improvements in the procurement of medicines in the provinces can at least in part be explained by democratic competition, which has only been active in Pakistan since 2008. Therefore, an anti-corruption strategy that leverages and makes explicit this competition may create incentives for further improvements in public procurement of medicines.

Table 2: A price comparison of medicines procured by provincial governments

Series no.	Generic name	Khyber Pakhtunkhwa (KP)			Punjab			Sindh		
		Price per tablet (Rs.)	Brand name	Supplier	Price per tablet (Rs.)	Brand name	Supplier	Price per tablet (Rs.)	Brand name	Supplier
182	Glyceryl trinitrate	2.23	Nitrosust 2.6 mg	Zafa Pharmaceuticals, Karachi	2.56	Sustac 2.6 mg	Searle, Karachi		N/A	
		3.1	Cardnit 6.4 mg	Atco Laboratories, Karachi	3.52	Sustac 6.4 mg	Searle, Karachi			
193	Hydrocortisone	35	Hyzonate 100 mg	Amson Vaccines & Pharma, Islamabad	31	Hyzonate 100 mg	Amson Vaccines & Pharma, Islamabad		N/A	
		58	Hyzonate 250 mg		62	Hyzonate 250 mg				
238	Loratadine	0.98	Megalor 10 mg	Mega Pharmaceuticals, Peshawar		N/A		1.4	Zorat 10 mg	Zafa Pharmaceuticals, Karachi
313	Potassium Chloride	6.76	Mini KCL 25ml inj.	Frontier Dextrose, Haripur	14.6	Corrective Potassium Chloride 25 ml infusion	Hospital Supply Corporation, Karachi (manufactured by Otuka, Hub)		N/A	
326	Propofol	224.9	Inj. Pofol 20 ml	Allied Distributors, Karachi	193	Inj. Pofol 20 ml	Allied Distributors, Karachi (manufactured in Korea)		N/A	
402	Vancomycin	186	Inj. Vanbact 500 mg	Nabiqasim Industries, Karachi	260	Inj. Vancomycin 500 mg	Abbot Laboratories, Karachi	145	Inj. Maparix 500 mg	SJ & G Fazul Ellahie, Karachi
		349	Inj. Vanbact 1g					249	Inj. Maparix 1 mg	
412	Xylometazoline	26.2	Xynosine Nasal Spray 0.1%	Zafa Pharmaceuticals, Karachi		N/A		26.76	Xolisan Nasal Spray 0.1%	Sanat (Pvt) Ltd C/O Hassaan Distribution

7. Conclusion

Pakistan's pharmaceutical sector has not been competitive within the export market, falling sharply behind comparators such as India. The structure of the industry – with the top-100 firms capturing 97% of the market share, and 650 firms competing over the remaining 3% – suggests that there is a high level of allocative inefficiency. These factors, along with strict price controls and extended price freezes, suggest that rents are being captured by the industry. Our examination of the rents associated with pricing, poor-quality drugs and government procurement processes reveal several preliminary policy implications.

Incentives are misaligned with regards to the pricing of medicines. In an effort to keep prices affordable, the Pakistani state enforces strict controls. However, these have the adverse effect of either restricting availability of essential drugs due to shortages, or increasing out-of-pocket expenditures for patients because newer and higher priced drugs enter the market. Sometimes patients face both. Incentives need to be restructured to correct this.

The procurement of medicines by provincial governments has steadily improved over time, with rents being reduced, but there are opportunities for further improvements. Positive changes began following Pakistan's transition to a democracy in 2008 and later in 2010 when provinces were given more autonomy. The competition between provinces, induced by institutional changes, has improved procurement systems over the last decade or so. However, there is still significant scope for improvements and for this competition to be made explicit, particularly with regards to the procurement and pricing of essential medicines.

The next stage of our research will look to frame these emerging policy implications within the wider political settlement of Pakistan and its pharmaceutical sector. This additional analysis, along with focus-group discussions with relevant stakeholders, will then be used to generate feasible anti-corruption strategies to reduce developmentally damaging rents.

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Annex 1: List of key informant interviews

