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## Gasoline and diesel pricing reforms in the BRIC countries: A comparison of policy and outcomes

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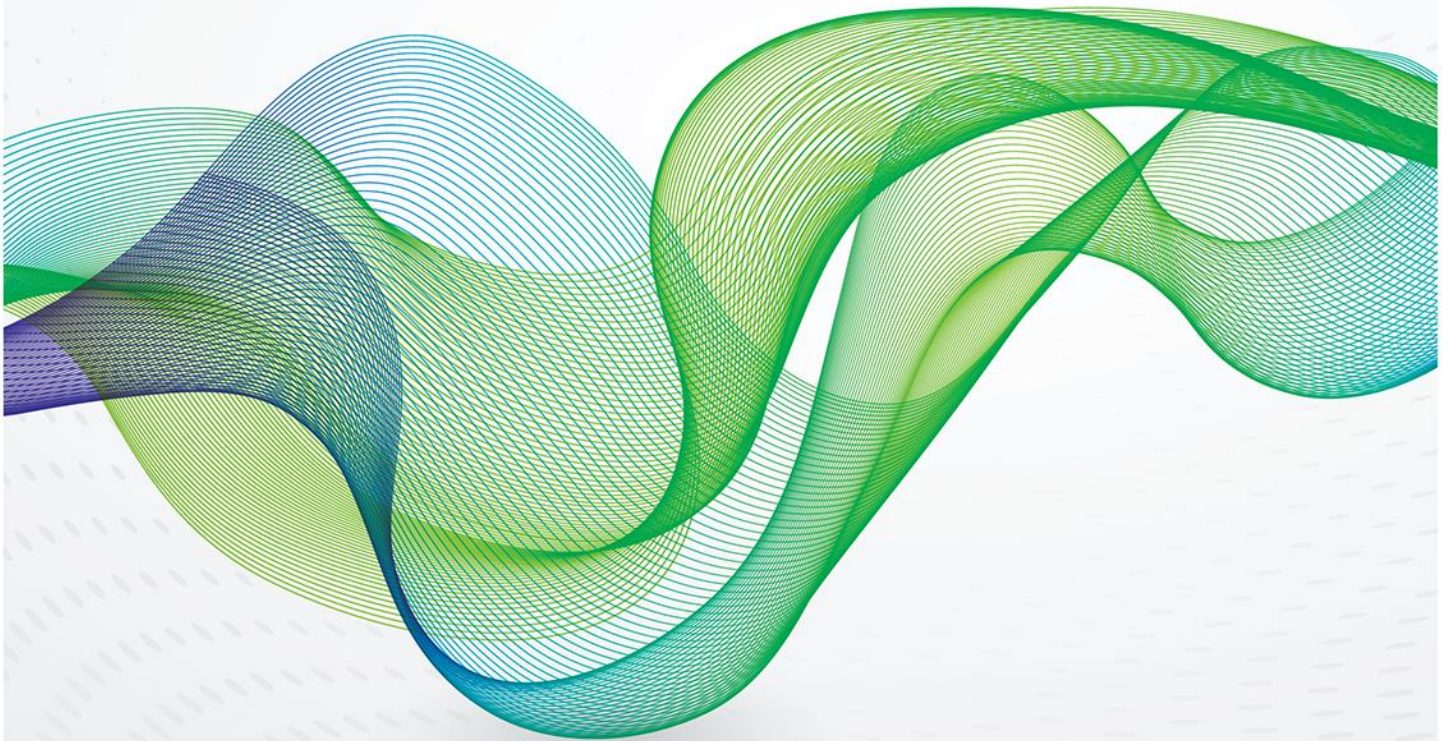
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# Gasoline and Diesel Pricing Reforms in the BRIC Countries: A Comparison of Policy and Outcomes



OIES PAPER: WPM 57

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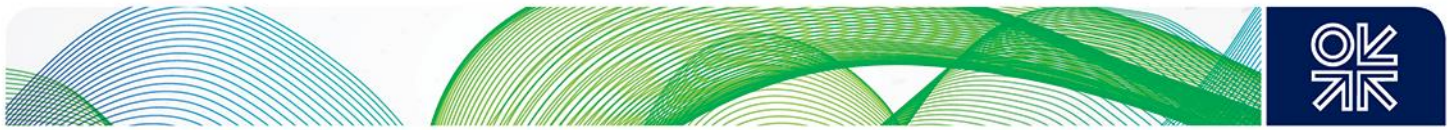
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## 1. Introduction<sup>1</sup>

Recent changes in international oil prices have once again highlighted the issue of petroleum product pricing reforms in a number of non-OECD economies, particularly as the non-OECD now accounts for the bulk of the global growth in consumption of petroleum products. In 2014, oil demand from the non-OECD economies is predicted to overtake OECD oil demand for the very first time. Of this, four economies – Brazil, Russia, India, and China, collectively referred to as the 'BRIC' countries – will account for 45 per cent of the non-OECD countries' total oil demand of 47 million barrels per day (mb/d), and 23 per cent of the world's total oil demand of 91.2 mb/d in 2014. The International Energy Agency in 2013 forecasted that non-OECD oil demand would continue to grow to 2018, by approximately 12 per cent (or 5.7 mb/d), with the BRIC countries continuing to account for roughly half of this growth (IEA, 2013).<sup>2</sup> Of the four BRICs, Russia is the only net oil exporter.

The BRIC<sup>3</sup> countries have some common socioeconomic and demographic characteristics (described in the next section), and also face similar challenges in the implementation of domestic energy policy. One significant common policy stance has been associated with the domestic pricing of petroleum products – specifically, the historical use of price controls to protect households from changes in the international oil price and to prevent rising energy prices from feeding into general inflationary pressures, together with efforts to reform these price controls over time.

Recent fluctuations in international oil prices have posed challenges for the BRIC economies in this regard. From 2004, oil prices rose to historic highs in mid-2008, only to fall precipitously in the last four months of 2008 (Kojima, 2009). After bottoming out in December 2008, oil prices recovered, and over the last three years, the quarterly Brent price has averaged over \$100/barrel. There has been a sharp decline yet again in recent months, with Brent prices falling below \$50 per barrel in January 2015. These fluctuations, combined with the often arbitrary manner in which policy instruments have been used for maintaining price controls to shield consumers from their impacts, have meant that the effects of changes in the international oil price are felt elsewhere in these economies – for instance, on the finances of the National Oil Companies (NOCs), and on the fiscal deficit.

The most interesting feature of this shared policy stance on price controls and pricing reform is that it has led to different outcomes in each of the BRIC economies, particularly in relation to the impacts on downstream investment. This implies that there are factors within the BRICs that have brought about different outcomes for each country's reform processes – processes that are arguably similar in their original policy objectives.

This paper investigates the impacts of gasoline and diesel pricing reforms on downstream investment in the BRICs; it sets out the reform process, draws out these factors, and analyses the impact of domestic pricing policy specifically in terms of its outcomes on investment in the downstream petroleum products sector, for the four BRIC economies. Section 2 presents a brief overview of the BRIC economies, comparing important socioeconomic and energy indicators.

<sup>1</sup> **Acknowledgments:** The authors would like to thank Xin Li and Jim Henderson for their comments on a draft of this paper.

<sup>2</sup> 15.4% for China, 13% for India, 12.4% for Russia, and 8.2% for Brazil. IEA (2013).

<sup>3</sup> The term 'BRIC' was made popular by O'Neill (2001) in a discussion of these economies' growing collective economic and political influence on world affairs through cooperation.

