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# **The success of the industrial development policy in the pharmaceutical industry in Bangladesh**

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## **Abstract**

While there are scores of excellent studies on failed industrial policies, studies of successful cases of industrial development are much fewer. This paper reports a case study of the successful development of the pharmaceutical industry in Bangladesh and the critical roles played by the country's National Drug Policy established in 1982 in boosting this development. This paper attempts to explain how badly the markets for drugs in developing countries in general fail in providing essential drugs for the poor, what characterize the National Drug Policy as an industrial policy, how the policy addressed the market failure problem, why the policy did not cause serious government failure problems, and how successfully this industry has since been growing.

## **1 Introduction**

Promoting industries and creating jobs, if successful, would boost economic development and thereby support state building. While politicians and bureaucrats are aware of how important industrial development is, they are unaware of how to facilitate it. In the international development cooperation community in developed countries and international organizations, the commonly accepted view until recently was that industrial policy would not work because market failures prevent industrial development from occurring and, hence, it would be too difficult for the developing countries, especially current low-income countries, to address the failures without causing serious government failures. Thus, policymakers in developing countries could not receive encouragement or useful suggestions for industrial development from this community.

More recently, there has been a sea change. Major publications by international organizations, such as the World Bank's World Development Report 2013 and the African Development Bank and the OECD Development Centre's African Economic Outlook 2012, emphasize the importance of creating jobs and generating incomes through improving productivity in the industrial sector. Also, symposiums and conferences on the same issues abound. This change is encouraging for the people of developing countries longing for industrial development. This, however, is just the beginning of the accumulation of knowledge necessary for providing a scientific foundation for the prescription and implementation of a strategy for industrial development. Considerable further research on industrial policy is clearly warranted.

This paper reports a case study of a successful industrial policy which was proclaimed and enacted by the government of Bangladesh three decades ago. One

reason why we focus on a successful case and not failures is that there are already scores of excellent studies on failed industrial policies, such as Balassa (1971), Bhagwati (1978), and Krueger (1978), just to name a few.<sup>1</sup> These studies have made it clear how government interventions that are intended to protect and promote industries can aggravate the dysfunction of markets, create hotbeds for corruption, and widen the gap between the rich and the poor.

A major message of economics is that government interventions enhance economic development only when they address market failure problems. Of course, market failures do not necessarily call for government intervention as they may be mitigated by grassroots non-market institutions based on the community mechanism or other mechanisms, as Greif (2006), Williamson (1985), Hayami and Godo (2005) and other prominent economists argue. Still, grassroots efforts are likely to solve market failure problems only partially because of the transaction costs and leave room for government interventions. From studies of failed industrial policies, it is impossible to learn whether government interventions are doomed to fail or whether they can succeed in correcting market failures if designed and implemented appropriately. Studies of successful cases of industrial development are expected to illustrate how market failures are mitigated without causing serious government failures and what the effective division of labor among markets, non-market institutions, and the government is. Successful cases, however, are much fewer. Although Baer (1972) and Chang (2003) among others argue that almost all of today's developed countries used protection and promotion policies to develop their industries when they were in their developing stages, such experiences in the West in the remote past may be difficult to apply to today's developing countries. More useful references would be the more recent experiences in

high-performing Asian countries.

This paper deals with the successful development of the pharmaceutical industry in Bangladesh and the critical roles played by the country's National Drug Policy established in 1982 in boosting this development. One might wonder why the pharmaceutical industry, which seems to be a capital-intensive, high-tech industry, can be developed in a low-income country like Bangladesh. A short answer is that the pharmaceutical industry in this country specializes in the production and sale of generic drugs, which is neither capital-intensive nor high-tech. This paper attempts to explain how badly the markets for drugs in developing countries in general fail in providing essential drugs for the poor, what characterize the National Drug Policy as an industrial policy, how the policy addressed the market failure problem, why the policy did not cause serious government failure problems, and how successful the development of this industry has been since 1982. While the government intervention was reduced over time, this industry in Bangladesh has continued to grow in size, improve product quality, and enhance productivity. This paper offers hypotheses on what features of the private sector has made this sustained growth possible, while deferring the empirical test of the hypothesis to a companion paper, Amin and Sonobe (2012).

## **2 The successful growth of the industry**

Pharmaceutical firms in developed countries undertake R&D activities to develop new drugs and test them for approval. These high-tech activities require enormous inputs of capital and the efforts of a number of highly skilled, professional pharmacists, biochemists, and other experts. After the drugs' patent expires, however, other pharmaceutical firms copy the drugs at much lower development costs. Although the

regulatory body in each country examines whether the copied drug is identical to the original drug in dose, strength, safety, and efficacy, the period needed for its approval is much shorter. While drugs have both trade names made by sellers and generic names that indicate their active ingredients, such copies are usually called by their generic names. Probably this is why they are called generic drugs. The pharmaceutical industry in Bangladesh has focused on the production and sale of such generic drugs.

This industry in Bangladesh, moreover, has relied on the import of the most important material, that is, active pharmaceutical ingredients (API), which are available from the firms that invented the original drugs as well as the producers of generic versions of the active ingredients in developed countries, India, China and a few other countries. With active ingredients being purchased, the remaining production process involves mixing them with other ingredients that make it easy for the human body to absorb the active ingredients and serve some other purposes, followed by pressing the mixed substance into tablets and packaging and shipping them. Such manufacturing is not high-tech. It is only very recently that some of the pharmaceutical firms in Bangladesh have begun producing generic versions of API.

Still it is astounding that Bangladesh, one of the least developed countries in the world, has its own pharmaceutical industry. Just before the National Drug Policy was launched in 1982, Bangladesh had 166 approved drug firms, of which about 80 were in operation. Many of them were microenterprises producing folk medicine, and others were small-scale subcontractors for multinational firms.<sup>2</sup> Although the number of firms in operation was large, the total production of drugs in the country, even including the output of the local subsidiaries of the multinationals, met only 35 percent of the domestic demand for drugs. The situation is different now. There are more than 250

approved domestic firms, of which more than 170 are in operation. They meet 97 percent of the domestic demand for drugs. The domestic production of drugs has been growing rapidly in recent years, as shown in Figure 10.1 (We are now updating the data and the next two sentences may be adjusted accordingly). In this figure, the bar chart indicates the sales revenue of this industry in million dollars, and the line chart indicates its annual growth rate from 1981 to 2001. Since 2007, the annual grow rate has been over 15 percent per year, a pace at which revenue doubles in five years.