S.No.	Date	Name	Designation	Organisation	Location
1	8/9/2018	CEO, Large-scale manufacturer			Karachi
2	10/9/2018	Senior official, Health Department, Government of Sindh			Karachi
3	15/9/2018	Retired pharmacist who spent his career in various multinational pharmaceutical companies; currently faculty member at a private university			Karachi
4	25/9/2018	Head of small distribution company			Karachi
5	25/9/2018	Head of small distribution company			Karachi
6	24/11/2018	Former Federal Drug Controller, Secretary Health, Government of Sindh; and currently part of a private pharmaceutical importer			Karachi
7	24/11/2018	Managing director, pharmaceutical importer			Karachi
8	24/11/2018	Official at DRAP, Sindh			Karachi
9	2/12/2018	Wholesaler			Karachi
10	5/12/2018	Senior official, DRAP			Islamabad
11	5/12/2018	Pharmacist, formerly with WHO, and currently at a non-governmental organization			Islamabad
12	6/12/2018	CEO, Medium-scale manufacturer			Islamabad
13	6/12/2018	Wholesaler			Islamabad
14	7/12/2018	Pharmacist at private university			Islamabad
15	15/12/2018	CEO, large-scale distributor			Karachi
16	22/01/2019	CEO, medium-scale manufacturer			Lahore
17	22/01/2019	Director, medium-scale manufacturer			Lahore
18	22/01/2019	Pharmacist with experience in MNCs, and currently part of a DTL			Lahore
19	22/01/2019	CEO, alternative medicine manufacturer (medium-scale)			Lahore
20	23/01/2019	Official, Directorate General Health Services, Primary and Secondary Healthcare Department, Government of Punjab			Lahore
21	23/01/2019	Senior official, Primary and Secondary Healthcare Department, Government of Punjab			Lahore
22	23/01/2019	Senior official, Primary and Secondary Healthcare Department, Government of Punjab			Lahore
23	24/01/2019	Pharmacist and senior official at Drug Testing Laboratory, Government of Punjab			Lahore
24	18/02/2019	Senior representative, Pharma Bureau			Karachi
25	1/3/2019	Former Secretary, Health Department, Government of Sindh			Karachi
26	27/3/2019	Senior Pharmacist, Lady Reading Hospital			Peshawar
27	27/3/2019	Senior official, Health Department, Government of Khyber Pakhtunkhwa			Peshawar
28	27/3/2019	Senior official, Health Department, Government of Khyber Pakhtunkhwa			Peshawar
29	28/3/2019	CEO, small-scale manufacturer			Peshawar
30	29/3/2019	CEO, medium-scale manufacturer			Peshawar
31	1/4/2019	Director Legal department, large-scale manufacturer			Karachi
32	6/4/2019	CEO, alternative medicine manufacturer (large-scale) and drug manufacturer (small-scale)			Karachi
33	12/4/2019	Managing Director, chemicals manufacturer			Lahore
34	12/4/2019	CEO, Large-scale manufacturer			Lahore
35	12/6/2019	Former Director-General Health, Government of Pakistan			Karachi
36	22/6/2019	Associate Professor of Pharmacy at public-sector university			Karachi
37	22/6/2019	Medical store owner in Hyderabad			Karachi
38	28/6/2019	CEO, alternative medicine manufacturer (medium-scale)			Lahore
39	1/7/2019	Pharmacist with experience in MNCs, and currently part of a DTL			Lahore

Annex 2: Sample of Essential Medicines

The table below shows the randomly selected sample of 10% of the medicines in the National Essential Medicines List 2016 (DRAP, 2016). The serial number shown in the first column corresponds to the serial number in the report. Of this sample of 42 medicines, 35 medicines were either not procured at all or were procured by only one province. The remaining seven medicines were purchased by more than one province, therefore enabling us to make a comparison.

Series no.	Generic molecule nName
8	Adenosine
22	Amoxicillin + Clavulanic Acid
27	Anti-D Immunoglobulin
50	Benzoyl Peroxide
63	Calamine
66	Calcium Gluconate
67	Capecitabine
82	Chlorine Base Compound
84	Chloroxylenol
88	Cholera Vaccine
122	Dextran 70
139	Efavirenz + Emtricitabine + Tenofovir
146	Ergocalciferol
164	Flucytosine
166	Fludrocortisone
182	Glyceryl trinitrate
186	Halothane
193	Hydrocortisone
211	Isoniazid
230	Levonorgestrel-Releasing Implant
238	Loratadine
246	Mefloquine
255	Methotrexate
256	Methyldopa
284	Ofloxacin
291	Oxygen
293	Paclitaxel
302	Permethrin
307	Phytomenadione
309	Platelets
313	Potassium Chloride
318	Praziquantel
323	Progesterone Vaginal Ring
326	Propofol
383	Terbinafine
398	Typhoid Vaccine
400	Valganciclovir
402	Vancomycin
403	Varicella Vaccine
404	Vecuronium
412	Xylometazoline
414	Zidovudine (ZDV or AZT)

ACE SOAS Consortium **Anti-Corruption Evidence**
Making Anti-Corruption Real

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ACE takes an innovative approach to anti-corruption policy and practice. Funded by UK aid, ACE is responding to the serious challenges facing people and economies affected by corruption by generating evidence that makes anti-corruption real, and using those findings to help policymakers, business and civil society adopt new, feasible, high-impact strategies to tackle corruption.

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- Economic and Social Research Foundation (ESRF)
- Health Policy Research Group (HPRG), University of Nigeria Nsukka (UNN)
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