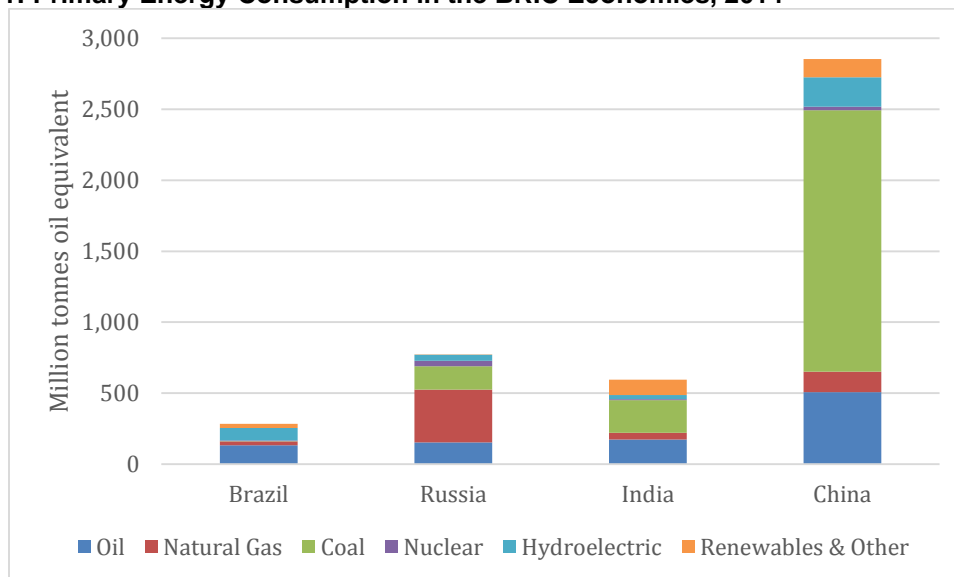


Section 3 discusses the history and evolution of petroleum product pricing reform in the BRICs, showing that the experiences of India and China contrast with those of Brazil and Russia. Section 4 then seeks to explain the extent to which these differences can be analysed through the 'pass-through' of changes in international prices to domestic prices, and Section 5 describes the manner in (and instruments through) which pricing policy has been implemented to this effect. Section 6 looks at the impact of the different measures used by the BRIC countries (in the pursuit of common policy objectives on petroleum product pricing) on downstream investment and on refining; it shows that the outcomes are counterintuitive to expectation. India and China (both net oil importers with a history of price controls) have seen massive expansions in investments in refining capacity, whereas in contrast, Brazil and Russia (which officially liberalized prices in the 1990s and early 2000s) have seen investments in refinery expansions and upgrades severely constrained. Section 7 discusses these findings further and concludes with policy lessons from the experiences of the BRICs.

## 2. Profile of the BRICs

Oil is the second most important primary energy source for Russia, India, and China, and the most important primary energy source for Brazil. Figure 1 shows the position of oil in primary energy consumption across the BRICs.

**Figure 1: Primary Energy Consumption in the BRIC Economies, 2014**



Source: BP (2014)

Although China has the largest primary energy consumption in absolute terms (as shown in Figure 1), Russia has the highest per capita energy consumption, followed by China, Brazil, and India. Figure 1 shows that in China and India, oil is of secondary importance to coal within the primary energy basket; and in Russia, to natural gas. However, oil forms an integral part of the



BRIC economies' trade balances, and this is shown to some extent in Table 1 below, in terms of oil consumption, production, and refining capacity.<sup>4</sup>

**Table 1: Oil Balances and Refining Capacity, 2014**

	Consumption			Production			Refining		
	mb/d	Share %	Ranking	mb/d	Share %	Ranking	mb/d	Share %	Ranking
<b>Brazil</b>	2.97	5.80	6	2.11	2.70	10	2.09	4.6	9
<b>Russia</b>	3.31	3.10	5	10.79	12.90	2	6.03	4.2	3
<b>India</b>	3.73	1.20	4	0.89	0.10	16	4.32	0.9	5
<b>China</b>	10.76	3.80	2	4.18	0.60	4	12.60	5.6	2

Source: BP (2014)

China and India are net importers of oil, as consumption is 6.58 mb/d and 2.83 mb/d higher than production in these economies, respectively. Despite the fact that China and India have largely retained price controls (discussed in Section 3), preferring a gradual approach towards petroleum product price liberalization, Table 1 shows that the existence of price controls has not impacted investments in refining capacity in either country – in China, refining capacity is roughly 200 per cent higher than domestic oil production, and in India it is well over 300 per cent higher than domestic production.

This contrasts with the situation in Brazil and Russia, both of which officially liberalized petroleum product (gasoline and diesel) prices in the 1990s and early 2000s, but where downstream refining capacity has not expanded. Brazil's oil production almost equates with its refining capacity at around 2 mb/d, but is insufficient to meet Brazil's consumption of 2.97 mb/d, implying a need to import petroleum products at international prices. Although Russia, the only 'resource-rich' BRIC country, consumes 7.48 mb/d less than it produces, and is also the world's second-largest producer of petroleum products, the investment problem manifests itself in the declining yield of its refineries; this has become a matter of critical concern (Fattouh and Henderson, 2012). All but one of Russia's oil refineries was built during the Soviet era, with a historical focus as much on producing fuel oil to service the USSR's enormous military and industrial complex as on producing light products for other transport needs (Fattouh and Henderson, 2012).

Table 2 elaborates upon these features of the oil sector as well as on some of the drivers which have shaped them, across the BRIC economies.

<sup>4</sup> We use these indicators as public data on exports and imports of petroleum products was unavailable for all the BRIC countries.





**Table 2: Comparative Economic Indicators**

	<b>Brazil</b>	<b>Russia</b>	<b>India</b>	<b>China</b>
<b>Energy Intensity Index*</b>	0.14	0.33	0.18	0.25
<b>Population (millions)</b>	193.5	141.9	1,190.1	1,331.3
<b>Poverty headcount ratio at national poverty line (% of population)†</b>	15.9	11.0	21.9	10.2
<b>Income share held by highest 20%‡</b>	58.6	47.1	42.8	47.1
<b>Income share held by lowest 20%‡</b>	2.9	6.5	8.5	4.7
<b>Gross Domestic Product (GDP, current US\$ trillion)</b>	2.3	2.0	1.9	8.2
<b>GDP Compound Annual Growth Rate (CAGR) from 2009 to 2012 (annual %)</b>	3.3	3.6	5.8	8.9
<b>GDP per capita (current US\$)</b>	11,340	14,037	1,503	6,091
<b>Net trade in goods and services (current US\$ billion)</b>	-21.7	145.8	-136.1	231.9
<b>Consumer Price Inflation (2013, annual %)</b>	6.2	6.8	10.9	2.6
<b>Official exchange rate (local currency unit per US\$, 2013 average)</b>	2.2	31.8	58.6	6.20
<b>PPP conversion factor (GDP) to market exchange rate ratio</b>	0.78	0.60	0.29	0.56

Source: WDI (2014) (except where indicated)

\* Index calculated from Enerdata as energy consumption divided by GDP at constant purchasing power parities (kgoe/ \$2005). † Xinhua News Agency. ‡ 2009 for Brazil, Russia, China; 2010 for India.

Table 2 shows that China's net trade balance is positive despite being a net oil importer, as its imports are offset by its exports of goods and services. India, on the other hand, has a negative trade balance, which is driven to a large extent by its burgeoning oil import bill, which stood at approximately \$160 billion in 2013–14.

The demand for energy (and specifically for oil) in the BRICs has been driven in recent years by economic growth, as observed in the figures for Compound Annual Growth Rates of GDP in Table 2; these averaged roughly 6 per cent in India and 9 per cent in China from 2009–12, briefly overlapping with the period of financial recession in the OECD economies. Also significant is the high energy intensity of GDP in the BRICs; Table 2 shows that Brazil is the only BRIC economy with an energy intensity of GDP in line with the OECD average (0.138). India's energy intensity of GDP has been declining over the last few years and is currently in line with the world average (0.184).

Despite impressive economic growth in recent years, the BRIC economies face significant challenges in relation to poverty, inequality, and income distribution. Table 2 shows that the share of income held by the top 20 per cent of the population is at least 42 per cent, whereas the share of income held by the lowest 20 per cent is below 9 per cent. Of the BRIC countries, China has made the most progress in poverty reduction, and has the lowest poverty headcount ratio measured at the national poverty line, at 10 per cent. The use of price controls and energy subsidies has been in part a consequence of successive BRIC governments' attempts to address these distributional problems and improve access to energy. However, there is a wealth of



literature which shows that universal price subsidies are generally regressive and inefficient (Kojima, 2013; del Granado et al., 2010). In the next section we discuss the history of these policy decisions in the BRICs.

### 3. History of Petroleum Product Pricing in the BRIC Countries

Despite attempts by successive governments to eliminate distortions in pricing, price controls have remained an almost constant feature in petroleum product pricing across the BRIC economies. The triggers for reform in Brazil, Russia, and India have been related primarily to the deterioration in their fiscal balances, whereas in China, the motivation for pricing reform is more generally related to broader economic reforms under its 'State Managed Marketization' approach (Chen, 2012).

Whilst Russia and Brazil have officially liberalized the pricing of petroleum products, India<sup>5</sup> and China have retained price controls. We summarize the history of pricing reforms in the BRICs below.

#### 3.1 Brazil and Russia: From Liberalization to Implicit Price Controls

Although Brazil and Russia both officially deregulated and liberalized petroleum product prices in the 1990s/early 2000s, both economies demonstrate evidence of the use of implicit price controls by the government in the downstream and retail sectors.