Bangladesh is known for its well-developed export-oriented garment industry. Compared with garment production, generic drug production is scientist-, skilled worker-, and capital-intensive. It is reasonable to ask whether the country has a comparative advantage in this industry. The answer is definitely affirmative because the industry recently began exporting their products to other countries without being subsidized by the government. The export destinations include not just other low-income countries but also middle-income countries in Asia, Latin America, and Southern Europe, and more recently developed countries including the United States, where the safety regulation is the most stringent in the world.

One might think that such phenomenal growth of an industry in a low-income country is not possible if it is not led by multinational firms. The reality in Bangladesh is that while multinationals dominated the country's market for drugs earlier, they have been marginalized since the 1980s. Table 10.1 shows the names and ownership types of the ten largest drug firms in terms of sales on the Bangladesh market in 1985 and 2011. While most of the top ten firms were the subsidiaries of renowned multinationals in 1985, all the top ten firms are domestic firms owned and operated by Bangladeshi capital and managers in 2011. The multinationals' local production

accounts for only 10 percent of the total drug consumption in this country now. Thus, it is not an exaggeration to say that the domestic drug industry in Bangladesh has successfully developed and is rapidly growing.

Still one may wonder whether the rapid growth of this industry has made any contribution to this low-income country if the industry is not much labor-intensive. Indeed, the employment size of this industry is estimated to be less than 100,000 persons, which is not comparable to the employment of four million persons by the export-oriented garment industry. Nonetheless, it is likely that the growth of the pharmaceutical industry has exerted considerable impacts on the welfare of people of in Bangladesh. This is because the increased supply of generic drugs due to the growth of this industry is likely to have reduced the prices of drugs drastically, thereby making drugs accessible for increasing portions of the population. If drugs were freely traded between countries and sold in a perfectly competitive market, the price of each drug would be by and large the same in all countries, and considerable increases in drug supplied from a small country like Bangladesh to the market will not have any significant impact on the price. In reality, however, drugs are not freely traded but are subject to approval and licenses and other forms of regulations in almost all countries because drug firms, both local firms and multinationals, attempt to differentiate products and to set prices strategically to each national market. It may well be that drug prices vary across countries widely, and that the development of the pharmaceutical industry in a country, especially that of domestic firms, has substantial impacts on the domestic prices of drugs.

To investigate this, we gathered fragmented information on changing drug prices from 1981 to 2012 in Bangladesh and also the current prices in some other countries.

The results are shown in Tables 10.2 and 10.3, which deserve a detailed explanation. In Bangladesh, the pharmaceutical industry manufactures more than 500 generic drugs for 6,200 registered brands in over 10,000 different forms of dosages and strengths. In addition to this immense diversity, what makes inter-temporal comparisons of drug prices difficult is that the importance of a drug changes over time because new substitutes are developed and because drug resistance may occur. We decided to focus on the top selling drugs in the years 1985, 2000 and 2011 as well as on representatives from different therapeutic classes and picked up ten drugs that have been used since the early 1980s or even earlier (which are referred to as “older 10 drugs”) and another ten drugs that were introduced to the Bangladeshi market in the mid-1990s or later (“newer 10 drugs”). Of these 20 drugs, 13 are included in the list of the country’s “essential drugs,” which is defined by the World Health Organization as drugs satisfying the healthcare needs of the majority of the population. Our older 10 drugs include nine essential drugs and our newer 10 drugs include four essential drugs. The older 10 drugs were also included in the 30 important drugs listed in a book authored by Zafrullah Chowdury (2010), who is a freedom fighter, medical doctor, civil society activist, and one of the masterminds of the National Drug Policy. His book is our source of information on the drug prices as of 1981 and 1991.

Table 10.2 presents the real retail prices of the ten older drugs in 1981, 1991, 2001, and 2012 and those of newer drugs in 1996, 2001, 2006, and 2012. To calculate the average price of each drug in 1996, 2001 and 2006, we collected the retail prices of all firms producing the particular drug for a particular dosage, mentioned in the first column, from different issues of QIMP (Quick Index for Medical Preparations). The numbers in the table are real retail prices in Bangladesh Taka deflated by the consumer

price index. The data on the retail prices in 2012 were collected through our own survey of 10 pharmacies or drug stores.<sup>3</sup> It should be clear from the table that the retail prices of these life-saving drugs have been drastically lowered. The prices of some of the older drugs, such as Atenolol (a drug for hypertension), Chloroquine (an antimalarial drug), Mebendazole (an antiparasitic drug), and Rifampicin (an antibiotic) in 2012 are only one-fourteenth to one-fortieth of their prices in 1981.

The reduction in drug prices is not unique to Bangladesh because new drugs are developed one after another to substitute or replace older drugs, however. Thus, the question arises as to whether the price reduction has been more drastic in Bangladesh than in other countries. Table 10.3 compares the current retail prices of drugs in Bangladesh, Sri Lanka, India, the Philippines, Indonesia, and the UK in 2010 to 2011. Sri Lanka and India are selected because they are located in the same region as Bangladesh. Sri Lanka is known for its free provision of public medical services and for its aggressive approach to reducing drug prices, which the country started as early as the 1970s. India is known for its thriving industry manufacturing generic drugs and generic APIs. In the table, Southeast Asia is represented by the Philippines and Indonesia. Both countries are more dependent on drugs produced by multinationals than the three countries in South Asia, but the Philippines was more active in reforming its pharmaceutical sector than Indonesia. As a representative of the developed countries, we select the UK, which is home to some renowned multinational drug firms. We collected data on the prices of 10 drugs selected from the 20 drugs listed in Table 2 in Bangladesh, Sri Lanka, and the Philippines through surveys.<sup>4</sup> For India, Indonesia, and UK, data were taken from the Current Index of Medical Specialities (CIMS), the Indonesian Index of Medical Specialities (MIMS), and the British National Formulary

(BNF), respectively.