##### *Russia*

Russia was the first BRIC country to officially deregulate petroleum product prices (in the 1990s), through a comprehensive programme of reform of its oil industry. This occurred during a wave of privatization and liberalization in the Russian economy and oil market, in response to the economic crisis following the collapse of the Soviet Union. Oil pricing reforms were initially excluded from the general price liberalization of January 1992, due to concerns over inflation, windfall profits for the 'oil barons', and the potential impact on Russia's market share in global oil markets (McPherson, 1996). However, a process of steady reform was soon initiated, and within a relatively short period of 18 months, all administrative controls, limitations on profit margins, and sales allocations for the domestic market were largely ended (McPherson, 1996). Trade liberalization then followed, wherein oil export quotas were abolished and oil export duties, which were seen as driving a wedge between international and domestic prices, were reduced (McPherson, 1996). On the face of it, Russia managed to achieve this deregulation within a very short space of time; at the beginning of the reform period in 1992, Russia's domestic oil price had been set at less than 5 per cent of the international price of crude oil, but by 1995 the domestic oil price was at parity with the international price (McPherson, 1996).

Russia's petroleum product price liberalization was effectively reversed during Vladimir Putin's first tenure as president of Russia, when state control was implicitly re-established over the oil and gas industry. This was a central tenet of what has been referred to as the 'Putin Doctrine', aimed at recovering the state's political, economic, and geostrategic assets following the collapse of the Soviet Union in 1991 (Aron, 2013). It has been argued that this state control was re-established solely through one state-owned enterprise: essentially, the key to the effective state

<sup>5</sup> India officially deregulated petrol prices in June 2010 and diesel prices in October 2014. However, the other two main petroleum products, LPG and kerosene, remain subsidized.



takeover of more than half of Russia's oil output was a dramatic expansion of the majority state-owned company Rosneft, which went from representing a mere 4 per cent of the country's oil output in 1998, to 40 per cent in 2014 (Aron, 2013). Rosneft's rise as a major player in the Russian oil sector has been described as being indicative of the Russian government's wider influence in its energy sector (Fattouh and Henderson, 2012). Although the policy of deregulated petroleum product prices has not been officially reversed, government influence is frequently exercised through implicit pressure on oil companies, and the use of export taxes (discussed in Section 5).

### **Brazil**

Petroleum product subsidies were first instituted in Brazil in the 1960s, primarily to 'equalize national access to energy' (de Oliveira and Laan, 2010).<sup>6</sup> The process began with LPG, and by the 1970s diesel and fuel oil were also being subsidized. Gasoline was considered a luxury good and was priced at the refinery gate substantially over its import parity price,<sup>7</sup> with the higher revenue used to cross-subsidize other petroleum products. These subsidies were gradually extended to ethanol. An oil price stabilization fund was established in the 1970s, following the oil price shocks, to mitigate the effects of price volatility. By the 1980s, subsidies began to be provided explicitly at the refinery gates for LPG and diesel, in addition to the cross subsidy from gasoline. The oil fund remained perpetually in deficit, despite government announcements that it would be financed and balanced through tax revenues which would eventually be used to reimburse the state NOC, Petrobras, for any losses incurred from the sale of crude at prices below import parity.

Brazil liberalized its energy market in the 1990s as part of a broader shift in government policy away from import substitution. Subsidies were removed in a phased manner, beginning with politically weak stakeholders, and ending with politically stronger stakeholders such as the ethanol producers. Simultaneous with subsidy reform, upstream regulation was also reformed, requiring Petrobras to compete with international oil companies and private firms for exploration acreage. Petroleum product liberalization in Brazil was effectively completed in 2002, and there is officially no government setting of prices in the chain of production and marketing of fuels (de Oliveira and Laan, 2010).

However, concerns over inflation led to the implicit reintroduction of price controls in the 2000s – this became apparent during the escalation in international oil prices in 2007–8. Similar to the position of Rosneft in Russia, Petrobras (Brazil's NOC) has been key to reinstating this implicit price control and is now responsible for 98 per cent of the country's refining activity, with a dominant market share. According to Petrobras's 'Form 20-F' filing with the Securities and Exchange Commission (SEC) on 26 April 2013,<sup>8</sup> the Brazilian federal government (as Petrobras's controlling shareholder) may cause the company to pursue macroeconomic and social objectives that may have a material adverse effect on the company. Brazilian law requires the Brazilian federal government to own a majority of Petrobras's voting stock; it will thus have the power to elect a majority of the members of the Board of Directors and, through them, a majority of the executive officers who are responsible for the day-to-day management of the company. As a result, Petrobras may engage in activities that give preference to the objectives of the Brazilian federal government rather than to its own economic and business objectives. In particular, Petrobras continues to assist the Brazilian federal government in ensuring that the supply and

<sup>6</sup> This discussion draws from de Oliveira and Laan (2010).

<sup>7</sup> The import parity price (IPP) equals the price of imports, including international transport costs and tariffs.

<sup>8</sup> Form 20-F is an SEC filing submitted to the US Securities and Exchange Commission; it is used by foreign private issuers to provide company information. See SEC (2013).



pricing of crude oil and oil products in Brazil meets Brazilian consumption requirements. As a result of decisions made by the Brazilian federal government, Petrobras has, and may continue to have, periods during which the products will not be at parity with international product prices.

This has directly affected Petrobras's financial health, with the rating agency Moody's downgrading its debt ratings in 2013 due to the expectation of a large negative cash flow.<sup>9</sup>

Additionally, the government has used the revenues from levies on the marketing of petroleum products to finance implicit subsidies. Federal taxes have also been frequently adjusted during oil price spikes to maintain the stability of petroleum product prices for final consumers. This use of a myriad of implicit measures has resulted in an opaque situation, making it difficult to estimate the true level of subsidies.

### 3.2 India and China: 'State-Managed Marketization'<sup>10</sup>

In India and China, the process of pricing reforms has been slower; governments have played an explicit role in determining the extent of deregulation and liberalization in these countries. Chen (2012) refers to this as 'state-managed marketization' (with specific reference to China), and defines it in the petroleum sector as a process wherein the state has recourse to a set of mixed means to divert the oil sector from state control to market operation, but in that process it is up to the state to decide and adjust the extent and scope of market activities. Governments of both countries have, in the past, frequently been compelled to withdraw reforms and reinstate price controls – this has been due to inflationary concerns in China and to concerns over the loss of electoral support in India.

#### *India*

Price controls on petroleum products for the domestic market were instituted in 1973, following the oil price shock, through the 'Administrative Pricing Mechanism' (APM) system, which prevented Oil Marketing Companies (OMCs) from passing on increases in international crude prices. The prices of gasoline, diesel, LPG, and kerosene were all subject to these controls. The APM was administered through an 'Oil Pool Mechanism' which consisted of three main oil pool accounts (Crude Oil Price Equalization Account, Cost and Freight Account, and Product Price Adjustment Account). These accounts, along with the price-setting rules, collectively made up the system of price controls on petroleum products (Fattouh et al., 2013; GoI, 2010). In theory, the oil pool accounts were intended to moderate the net effect of increases in the international price of oil by offsetting each other – in a sense mimicking the Balance of Payments mechanism (Fattouh et al., 2013). In practice, however, this was rarely the case as adjustments often required political sanction and the oil pool accounts thus remained in deficit. The APM led to a subsidization of the prices of both inputs (such as petroleum products sold as intermediate goods to industry – for example fertilizers and power) and outputs (such as petroleum products) rather than a direct output subsidy (to the consumer), resulting in a distorted pricing system (Fattouh et al., 2013).

<sup>9</sup>According to Moody's, 'Petrobras's funding needs and leverage will also be pressured by continuing losses in its downstream operations ... Petrobras's refineries are running at higher rates and are increasing output, reducing the need for product imports ... Still, the downstream sector is generating sizeable losses and it is not clear whether sufficient further price increases will be forthcoming, given political pressures on the government and its focus on controlling inflation.' See [https://www.moody.com/research/Moodys-downgrades-Petrobras-long-term-debt-ratings-to-Baa1--PR\\_283265](https://www.moody.com/research/Moodys-downgrades-Petrobras-long-term-debt-ratings-to-Baa1--PR_283265).

<sup>10</sup> Chen (2012).



In 2002, following a wave of reforms in the upstream sector, the government officially abolished the APM system and attempted to adopt a regulated increase in retail prices of petroleum products to international (import) parity. Kerosene and LPG, important fuels for lighting and cooking amongst residential and rural consumers, continued to be subsidized on the budget and were not allowed to exceed 33 per cent and 15 per cent of their respective import parity prices. This attempt was short-lived, and as the international oil price began an upswing in 2004, price controls were reinforced; in 2004, a 'price band' mechanism was introduced which permitted the OMCs to revise retail prices within a band of  $\pm 10$  per cent of a 12 month rolling average of the international oil price (GoI, 2010). This band was replaced in 2005 by Trade Parity Pricing for gasoline and diesel at the refinery gate. Although the government adopted Trade Parity Prices<sup>11</sup> OMCs were required to maintain low retail prices. The difference between the Trade Parity Price and the retail price of petroleum products came to be termed 'under-recovery', and represents the primary instrument for subsidizing fuels in India.

In adopting this instrument, the fiscal burden of subsidies was shifted from the government budget to that of the OMCs. Various measures were resorted to in dealing with the growing subsidy burden without raising petroleum product prices. In addition to on-budget subsidies (relatively small in proportion) and under-recoveries, one of these measures required public sector upstream companies to provide discounts on the sale of crude oil to the OMCs (Fattouh et al., 2013). Off-budget 'oil bonds'<sup>12</sup> were also issued to the OMCs to keep them solvent and, essentially, to disguise the fiscal impact of subsidies, in an attempt to bring the fiscal deficit down to 3 per cent. Oil bonds did not resolve liquidity problems for the OMCs, as they did not count towards the Statutory Liquidity Ratios of banks and financial institutions (demand for them was therefore low), and they also had to compete with numerous farm and fertilizer bonds in a saturated market (IEA, 2009; Clarke and Graczyk, 2010). Another measure undertaken to mitigate the impact of price volatility was the adjustment of federal excise and customs duties on petroleum products by the federal government. However, the structure of fiscal federalism in India meant that the continued indirect taxation of petroleum products by states at differential rates countered the effectiveness of this strategy (Fattouh et al., 2013).<sup>13</sup>

The trigger for reforms occurred in 2008, when a government-appointed committee (the Chaturvedi Committee) recommended that subsidies ought to be targeted at households living below the national poverty line and that direct methods such as direct cash transfers or smart cards should be used rather than the existing Public Distribution System (Fattouh et al., 2013).<sup>14</sup> A new system of delivering subsidies was trialed during 2009 and early 2010 – the 'Unique Identification Number' (UIN) – which involved the collection of biometric information from, and assignment of a social security number to, every citizen, allowing the federal government to transfer subsidy amounts directly into eligible consumers' bank accounts. The UIN was designed to essentially bypass the Public Distribution System and the associated problems of leakages, thus reforming prices without breaking the 'social contract' (Fattouh et al., 2013).

<sup>11</sup> The Trade Parity Price (TPP) is a weighted average of import and export parity prices in the ratio of 4:1, the Export Parity Price (EPP) is the price of an exported good, excluding international transport costs and tariffs.

<sup>12</sup> 'Oil bonds' were issued as off-budget debt and therefore did not immediately show up as part of the fiscal deficit.

<sup>13</sup> Indian states are allowed to set their own rates of value-added tax; as these make up a majority of their revenues, adjustments at the federal level had little impact on retail prices at the state level. It was estimated that roughly 20% of the retail price of petroleum products at the time could be attributed to state taxes (GoI, 2010).

<sup>14</sup> The Public Distribution System is a network of retail outlets managed by the Government of India. It distributes subsidized food and non-food items to poor households. The system has attracted wide criticism for its leakages and for its failure to accurately target the intended beneficiaries of subsidies.



Gasoline prices were liberalized at the retail level in June 2010. A programme for the deregulation of diesel prices in stages was initiated in January 2013, when the prices of diesel for bulk (large/industrial) consumers were liberalized, and OMCs were permitted to raise the retail prices of diesel every month up to the point where the ‘under-recovery’ from diesel (which totalled US\$17 billion in 2012) was completely wiped out (Fattouh et al., 2013). This programme continued following the election of a new government in May 2014, and by September 2014 under-recoveries on diesel had been eliminated, with the government deregulating diesel prices at the retail level by October 2014. The prices of LPG and kerosene, however, continue to be controlled. The finances of India’s NOCs and OMCs have shown a marked improvement since the reform of gasoline and diesel prices.

### China

Prior to 1981, oil was sold at a single state-controlled price in China (Chen, 2012). In 1982, a tiered pricing system was introduced to address the capital constraints faced by Chinese NOCs; under this, there were two prices for petroleum products. The ‘in-quota’ price was a lower price (below the international crude price) set by the government for specified quantities or proportions of refined products sold within the domestic market (primarily to the military, the agriculture sector, and large state-owned enterprises). The ‘market’ price<sup>15</sup> was the price freely permitted for any surplus (which was about 10 per cent of total supply in 1983) beyond the quota set by the state (Chen, 2012).<sup>16</sup> China became a net oil importer in 1993, and as a result of continued capital constraints faced by the Chinese NOCs, the government further deregulated prices, allowing a greater proportion (roughly 65 per cent) of refined products to be sold at market (international) prices (Chen, 2012).

This partial deregulation led to two adverse effects: smaller provincial oil companies benefited from price arbitrage by buying ‘in-quota’ crude oil from the NOCs at prices lower than international ones, and then selling refined product at higher ‘market’ prices. This perpetuated the deterioration of the NOCs’ finances. Secondly, inflation skyrocketed, reaching 26 per cent in 1994, which far exceeded the government’s ‘moderate inflation’ benchmark of 5–9 per cent (Chen, 2012). These unintended impacts resulted in the government re-imposing explicit price controls in 1994; the tiered system was abolished, and the government set the prices of both crude oil and refined products in each city and province (Chen, 2012).

Along with the re-imposition of price controls, the government adopted a ‘command and control’ approach (Chen, 2012) aimed at resolving capital-related problems and underinvestment by NOCs. It did this by imposing import bans and strict licences for oil trading together with stringent guidelines on the supply of crude oil from oilfields to specified consumers. Within the system of price controls, the government increased the prices of crude oil (which remained below international prices) and increased the wholesale prices of refined products. However, the provinces were permitted to set the retail prices of refined products and this led to a situation wherein they were higher than the average international price of refined products in some cases (Chen, 2012).<sup>17</sup> The main beneficiaries of these measures were China’s NOCs.

<sup>15</sup> This was a price aligned with the international price of crude oil.

<sup>16</sup> Oil companies could sell their surplus production at market prices only after they had fulfilled the centrally mandated quotas of quantity.

<sup>17</sup> In 1994 domestic prices of gasoline and diesel were, respectively, US\$380/t (2350 y/t) and US\$307/t (1900 y/t) while international prices were about US\$277 (1715 y/t) and US\$213 (1318 y/t). (Chen, 2012; Maekawa and Kawamura, 2010).



In 1998, China began a landmark process of 'price integration'. This had a longer-term view of making its NOCs internationally competitive, and the short-term aim of curbing illegal imports of refined products (which occurred frequently, due to the gap between international and domestic prices). The government stipulated that domestic oil prices would be adjusted when the international price of refined oil fluctuated beyond a range of 8 per cent, and also changed the benchmark (Singapore price) to which domestic prices were pegged to a basket reflecting prices in Singapore, Rotterdam, and New York (Chen, 2012).<sup>18</sup> These pricing reforms occurred alongside the corporate restructuring and partial commercialization of China's main NOCs – CNPC, CNOOC, and Sinopec – as part of broader institutional reform. However, the upswing in the international oil price which began in 2003 arrested the pricing reforms. Price rises were once again prevented or controlled by the government (NDRC) to protect domestic consumers and therefore domestic prices did not rise in tandem with changes in the international benchmark during this period.

Taking advantage of the drop in international crude prices in 2008, the government then went further with pricing reform in 2009, linking changes to gasoline and diesel prices directly to changes in crude oil prices. Under this system, retail prices were to be based on global crude oil prices, domestic refining costs, reasonable distribution costs, an appropriate margin, and taxes (Maekawa and Kawamura, 2010). In practice, this reform proved difficult to implement on a regular basis, but comprised a step towards the government's longer-term reform goals. In March 2013, China moved closer than ever to the full marketization of energy pricing by shortening the price adjustment cycle from 22 working days to 10 working days, cancelling the 4 per cent floating band for oil price changes, and adjusting the varieties of crude used to calculate changes in the domestic oil price.<sup>19</sup> Notably, the government retained explicit control over the reform process, undertaking measures to protect the competitiveness of the NOCs. Between June 2014 and December 2014, China carried out eight downward adjustments to the prices of gasoline and diesel, reflecting the close alignment of domestic and international price movements.