It is evident that there is no integrated world market for drugs in which the law of one price holds true. Instead there are segmented national markets for drugs. It is also evident from Table 10.2 that almost all of the medicines are sold at the lowest price in Bangladesh, except for Cefixime, which is sold at a slightly lower price in the other two South Asian countries. The prices of the other medicines are lower in Bangladesh by 5 percent to 1500 percent. Thus, the prices of important drugs are exceptionally low in Bangladesh. By contrast, drug prices are much higher in the Philippines, Indonesia, and UK. The results of the price comparison may lead one to imagine that drug prices are higher in countries which are dependent on multinationals for the supply of drugs and are taking no countermeasures toward high drug prices supplied by multinationals. Obviously, it is more difficult for patients in developing countries to pay for drugs than patients in affluent countries.<sup>5</sup> Nonetheless, Table 10.3 indicates that the prices are lower in the UK than in Indonesia for seven drugs out of the ten. These results present clear evidence of market failures, the issue to which we will turn in the next section.

We conclude this section by mentioning the increasing affordability of life-saving drugs for ordinary people in Bangladesh. In this country, real wages for unskilled workers have increased gradually for the last three decades. The real wage of the lowest-paid unskilled government worker (i.e., grade 20th) has increased 2.4 times since 1981.<sup>6</sup> Thus, affordability, measured by the drug prices relative to the unskilled labor wage, has been improved even more drastically than the real prices of drugs have been lowered. Thus, the development of the pharmaceutical industry is not an insignificant matter but a major achievement of the Bangladeshi economy.

### **3 Market failures and earlier reform attempts**

In 1978, the United Nations Children’s Fund (UNICEF) and the World Health Organization (WHO) jointly hosted an international conference in Alma-Ata, USSR and declared “Health Care for All by 2000.” The declaration views health as a fundamental human right and asks all governments to formulate national policies, strategies, and action plans. To achieve the goal of health care for all, making essential drugs affordable to the poor was considered to be essential.<sup>7</sup> Much to the disappointment of the signatory countries including Bangladesh, however, the Alma-Ata declaration was completely ignored by drug firms in the world. Why do firms not respond to the demand by the international community? Is it difficult for the government to force firms to lower prices? This section reviews the major reasons why this is so and the countermeasures actually attempted in some countries.

The first reason is that drug firms claim that their pricing is appropriate in view of the need to cover the high cost of developing new drugs. Berndt *et al.* (1995) estimate the cost of launching a new drug to market to be 360 million USD. Patent protection, which creates a monopoly lasting for a few decades artificially, has been the incentive device encouraging drug firms to develop new drugs. Although alternative incentive mechanisms are being proposed, none has so far been implemented on a large scale to reconcile the two conflicting aims of keeping drug prices low and encouraging drug firms to develop new drugs.

Secondly, it is difficult to educate consumers (or patients) and medical doctors to be more price-sensitive buyers of drugs, or to put it in technical terms, to make the demand for drugs more elastic with respect to prices. The less price elastic the demand

is, the higher the monopoly price, compared with the unit production cost. The demand for drugs is made less elastic by the fact that “the menu of drugs is so vast and complex that few physicians can inform themselves fully about the available alternatives” (Scherer, 1993, p. 98). The problem is aggravated by the possible moral hazard problem arising from the fact that while it is doctors who choose drugs, they do not pay for the drugs. To inform doctors about the usage and efficacy of drugs, pharmaceutical firms employ a large number of medical representatives and dispatch them to doctors, but it is ambiguous how effective this service is.

Thirdly, drug firms differentiate their products from other products to make the demand for drugs even less elastic, thereby strengthening their price setting power. An integral part of product differentiation is the creation and proliferation of brand names put on essentially the same products. In the 1970s, the Sri Lankan government decided to reduce the number of imported drugs because the country was faced with a severe foreign currency shortage and because the country was heavily dependent on imported drugs. The government could easily reduce the number of imported drugs from 4,000 to 2,100 and then to 600 because many drugs were essentially the same as other drugs (Chowdhury 2010; Reich 1995). Similarly, when the government of Bangladesh started the reform of the pharmaceutical sector in 1982, it banned 1,655 drugs out of the 4,340 registered drugs as either harmful, useless, or therapeutically ineffective drugs. Although the above mentioned medical representatives may help to mitigate the information problem, they are also used to imprint brand names in doctors’ minds, strengthen their brand loyalty, and keep the price of each differentiated product high.

A common policy tool to reduce monopolistic prices for the government is to put

a price ceiling. While this sounds straightforward, its proper implementation requires appropriate information on the costs of production and distribution, which is difficult to obtain due to drug firms' complicated information manipulation (e.g., Laffont and Tirole 1993). In many developing countries, the subsidiaries of multinational firms or their local subcontractor import active ingredients and other materials. Although the custom office should have information on the prices of such intermediate inputs, the reported prices may be much inflated, and such price information may not be used by government bodies (e.g., Lall 1973; Peralta, Wauthy, and Ypersele 2006). The capacity of the government to set an appropriate level of price ceilings would also depend on how abundantly the country is endowed with human resources with expertise in pharmacy, which could provide sensible advice for the government.

In 1971, the Sri Lankan government mandated that brand names be replaced by their corresponding generic names in the sale and prescription of drugs. The expected effect of this action is to make product differentiation difficult, thereby making drug demand more elastic. The government also mandated that all imports of finished drugs and raw materials be purchased through international tender by the newly established State Pharmaceutical Corporation (SPC). These reforms met with fierce opposition, however. Major multinational firms initially ignored the SPC and continued to sell drugs through their marketing channels. In response, the SPC tried to procure generic drugs from the socialist countries in Europe by amending the country's patent law. This move was blocked chiefly by the pressure from the governments of the home countries of the multinationals.