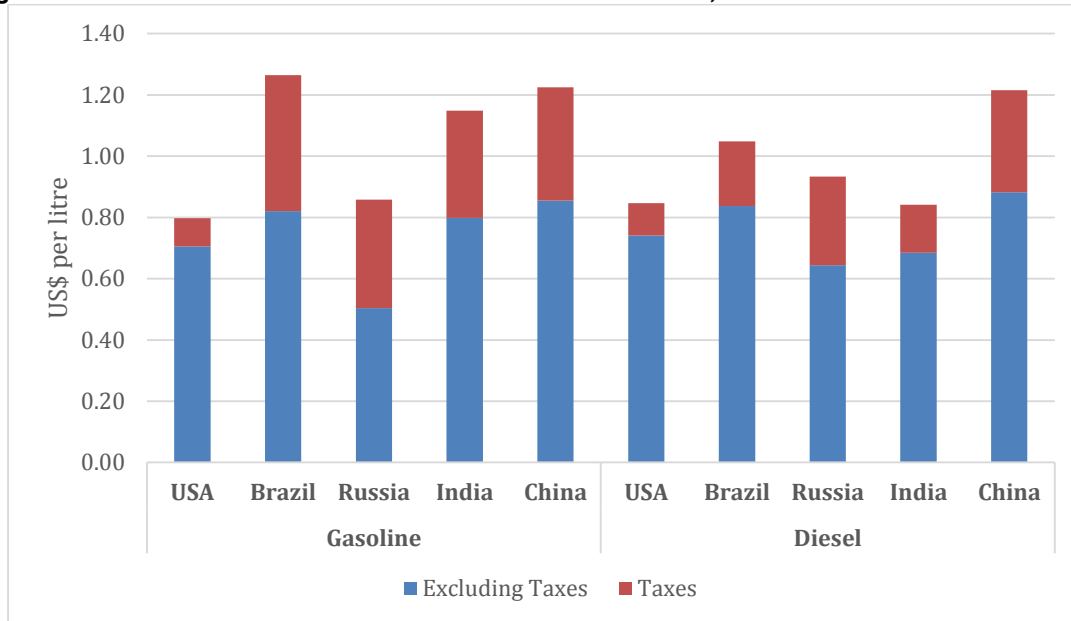
### **Summary**

The history of petroleum product pricing reforms described above demonstrates a dichotomy of experience amongst the BRICs. While in Russia and Brazil, prices were officially liberalized, implicit price controls were re-imposed primarily through the NOCs. As Russia is a net oil exporter by a comfortable margin, the impact of this strategy on the finances of Rosneft has arguably been less adverse than it has been on Petrobras. In the cases of China and India, price controls were retained by the government, with gradual liberalization. Although the impacts on Chinese and Indian NOCs were negative for a long period, their finances have gradually improved following targeted efforts by their governments on price deregulation.

<sup>18</sup> The range of 8% was later tightened to 4%.

<sup>19</sup> See 'Oil pricing reform spearheads China's marketization push', China Internet Information Center, 28 March 2013, [www.china.org.cn/business/2013-03/28/content\\_28390094.htm](http://www.china.org.cn/business/2013-03/28/content_28390094.htm).

**Figure 2: Retail Prices of Gasoline and Diesel in the BRICs, June 2013<sup>20</sup>**



Source: Authors' calculations (see footnote 26)

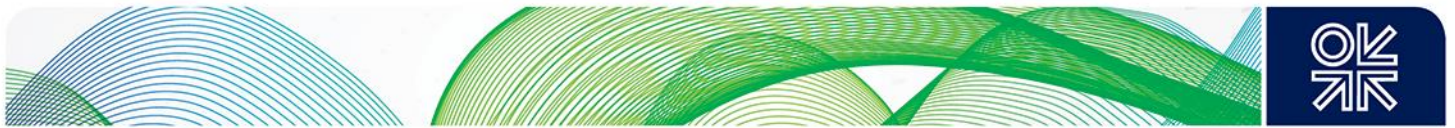
Figure 2 shows a snapshot of the prices of gasoline and diesel in the BRICs compared with those in the USA, where prices are set in competitive markets. Fuel quality varies from country to country, in terms of octane (for gasoline) or cetane (for diesel), as well as other attributes – for instance the level of sulphur (Bacon and Kojima, 2006).<sup>21</sup> It is also important to note that in Brazil, gasoline sold at filling stations is mandatorily blended with 25 per cent of anhydrous ethanol, while diesel is blended with 5 per cent of biodiesel (Bacon and Kojima, 2006). Nevertheless, the range of price variation between countries is greater than can be accounted for by fuel quality differences, implying that the differences can be attributed in large part to the pricing mechanisms that are in place across the BRICs (Bacon and Kojima, 2006).

In order to understand these differences in pricing mechanisms and their effects further, the next section examines the extent to which changes in international prices have been passed through to domestic prices in the BRIC countries.

<sup>20</sup> As of 29 June 2013 except for Brazil (for which we use the average price in the final week of June), and the USA (for which we used monthly data). Sources: Authors' calculation based on exchange rates published by the IMF; build-up of pump prices published by the Petroleum Planning and Analysis Cell (India), Petrobras (Brazil), and Energy Information Administration (USA); pump prices published by ANP (Brazil), PetrolPlus (Russia), and Beijing Municipal Commission of Development and Reform – BJPC (China). Taxes considered: India – Excise Tax, VAT, Education Cess, and Air Ambient Charges; Russia – Excise Tax and VAT (Alliance Oil); Brazil – CIDE, PISCOFINS, and ICMS; China – Consumption Tax, VAT, Educational Tax, and Construction Tax (Deloitte). Updated (2014) data for all BRICs was not available.

<sup>21</sup> This paper does not attempt to adjust prices to account for these differences in fuel attributes as it is beyond our scope.





#### 4. The Effects of International Oil Price Changes on the BRICs' Domestic Pricing

A key indicator of the BRIC countries' responses to changes (increases) in international oil prices is the extent to which these have been passed on to consumers through retail prices – or prices at the pump (Bacon and Kojima, 2006). Broadly, there are two methods of measuring the effects of international price changes on domestic prices. The first is to carry out an absolute comparison between movements in domestic retail prices of gasoline and diesel and their relevant international benchmark prices. However, this does not provide a clear picture of the extent to which international prices are passed through to domestic consumers.

A second additional method, following Bacon and Kojima (2006), is to use a *relative* measure of these changes, through the computation of a Pass-Through Coefficient (PTC).<sup>22</sup> In general, given the scale of differences between countries and the lack of sufficient information needed to split the changes in retail prices into the product cost, subsidy, and tax components, only a broad or overall analysis of pass-through is possible (Bacon and Kojima, 2006). To standardize the data and allow comparisons to be made between countries, the PTC is defined as the ratio of the change in domestic retail prices over the relevant time period (measured in local currency) to the change in the appropriate comparable international product price benchmark (converted to local currency), with the international benchmark being measured one period before the domestic retail price (Bacon and Kojima, 2006).<sup>23</sup> This measure also reflects the effects of changes in the exchange rate on the cost of imported products. The pass-through is measured in local currency rather than the US dollar equivalent because it is the effect on local currency, rather than the dollar equivalent, that concerns governments (Bacon and Kojima, 2006).

Data on the domestic retail prices of gasoline (petrol) and diesel was accordingly collected for the BRICs, for the period covering the beginning of the first quarter of 2008 to the end of the first quarter of 2013.<sup>24</sup> Similarly, data was collected for the same period for a set of international benchmarks that are best suited for comparison with domestic gasoline and diesel prices for each of the BRIC economies; this included the US Gulf (USG) price benchmark for Brazil, the north-west Europe (NWE) price benchmark for Russia, the Arab Gulf price benchmark for India, and the Singapore price marker for China. We use monthly data – therefore the prices and exchange rates represent a monthly average for each country. Where country-wide averages are unavailable, we use average prices in the capital city. The data is plotted in Figures 3-6 (with explanation below) to show absolute price movements. Additionally, we compute the PTC for the entire period 2008–13 using the following formula:

$$\text{Pass-Through Coefficient (PTC)} = \frac{\Delta \text{ retail price in domestic market}}{\Delta \text{ f.o.b. international benchmark price}}$$

The value of the PTC, in the absence of changes in government policy or in the domestic market, will be at least unity where all international price rises are fully passed through, and no other

<sup>22</sup> Bacon and Kojima (2006); Kojima (2009; 2012; 2013).

<sup>23</sup> This allows a lag for changes in international prices to pass through to domestic prices. The literature shows that increases are typically passed on to consumers within three to five weeks (Meyler, 2009; Kojima, 2009).

<sup>24</sup> Specifically, f.o.b. prices were taken from the period January 2008 to May 2013 and domestic retail prices from February 2008 to June 2013.



factors in the mark-up are affected by the rise in the cost of oil (Bacon and Kojima, 2006). Where there are *ad valorem* taxes, or transportation cost margins that increase with rising oil prices, then the impact on end consumers of a full pass through would be expected to be more than unity (Bacon and Kojima, 2006). Where the increase in imported product costs forces increases in efficiency, or decreased domestic margins, then the impact of the pass-through would be lowered (Bacon and Kojima, 2006). A policy of increasing subsidies or of decreasing taxes would also tend to lower the PTC (Bacon and Kojima, 2006). However, a high PTC does not necessarily indicate that the product is no longer sold below cost or without subsidy – where the starting price is very low, the country could increase domestic prices by more than the rate at which prices on the world market increase, while still leaving a subsidy element to be financed (Bacon and Kojima, 2006). A PTC value in the neighbourhood of unity implies that the government has undertaken measures to ensure that the fiscal burden is neither increasing nor decreasing markedly, given that the volume of consumption is unlikely to be strongly affected by the change in domestic prices (Bacon and Kojima, 2006).

The existence of *ad valorem* taxes in the BRIC countries implies that if an increase in international oil prices were to be fully passed through, holding everything else constant, the PTC would be expected to be more than unity. Therefore, the expected (or theoretical) PTC values which reflect a full pass through of international price changes including the respective increases in *ad valorem* taxes for the BRICs (and holding all other factors constant), would be roughly 1.28 for gasoline and 1.14 for diesel in Brazil,<sup>25</sup> 1.18 for both fuels in Russia,<sup>26</sup> 1.12 for gasoline and 1.20 for diesel in India,<sup>27</sup> and 1.17 for both fuels in China.<sup>28</sup> A PTC greater than 1 could reflect any of several possibilities: subsidy reduction, higher fuel taxes, higher costs in the supply chain, or higher profit margins. Similarly, a PTC less than 1 could imply any combination of fuel tax reduction, greater subsidies, lower costs of supply, or lower profit margins for oil companies. Acknowledging these limitations, the main purpose of the PTC is to confirm the existence of direct or indirect government intervention in the pricing system, given that some prices have been officially liberalized in the BRICs for the period covered.

Figures 3 to 6 below graphically show absolute movements in domestic prices and international benchmarks of gasoline and diesel in each of the BRICs, as well as the expected (theoretical) and actual PTCs for the period 2008–13. The inclusion of absolute prices allows us to observe how close the retail price in the domestic market is to the international f.o.b. price. Typically, due to the costs of transport, storage, retailing, taxes, and profit margins, retail prices should be considerably higher than international f.o.b. prices in deregulated markets. If retail prices and international f.o.b. prices are relatively close, this is likely to signal the existence of a subsidy.

We first consider Figures 3 and 4 – India and China – both of which have experienced a gradual move towards the removal of price controls, with governments explicitly involved in the price reform process.

<sup>25</sup> An average VAT rate of 28% for gasoline and 14% for diesel (Petrobras, 'Products Price Composition', June 2013, [www.petrobras.com.br/en/products/price-composition/](http://www.petrobras.com.br/en/products/price-composition/)).

<sup>26</sup> A VAT rate of 18% on gasoline and diesel ('Tax and Legal Guide to the Russian Oil and Gas Sector', ZAO Deloitte & Touche CIS, 2012; also see 'Russia VAT Essentials', KPMG, <http://www.kpmg.com/global/en/issuesandinsights/articlespublications/vat-gst-essentials/pages/russia.aspx>)

<sup>27</sup> Taking the VAT rate for Delhi, which is 20% on gasoline and 12.5% on diesel (Petroleum Planning & Analysis Cell – Price build-up of petroleum products, [http://ppac.org.in/content/149\\_1\\_PricesPetroleum.aspx](http://ppac.org.in/content/149_1_PricesPetroleum.aspx)).

<sup>28</sup> A VAT rate of 17% on gasoline and diesel ('Global oil and gas tax newsletter', Deloitte April 2013, <http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Energy-and-Resources/dtl-er-oil-gas-tax-newsletter-april-2013-issue-08082013.pdf>).

**Figure 3: India – Absolute Movements in Domestic Prices versus International Benchmarks and Pass-Through Coefficient (PTC), 2008–13**

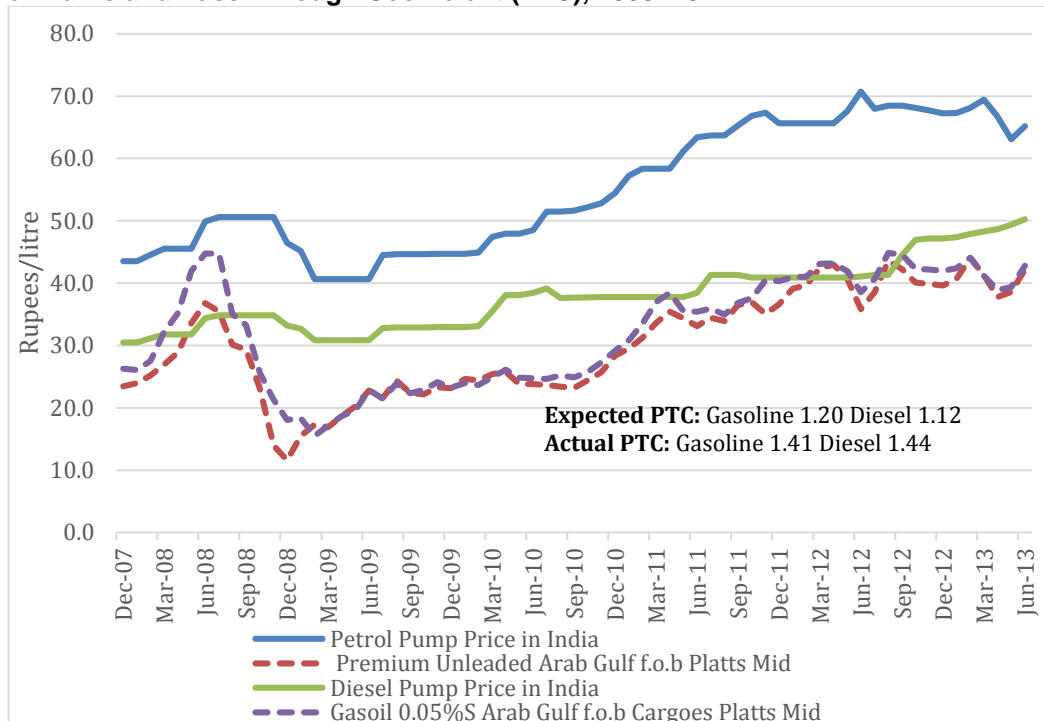
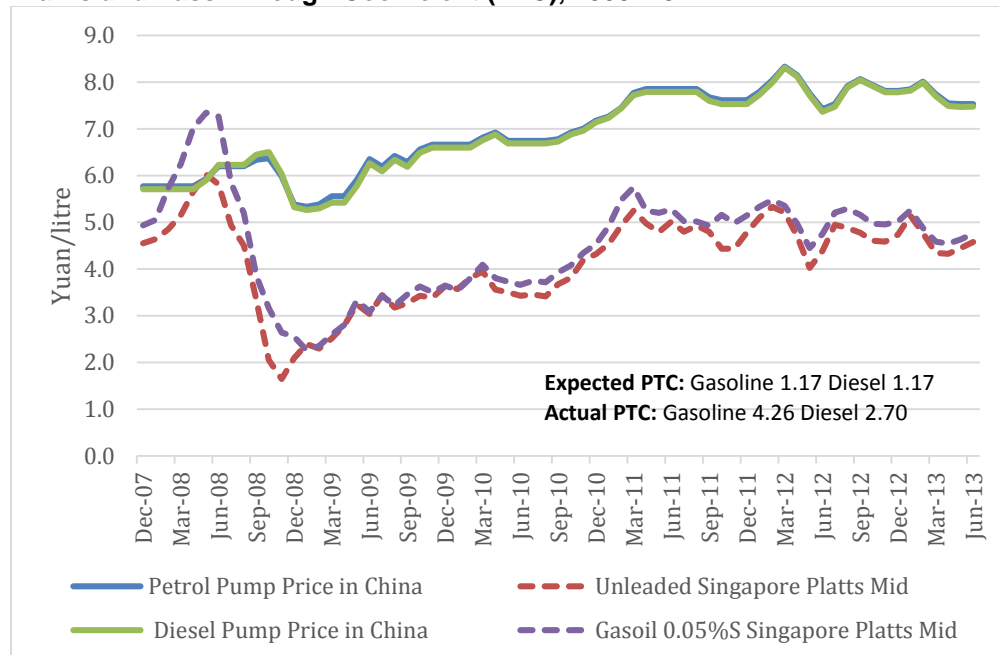


Figure 3 shows the retail prices of gasoline and diesel in India’s domestic market as well as their appropriate comparative international benchmarks (Arab Gulf prices) measured in local currency (Rupees per litre) on the vertical axis. It also shows the expected or ‘theoretical’ value (as discussed above) of the PTC for gasoline (1.20) and diesel (1.12) and the actual PTC calculated for the period 2008–13 for gasoline (1.41) and diesel (1.44). Similarly, Figure 4 shows the retail prices of gasoline and diesel in China’s domestic market as well as their appropriate international benchmarks (Singapore price) measured in local currency (Yuan per litre) on the vertical axis. Figure 4 also shows the expected or ‘theoretical’ value (as discussed above) of the PTC for gasoline (1.17) and diesel (1.17) and the actual PTC calculated for the period 2008–13 for gasoline (4.26) and diesel (2.70).