Opposition was also expressed by medical doctors and pharmacists probably because of their misunderstanding about the safety of generic drugs, their habit of using

brand names in prescription, and their loss of direct and indirect benefits that they had received from the importers and multinational firms, such as free samples and promotional materials. Wealthy people and intellectuals who were loyal to well-known brands were dissatisfied with the abolition of their favorite branded drugs. The propaganda campaign conducted by the multinational firms was successful in fueling the confusion and misunderstanding about the safety of generic drugs. The use of generic names was required also in Pakistan in 1971, in India in 1981, in the Philippines in the 1990s and some other countries, but these reform attempts were all short-lived due to protests from multinational firms and physicians (Reich 1995; Chowdhury 2010). The Sri Lankan government went further than these countries and established the SPC, and this step seemed successful because in 1972, SPC saved about 40 percent of the payment for imported drugs and materials compared with the previous year (Lall and Bibile 1978). Still the policy was so unpopular that it was watered down considerably in subsequent years.

Thus, the market for drugs is associated with a composite of market failures, including the indivisibility due to high development costs, asymmetric information, and coordination failure, which are epitomized by the high prices of drugs. Consumer activists in both developed and developing countries have long been criticizing drug multinationals, but they have seldom been successful in changing the behaviors of multinationals. Neither mass media nor professionals such as medical doctors and pharmacists are highly motivated to fight against the monopolistic power of drug firms, especially multinationals. It seems that the problem cannot be solved without the government's well designed actions.

## **4 The national drug policy of Bangladesh**

### *Immediate reactions*

After gaining independence in 1971, Bangladesh experienced famine, acute poverty, and political turmoil in the 1970s. When Lieutenant General Ershad gained power in a bloodless coup in March 1982, the country was still in the middle of the process of state building. It was this new government that declared the new law called “the Drug (Control) Ordinance, 1982” and the National Drug Policy (NDP), a set of policy measures to secure access to essential drugs for all. This benevolent policy could not immediately win the approval of the people of Bangladesh, even though they had suffered from the high prices of important life-saving drugs. Instead the major newspapers regarded the policy as a harebrained populist policy improvised by the military government and as doomed to be crushed by pressure from abroad. Indeed, the US ambassador came to Ershad immediately and began bringing relentless pressure on the Bangladesh government to reverse the decision, according to Chowdhury (2010). The ambassadors from the UK and Germany soon followed her lead. Their pressure included the threat of stopping assistance from their countries to Bangladesh. Similarly, the multinationals threatened explicitly to stop the supply of medicines to the country completely.

The National Drug Policy was well thought out, however. It was carefully crafted by an expert committee consisting of Professor Nurul Islam of Dhaka University, Zafrullah Chowdhury, and other six professionals, such as military surgeons, with considerable experience and expertise. After being appointed by the government to be committee members, they reviewed the drug situation and the healthcare needs in the country and also the reform experiences of other countries, such as Pakistan, Sri Lanka,

and India. Their proposal of the National Drug Policy was swiftly accepted by the government on May 29, 1982. The following description of the events related to this policy and the major contents of the policy are based on our interviews with Zafrullah Chowdhury, Samson H. Chowdhury, the founder of the largest pharmaceutical firm in the country, and other few persons who were engaged in this industry and witnessed how events unfolded in those days, as well as Chowdhury (2010).

Less than three months after the coup, Ershad visited the US to meet with President Reagan. Ershad also met with Vice-President Bush, who suggested that Ershad review his drug policy with the help of “independent US scientists” who would visit Bangladesh soon (Chowdhury 2010, 105). Ershad agreed with Bush without knowing that Bush was a shareholder of some pharmaceutical firms based in the US. When a four-member team of “independent US scientists” visited Bangladesh, the health minister, Dr. Shamsul Haq, requested the US embassy for their CVs. Although his request made the US ambassador furious, the health minister finally obtained the CVs of the co-called “independent scientists” and found that they were executives and employees of large pharmaceutical firms.

As in Sri Lanka and other countries, the multinational firms succeeded in influencing physicians, pharmacists, and the public through propaganda campaigns. The looming skepticism among the public, together with the threat from the multinationals and the disapproving attitude of the donor countries, made Ershad less willing to move ahead on the drug policy, according to Chowdhury (2010). To encourage Ershad, the members of the expert committee explained the reason why the multinationals would never withdraw from the Bangladesh market. The expert committee designed the new policy, taking into account the reactions of the

multinationals and the public. Their policy attempted to extract part of the monopolistic profits that the multinationals had taken away from Bangladesh, but the expert committee was fully aware that the Bangladesh market had to remain attractive for the multinationals. Further, the committee anticipated the propaganda campaign run by the multinationals, the reactions of the donor countries, and the attitude of the public.

### ***Ingredients of the NDP***

Under this policy, the government designated the set of essential drugs, mandated the use of generic names, enhanced the public awareness of generic drugs, and had a price-cap regulation. The committee, however, was aware that a more drastic measure was needed to achieve the policy goal of ensuring favorable access to essential drugs. As such a measure, Sri Lanka created a state-run monopoly on importing and distributing drugs through international tender. This socialist approach was not acceptable for Ershad, who was looking toward the US.<sup>8</sup> Nor was it effective in fighting against the propaganda by the multinationals because it would not create any supporters, that is, individuals who would directly profit so much from it as to side with the government, as the Sri Lankan experience had indicated. Probably we should also mention, although we do not know whether or not the committee considered this point, that the Sri Lankan approach could come to a miserable end, if implemented in a corrupt country like Bangladesh.<sup>9</sup>

Instead, the expert committee intended to promote the local production of drugs by local firms owned by Bangladesh capital and operated by Bangladesh managers. Although there were many such firms, they ran tiny businesses. The new policy was

intended to promote them and new entrants by using three aggressive measures. The first measure was to prohibit the multinational firms from selling antacids (which prevent acidity in the stomach) and vitamins and asked them to instead concentrate on the development and production of innovative, sophisticated and high-tech products, such as antibiotics. Antacids and vitamins were relatively easy for local firms to produce. The markets for these drugs were fairly large, probably accounting for 16 percent of the whole domestic market for drugs in terms of sales value in those days, according to our interview with Dr. Chowdhury on January 15, 2011.