Figure 3 shows that in India, whilst the retail price of gasoline in the domestic market has been far higher than the comparable international f.o.b. gasoline price benchmark (which conforms to expectation), the retail prices of domestic diesel and the comparable international f.o.b. diesel price benchmark almost converged between March 2011 and September 2012, implying the existence of strong price controls. However, the PTC for the entire period 2008–13 was substantially higher than the expected or ‘theoretical’ values for both gasoline (1.41) and diesel (1.44) reflecting the Indian government’s attempts to gradually phase out price controls. It should also be noted that diesel price deregulation only began in January 2013, the point at which Figure 3 shows the domestic retail price of diesel and the international f.o.b. price of diesel beginning to diverge again, corroborating the government’s policy efforts at reform.

**Figure 4: China – Absolute Movements in Domestic Prices versus International Benchmarks and Pass-Through Coefficient (PTC), 2008–13**



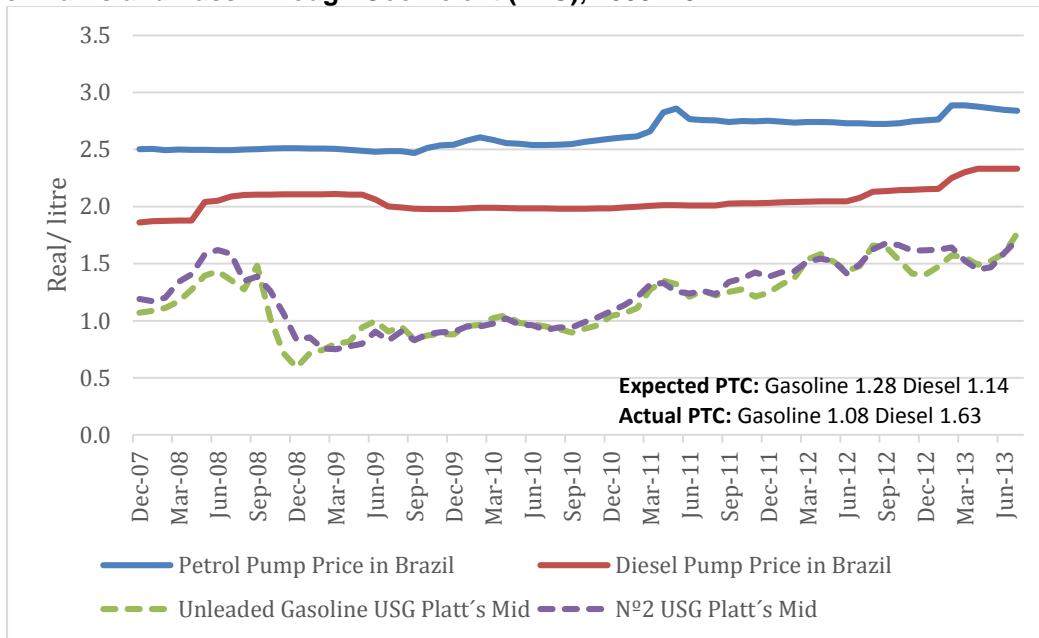
Source (3 & 4): Authors' calculations based on pump prices published by Beijing Municipal Commission of Development and Reform (BJPC) for Beijing and by Petroleum Planning and Analysis Cell (PPAC) for Delhi; Singapore and Arab Gulf prices published by Platts; Exchange rates published by IMF.

In contrast, Figure 4 shows a strong divergence between the domestic retail prices of gasoline and diesel and the international f.o.b. prices, reflecting the Chinese government's stringent efforts at price reform through its 'state managed marketization' approach. Moreover, the actual Pass-Through Coefficients for gasoline and diesel over the period 2008–13 were far higher than expected, at 4.26 and 2.70, implying that domestic retail prices increased by far more than the increase in international f.o.b. benchmark prices. It is also worth noting, however, that China experienced an exchange rate appreciation during this period, which meant that the impact of increases in international prices was, in fact, lower in equivalent local currency terms. This implies that China may have taken advantage of its stronger currency position (and improved terms of trade) to increase its domestic retail prices by more than the increase in international prices, to bring about a significant correction in the domestic pricing system.

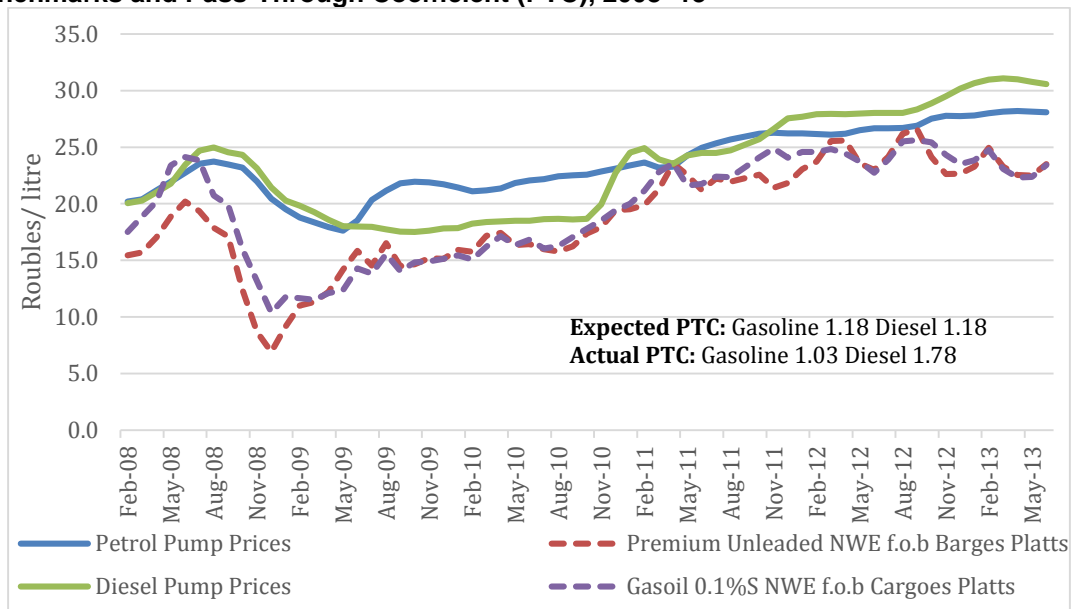
Next, we consider Figures 5 and 6 – Brazil and Russia – where prices were officially liberalized in the 1990s/2000s and where there are no official or explicit government controls on, or intervention in, prices. Figure 5 shows the retail prices of gasoline and diesel in Brazil's domestic market as well as their appropriate comparative international benchmarks (US Gulf prices) measured in local currency (Real per litre) on the vertical axis. It also shows the expected or 'theoretical' value (as discussed above) of the PTC for gasoline (1.28) and diesel (1.14) and the actual PTC calculated for the period 2008–13 for gasoline (1.08) and diesel (1.63). Similarly, Figure 6 shows the retail prices of gasoline and diesel in Russia's domestic market as well as their appropriate international benchmarks (north-west Europe price marker) measured in local currency (Roubles per litre) on the vertical axis. Figure 6 also shows the expected or 'theoretical' value (as discussed above) of the PTC for gasoline (1.18) and diesel (1.18) and the actual PTC calculated for the period 2008–13 for gasoline (1.03) and diesel (1.78).