The second measure was to restrict the import of substitutes for the finished drugs and intermediate inputs that were produced by two or more local firms. This measure would be as powerful as the first measure. Take the Ventolin Inhaler as an example. This is a drug for respiratory diseases, whose generic name is salbutamol. Before the National Drug Policy, this product was imported by its inventor GlaxoSmithKline (GSK) from outside Bangladesh even though GSK had a production facility for other products in Bangladesh. Ventolin Inhaler was one of the top selling drugs in Bangladesh, accounting for 15 percent of GSK's sales revenue in Bangladesh. After the NDP was implemented, four local firms began producing and marketing copies of this drug. Because of this second measure, their entry resulted in the restriction on GSK's import of the original drug and induced GSK to enter into a toll manufacturing arrangement with one of the four imitators (i.e., GSK asked one of the imitators to produce the drug as a subcontractor for GSK). Once the market knew that the drug was produced by the domestic imitator, the advantage of GSK as the inventor, such as the consumers' perception of superior quality, over local firms disappeared, and the local firms captured large shares of the market for this drug easily.

The third measure for the promotion of the local drug industry was to prohibit those multinational firms without any production facilities in Bangladesh from marketing their products produced by other firms on a toll manufacturing basis. As a result, such multinational firms were forced to establish their own factories in Bangladesh, and local firms working for these multinational firms as subcontractors lost customers. Thus, immediately after the policy was proclaimed, these subcontractors, who were central players in the association of local drug producers, were strongly opposed to the policy. Not long after, however, they learned that a window of lucrative profit opportunity would be opened only if they produced antacids and vitamins and imitated the multinationals' products. Thus, they became staunch supporters of the NDP even though they would not really welcome the price cap regulation.

It was no wonder that the multinational firms and the governments of their home countries were outraged by these blatantly aggressive measures, which were intended to substitute the products of the multinationals with the products of the local firms.<sup>10</sup> These measures were similar to the measures implemented under the name of the import-substitution industrialization strategy in a number of developing countries in the 1960s and 1970s, which turned into a complete fiasco in most countries. Why did the policy that failed to promote industries in many countries succeed in boosting the development of the local drug industry in Bangladesh?

### ***Why the NDP succeeded in industrial promotion***

To answer this question, we conducted a survey of 148 drug producing firms, together with interviews with persons who played important roles in creating the National Drug Policy and who witnessed the events unfolding in those days. In our firm survey,

which was essentially a census of drug firms in operation, we met with the top decision maker of each firm. As soon as we started these information gathering activities, we noticed an interesting phenomenon that began immediately after the proclamation of the National Drug Policy. It was the massive shift of managers, engineers, and skilled workers from the multinational firms to local firms. We first recognized that there were a number of top managers who used to work at the local subsidiaries of the multinational firms. Thus, we gathered information on the occupational backgrounds of the top managers and employees and found that 32 out of the 148 top managers had prior experience of working at a pharmaceutical multinational firm, that the percentage is nearly 50 percent if we focus on the relatively advanced 67 firms, and that 14.5 percent of employees of these 67 firms used to work at a multinational firm (Amin and Sonobe 2012).

According to our interviews with elderly respondents, the shift of human resources from the multinationals to the local firms began immediately after the National Drug Policy was proclaimed, thus confirming that the policy played a critically important role in the development of the local drug industry. The shift has continued to date, but the number of persons moving from the multinationals to the local firms has been decreasing over time because the presence of the multinationals in this sector has been declining. The literature on international economics abounds with empirical studies of the impact of foreign direct investment on the development of local industries in the host country (e.g., Kokko 1994; Kokko, Tansini, and Zejan 1996; Audretsch 1998; Aitken and Harrison 1999; Griffith, Redding, and Reenen 2003; Javorcik, 2004; Lipsey and Sjöholm 2005). These studies attempt to substantiate or refute a hypothesis that the operation of multinational firms stimulates the development of local

industries because advanced knowledge of production technology, management, and marketing is transferred from multinational firms to local firms. These studies expect that knowledge is transferred when employees who have acquired advanced knowledge while working at multinational firms move to local firms, even though knowledge transfer may also occur through other channels (e.g., Görg and Stroble 2005; Balsvik 2011). The empirical results are mixed, however. Some studies find that foreign direct investments have favorable impacts on the development of local industries and on the productivity of local firms. Many studies, however, find that such impacts are negligible or non-existent.

In the case of the pharmaceutical industry, multinational firms operate in almost every country and have local production facilities in a number of developing countries, including low-income countries. Still, local drug industries were developed only in a small number of developing countries and no country classified as least developed countries, except for Bangladesh. How can the mobility of labor from multinationals to local firms play a critically important role in successful industrial development? Presumably, the answer lies in the remarks of the elderly respondents. According to them, not a few Bangladeshi employees of the multinational drug firms occupied important positions, such as the head of the product development, production, quality control, marketing and senior manager of general management, already in 1982, and, hence, they had hands-on knowledge and experience in pharmaceutical production, marketing, and management. Thus, as soon as they moved to local firms, they could produce the same product as the multinationals produced if the local firms had machinery of the same quality, and they could sell the product at least in the same way as and possibly in a better way than they did at the multinationals.

When we asked ourselves why local employees could occupy high positions in the multinationals, the answer was already obvious to us because almost every top manager we met was a graduate of the faculty of pharmacy, the University of Dhaka. Amazingly, Bangladesh began pharmacy education at the university level as early as 1964 with 20 students.<sup>11</sup> We met with two of these first batch graduates, who were executives at two of the largest local pharmaceutical firms in the country, and learnt that they and their classmates joined multinational drug firms, were promoted to important positions, and moved to local firms at varying times after the NDP was implemented.<sup>12</sup>

As shown in Table 10.4, the opportunity for pharmacy education has been expanding rapidly in Bangladesh. In 1969, the university started a master's program in pharmacy. In 2003-2004, the faculty was expanded and turned into three departments; that is, Department of Pharmaceutical Technology, Department of Clinical Pharmacology, and Department of Pharmaceutical Chemistry, each conferring master's degree, M. Phil., and Ph.D.<sup>13</sup> Currently, there are six public universities and 21 private universities offering undergraduate and graduate courses in pharmacy and having 2,267 approved seats. Needless to say, the operation of pharmaceutical firms requires other expertise, such as bio-chemistry, microbiology, engineering, and business administration. Bangladesh has offered favorable access to higher education in these subjects and expanded the opportunity for such education rapidly, compared with other developing countries.

Between 1964 and 1982, a pool of human resources with expertise in production, management, and marketing of drug firms was built up in Bangladesh. Before 1982, such human resources were not working at local drug firms, which were tiny in size and equipped poorly with machinery. They were working at multinational firms, which

paid much higher salaries and provided better work environments. By working at the multinational firms, they could acquire a broader range of knowledge and advanced expertise. It is easy to imagine that if there had not been these human resources, the National Drug Policy would have been just one of the numerous failed attempts of import-substitution industrialization.

Of course, human resources were not the only factor needed for the development of the local drug industry. Investment in machinery was definitely needed. According to our investigation, investment in machinery was in many cases financed by banks. Once it became clear to bankers that the National Drug Policy provided enormous profitable opportunities for local drug firms and that human resources with advanced expertise were available, banks were willing to finance fixed capital investments undertaken by local drug firms.

Thus, the existence of the sizable pool of human resources with advanced expertise was critical, as our elderly respondents suggested. Another important reason for the success of the policy to boost the development of this industry dramatically was that the market failures were so rampant that the drug prices were exorbitant. Since the prices were initially very high, the local drug producers, many of whom were at that time subcontractors for the multinationals, found it highly profitable to enter the market for final products, such as antacids and vitamins, by hiring (or poaching) managers and specialists from the multinationals at high salaries, when the policy provided them with the market. The banks accordingly found it profitable to lend money to the local drug producers.

Note that this is just a description of the initial phase of the industrial development. There remains a question of how the industry could sustain its growth

after its initial success. Answering this question, however, is beyond the scope of this paper. Amin and Sonobe (2012) use firm-level data to substantiate the hypothesis that the local drug industry continued to grow in terms of productivity, product quality and diversity, and operation size because it continued to learn advanced technologies and management practices from abroad. Indeed, the results of the econometric analysis indicate clearly that those firms employing highly educated and experienced managers and specialists tended to learn from abroad actively and grow faster, and that such firms tended to be led by highly educated and experienced top-managers. In our interviews with managers at various ranks in such firms, they told us that their firms provided them with learning opportunities for more than one month in total per year. Such opportunities take various forms, such as training programs within the firm, short-term training programs held abroad by international organizations, and study at graduate schools abroad. Although employees may quit the firm to move to other firms after receiving training, high-performing firms provide learning opportunities because they otherwise could not recruit talented managers and specialists. Needless to say, we should emphasize again that important roles was played also by university education and multinational firms' training.

It is also noteworthy that rampant rent seeking and corruption did not topple the National Drug Policy. Although we have no hard evidence for this, we conjecture that two factors helped to prevent rent seeking and corruption from damaging the policy and the industry. First, the ultimate goal of the policy was not to promote the local industry but to reduce drug prices. The government committed itself to this goal and demonstrated clearly that it could take radical measures to achieve this goal. If the local firms had pretended that they needed more assistance from the government, the

government might have stopped promoting the local industry and instead tried to find sources of drugs elsewhere. Second, due to the multitude of market failure problems in drug markets across the world, drug prices were so high and, hence, the drug business became so profitable in Bangladesh after the reform in 1982 that the local drug firms allocated more resources to the drug business itself than to rent seeking activities.

## **5 Conclusions**

As soon as we started this study, we could fortunately meet with Dr. Zafrullah Chowdhury at his office. In response to our question of why the expert committee proposed the promotion of the local drug industry, he said that they were sure that without industrial promotion, their reform attempt would not be successful as the Sri Lankan case had suggested. At the time of this interview, we knew little about drug production because we had not visited any factories yet. We asked him whether it would be difficult for developing countries to produce drugs, and he replied that it was not and that the production of drugs was just an extension of cooking if producers are appropriately trained people. From the next day, we spent many days visiting a number of drug factories in Bangladesh and understood what Dr. Zafrullah Chowdhury meant by “extension of cooking” and “appropriately trained people.” It is now evident to us that developing countries can have a comparative advantage in the production of generic drugs if they have invested in university education in pharmacy, and that this industry can have sustained growth if it continues to learn from abroad.

The accumulation of general and industry-specific human capital, however, is just a necessary condition for this comparative advantage to be materialized. There must be a countermeasure to market failures. If the countermeasure addresses the market

failure problems more directly, the industry is more likely to pick up. The case of the pharmaceutical industry in Bangladesh illustrates how strong the impacts of such a countermeasure can be where there are serious market failure problems. As mentioned in the introductory section of this paper, it is said that even a policy addressing market failure problems falls short of expectations because any policy intervention is prone to rent seeking and corruption. The case of the pharmaceutical industry in Bangladesh, however, suggests that if the market failure problem is really serious, the benefit from solving the problem is accordingly great, and that the policy intervention can be nicely designed to distribute this great benefit between the private industry and the public so as to discourage rent seeking and corruption.

This case also suggests that good design of industrial policy must pay attention to the political aspects of the market failure problem. Although market failure is an economic term concerning the efficiency of resource allocation, the correction of market failure affects the distribution of wealth (such as the extraction of monopolistic profit), thereby resulting in distributional conflict, which inevitably has a political consequence, or the political contention of various stakeholders. The continuation of a policy needs political support from both inside and outside the country. Thus, policy planners, like the expert committee that designed the National Drug Policy of Bangladesh, should be able to determine the relationship between particular policy interventions and their political consequences, including the outcome of contentious politics, and design a policy that secures enough support.

## Notes

- 1 The excellent analyses of failed cases mentioned above were based on numerous real incidents of the failed applications of the now notorious import-substitution industrialization strategy in a number of developing countries in the 1960s and 1970s. This literature has found, among other things, that protectionist policies make firms very dependent on protection (Soligo and Stern 1965) because these policies never contribute to the productivity gains of firms (Krueger and Tuncer 1982) and are likely to make firms technically less efficient than export-oriented policies (Chen and Tang 1987) and to create environments that discourage productivity gains through learning from abroad (Bruton 1998).
- 2 In this paper, a multinational firm is defined as a firm of whose corporate headquarters is located outside Bangladesh and is in operation in two countries or more.
- 3 Of these ten drug stores, three are located in Dhaka city, four are in its suburb and three are in a small town called Lalmohan under the Bhola district. Bhola is the only island district of Bangladesh, located about 150 kilometers south of the capital city, Dhaka.
- 4 On this occasion, special thanks go to Dr. Khondoker Abdul Mottaleb of International Rice Research Institute (IRRI), Philippines, Mr. Chakra Pani Achariya and Mr. Thanabalasingam Vinayagathan, my two fellows in the National Graduate Institute for Policy Studies (GRIPS), Japan, and Mr. Aminul Haque, a young pharma graduate for their great support in collecting pharmaceutical price data from the Philippines, Sri Lanka and Bangladesh, respectively.

- 5 According to WHO (2004) and OECD (2005), medicines account for 25 to 70 percent of overall healthcare expenditure in developing countries and only about 18 percent in OECD countries. Moreover, patients in developing countries pay 50 to 90 percent of the medicine costs out of their pocket, but patients in developed countries pay much smaller fractions because of health insurance (WHO 2004).
- 6 This is our calculation based on the relevant National Pay Scales of Bangladesh (Ministry of Finance Bangladesh 2009; BTCL, 2010).
- 7 In 1976, drug consumption was over 50 US dollars per capita in Germany, Belgium, Switzerland and France, but it was less than one dollar in India and Bangladesh (WHO 1988, 12-4).
- 8 He impressed President Reagan favorably. On October 25, 1983, when they met again, Reagan wrote in his diary: “He’s quite a man & is taking that poverty stricken land out of statism & into the world of free enterprise. I like him & his ministers” (Reagan 2007, 191).
- 9 Bangladesh has been one of the most corrupt countries in the world according to Transparency International’s Corruption Perceptions Index and other perceptions-based indices.
- 10 Probably to keep the Bangladesh market attractive for the multinationals and to help local producers, the price cap regulation was less strict than it could be. The price cap was a certain percentage over the costs of raw materials and packaging materials, transportation costs, and duties and taxes. The mark-up rate was 240 percent for the drugs that are technically the most advanced and the most costly to produce. Four lower mark-up rates were applied to less advanced drugs with the lowest rate being 50 percent. Later on, in 1994, the government made 117 drugs

(out of 209 drugs designated as essential drugs) subject to price control. For other drugs, manufacturers were allowed to set their own prices and inform the regulatory body. More recently, most of these 117 drugs have become obsolete (UNCTAD 2011), and accordingly the price control has faded.

- 11 This is based on our interview with Professor Emeritus Dr. Abdul Jabbar, founder of faculty of pharmacy at the University of Dhaka. August 03, 2011.
- 12 We interviewed Mr. Amanullah Chowdhury, Executive Vice President and Director of Rangs Pharma Ltd., on June 04, 2011 and Mr. Lutfur Rhaman, Director Manufacturing of Beximco Pharmaceuticals Ltd., on January 19, 2011. Both were first-batch graduates. Mr. Rhaman worked for 15 years in SQUIBB, a US-based MNC, before he joined BEXIMCO. We also met with several early graduates, including Mr. Mahbubul Karim, Director Technical Operation of INCEPTA, who had served in two multinational firms (Sanofi and Novartis) for about 25 years in many key positions including head of production before he joined INCEPTA, and Mr. M. Mosaddek Hossain, Managing Director of UniMed and UniHealth Manufacturers Ltd., who had worked at two multinational firms (FISONS, and ICI) for about 15 years before establishing his own firm.
- 13 This is based on our interview on December 3, 2011 with Professor A.B.M Faruque, Dean of the Faculty of Pharmacy, University of Dhaka, who was a fifth batch graduate.

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Table 1 Top 10 Pharmaceutical firms in Bangladesh in 1985 and 2011

Top 10 firms in 1985			Top 10 firms in 2011	
	Firm's name	Ownership type	Firm's name	Ownership type
1	SQUARE	Local	SQUARE	Local
2	BPI (MAY BAKER)	MNC	INCEPTA	Local
3	GLAXO	MNC	BEXIMCO	Local
4	OPSONIN	Local	OPSONIN	Local
5	PFIZER	MNC	RENATA	Local
6	FISONS	MNC	ESKAYEF	Local
7	GONOSHASTHYA	Local	A.C.I.	Local
8	MSD	MNC	ACME	Local
9	CIBA GEIGY	MNC	ARISTOPHARMA	Local
10	HOECHST	MNC	DRUG INT'L	Local

Source: Author's calculation based on data from IMS Health (2012)

Table 2 Changes in retail prices of 20 important drugs in Bangladesh

Product (generic name)	Essential drug	Real retail price (in Taka)			
		1981	1991	2001	2012
<b>(a) Retail prices of older 10 drugs</b>		<b>1981</b>	<b>1991</b>	<b>2001</b>	<b>2012</b>
Amoxicillin Cap. 250 mg	Yes	5.6	3.2	2.5	1.3
Atenolol Tab 100 mg	Yes	19.9	4.2	1.0	0.5
Chloroquine Tab 250 mg	Yes	1.3	1.3	0.9	0.4
Diazepam Tab 5 mg	Yes	1.0	0.3	0.2	0.1
Mebendazole Tab 100 mg	Yes	7.0	0.9	0.6	0.3
Metronidazole Tab 200 mg	Yes	2.3	0.8	0.5	0.2
Paracetamol Tab 500 mg	Yes	0.8	0.7	0.4	0.2
Ranitidine Tab 150 mg	No	10.0	2.6	1.6	0.7
Rifampicin Cap. 150 mg	Yes	17.2	4.4	3.0	1.2
Vitamin B complex tablet	Yes	2.5	0.5	0.3	0.2
<b>(b) Retail prices of newer 10 drugs</b>		<b>1996</b>	<b>2001</b>	<b>2006</b>	<b>2012</b>
Albendazole Tab 400 mg	Yes	3.4	2.8	2.1	1.7
Azithromycin cap/Tab 500 mg	No	64.4	30.0	17.4	10.8
Cefixime susp. 50 ml	No	n.a	226.3	141.3	70.6
Cetirizine Tab 10 mg	No	n.a	1.8	1.4	0.9
Ciprofloxacin eye drop 5 ml	Yes	n.a	22.1	16.5	14.5
Diclofenac Sodium Tab 50 mg	No	1.1	0.7	0.5	0.3
Glibenclamide Tab 5 mg	Yes	0.3	0.2	0.2	0.2
Omeprazole Cap 20 mg	Yes	12.7	3.7	2.0	1.8
Pantoprazole Tab 20 mg	No	n.a	2.3	1.8	1.4
Paracetamol+ Caffeine Tab	No	n.a	n.a	0.9	0.7

Source: The real prices in 1981, 1991, and 2001 are the authors' calculation based on Chowdhury (2010, p101) and different issues of QIMP. The prices in 2012 are taken from the IMS Health (2012).

Note: The retail prices are deflated by using the consumer price index.

Table 3 Retail price comparison of selected drugs in selected countries (in USD)

Products	Bangladesh	Sri Lanka	India	Philippines	Indonesia	UK
Atenolol (Tab. 100 mg)	0.016	0.023	0.065	0.143	0.221	0.182
Azithromycin (Cap./Tab. 500 mg)	0.365	0.384	0.514	3.042	2.283	4.500
Cefixime (Susp. 50 ml)	2.388	1.943	1.943	5.348	9.805	15.522
Diazepam (Tab. 5 mg)	0.003	0.004	0.045	n.a	0.848	0.052
Glibenclamide (Tab. 5 mg)	0.006	0.008	0.014	0.018	0.099	0.046
Mebendazole (Tab. 100 mg)	0.010	0.012	0.029	0.101	1.566	0.334
Metronidazole Tab 200 mg	0.009	0.012	0.015	0.048	0.095	0.376
Omeprazole (Cap. 20 mg)	0.061	0.100	0.080	0.295	0.929	0.169
Pantoprazole (Tab. 20 mg)	0.047	0.115	0.074	0.475	1.618	0.623
Paracetamol (Tab. 500 mg)	0.010	0.012	0.021	0.014	0.065	0.053

Source: For data on Bangladesh, Sri Lanka, Nepal and the Philippines: the IMS Health (2012). For India, Indonesia and United Kingdom: authors' calculation based on data from different issues of MIMS Indonesia, Current Index of Medical Specialities (CIMS), and British National Formulary (BNF) respectively.

Notse: Pharmaceutical price data from Bangladesh, Sri Lanka, Nepal and the Philippines are for the year 2012. Data from India for 2011, and Indonesia and UK are for the year 2010. Price data on the Philippines include data on generic drugs only. n.a. indicates that data are not available.

Table 4 Pharmacy education in Bangladesh, 1964-2011

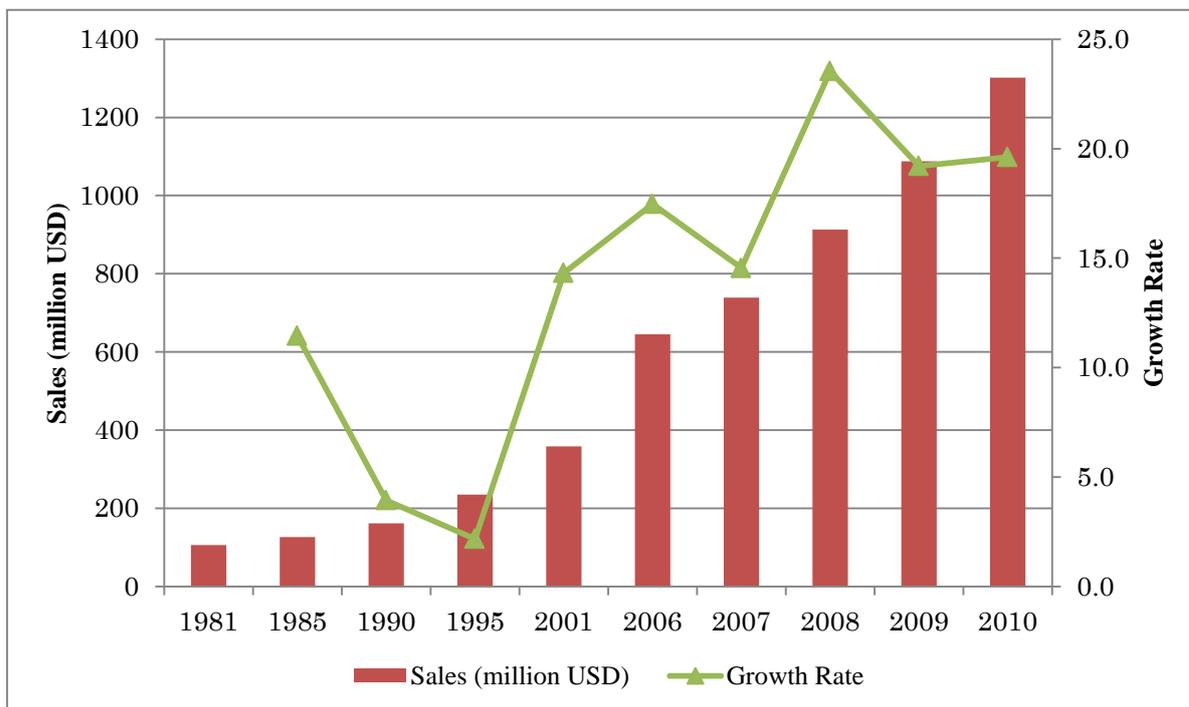
	1964	1985	2000	2011
Number of universities with pharmacy department	1	2	7	27
Number of approved seats	20	40	450	2,267
Types of universities (Public/Private)	Public	public	Public-4 Private-3	Public-6 Private-21

Source: Bangladesh Pharmaceutical Society.

<http://www.bps-bd.org/university/pharmaeducation.html> (accessed October 17, 2011).

Notes: Dhaka University is the first institute offering pharmacy courses since 1964. 'Number of approved seats' means maximum number of students permitted to be accepted by the respective university.

Figure 1 Pharmaceutical production in Bangladesh: 1981-2010



Sources: (a) For the year 1981, 1985, and 1990- Directorate General of Drug Administration (DGDA), Bangladesh (Cited in Chowdhury 2010, 99), (b) for the year 1995- IMS Health (2012), and (c) the remaining of the data are from the survey 2011.