**Figure 5: Brazil – Absolute Movements in Domestic Prices versus International Benchmarks and Pass-Through Coefficient (PTC), 2008–13**



**Figure 6: Russia – Absolute Movements in Domestic Prices versus International Benchmarks and Pass-Through Coefficient (PTC), 2008–13**



Source (5 & 6): Authors' calculations based on average pump prices published by [www.petroplus.ru/fuelindex](http://www.petroplus.ru/fuelindex) for Russia; ANP for Brazil; NWE and USG prices from Platts; Exchange rates from IMF.

Figure 5 shows that the actual Pass-Through Coefficient for diesel (1.63) is higher than expected, thereby conforming to expectations that increases in international prices were being passed



through. However, this is not the case for gasoline, where the actual PTC is shown at 1.08, only just above unity. Given the existence of *ad valorem* taxes (amongst other factors) this shows that implicit price controls are being exercised in some way, despite the official liberalization of gasoline prices. Moreover, if we look at the movement in absolute prices, a slow convergence appears to be taking place between domestic retail prices and the international f.o.b. benchmark prices beginning from March 2011. This again implies some form of implicit price control being imposed, via subsidies or other instruments (we discuss this further in Section 5).

Figure 6 shows that the picture for Brazil is mirrored in Russia. While the actual Pass-Through Coefficient for diesel (1.78) is higher than expected (conforming to expectations), the PTC for gasoline is very close to unity (1.03), implying the existence of implicit price controls. Furthermore, the movements in absolute prices show a convergence between the domestic retail prices of gasoline and diesel and the comparable international f.o.b. price benchmarks – which incidentally coincided with the period running up to a general election (2011–12). This also corroborates the argument that despite officially liberalizing gasoline and diesel prices, implicit price controls have been maintained in Russia via other avenues or instruments. We explore these further in the next section.

## 5. Policy Interventions in Pricing in the Domestic Markets for Gasoline and Diesel

Governments typically resort to a combination of measures to influence the retail prices of petroleum products in the domestic market. These can be *direct* or explicit – such measures are relatively transparent and can be reasonably measured – or *indirect* or implicit – procedures which are relatively opaque, and difficult to measure. Direct measures include those officially resorted to by governments such as setting the domestic price, setting permissible profit margins, and adjusting fuel taxes. These are usually carried out within some sort of visible framework and time period, and the impacts of these measures can be worked out. Indirect measures could include governments exercising their influence through the National Oil Companies (NOCs), or using avenues that are not directly related to pricing – such as the imposition of general business regulations and export constraints. Indirect or implicit measures are typically *ad hoc* in terms of framework and time period for implementation, and their effects are difficult to measure.

As China and India have (until recently) largely retained price controls whilst Brazil and Russia officially liberalized the retail price of gasoline and diesel in the 1990s/2000s, it can be expected that the former have resorted to explicit or direct policy measures, whereas the latter (given the evidence of price intervention despite liberalization), have resorted to indirect or implicit policy measures to influence pricing. In practice, although this expectation is generally true, a mix of measures has been used in the BRICs. We review these below.

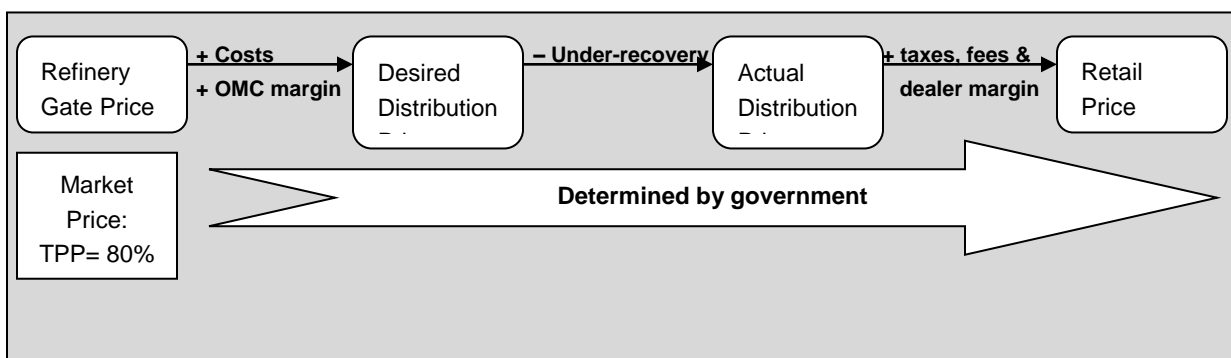
### 5.1 Prices Set Directly by Governments

Although India and China have gradually moved towards the liberalization of gasoline and diesel prices, their governments have retained explicit control over the pace and degree of the process. The Indian government (until its recent deregulation of diesel prices) has directly set prices for public sector Oil Marketing Companies (OMCs) through the value chain. Figure 7 shows the build-up of the retail price of diesel.



As Figure 7 indicates, diesel sold by the OMCs has had its distribution and retail prices set by the government on a cost-plus basis. The build-up of the diesel pump price begins with the Refinery Gate Price, which is market-determined; it is based on the trade parity price (TPP), which is calculated as 80 per cent of Import Parity Price (IPP) and 20 per cent of Export Parity Price (EPP). The cost of inland freight, delivery charges, marketing costs, and wholesale margins are added to the TPP to obtain a Desired Distribution Price for the OMCs. However, the government determines the Actual Distribution Price (which is lower than this desired distribution price), effectively also determining the under-recovery (subsidy) which is subtracted from the desired distribution price. Taxes, fees, and dealer margins are added to the actual distribution price to obtain the retail price or pump price of diesel to the consumer. Following the deregulation of diesel prices in September 2014,<sup>29</sup> when under-recoveries were effectively wiped out, there is no difference between the desired distribution price and the actual distribution price.

**Figure 7: Build-up of Retail Price of Diesel in India, 2013**



Source: Authors; based on information from the Petroleum Planning and Analysis Cell (PPAC), India

In China, the government directly controls retail prices for gasoline and diesel, primarily through adjustment of the refining margins. The National Development and Reform Commission (NDRC)<sup>30</sup> sets and publishes cap prices through the supply chain, guaranteeing minimum retail and wholesale margins. Figure 8 below shows the build-up of retail prices of gasoline and diesel.

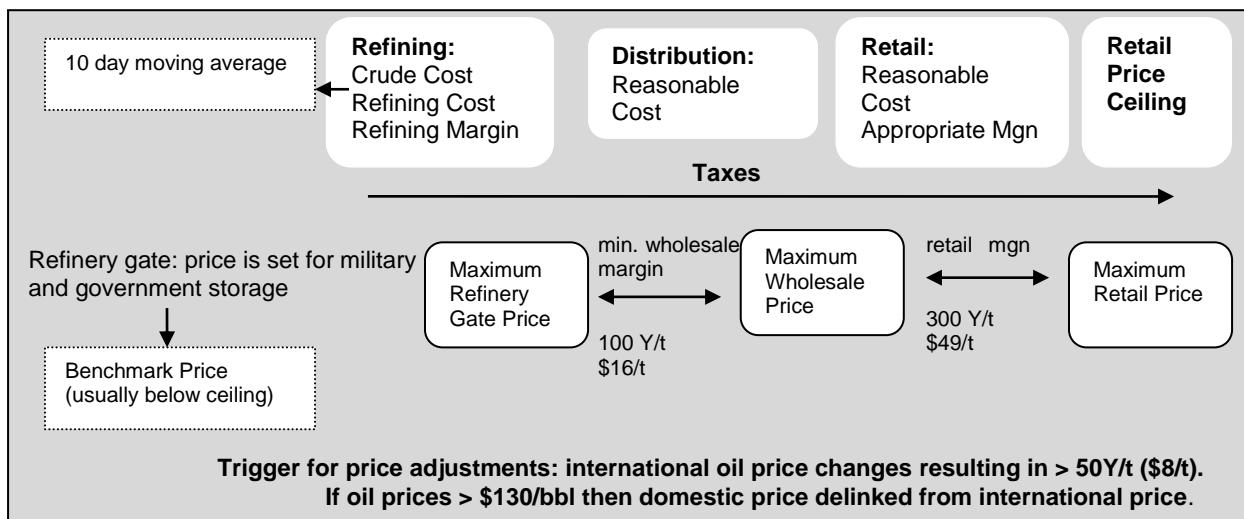
The Chinese government directly sets the Maximum Retail Price by guaranteeing a US\$49/ton (300 Yuan/ton) retail margin. This consequently guarantees the Maximum Wholesale Price (or wholesale ‘ceiling price’) which equals the retail price less US\$49/t (300 Y/t). Subsequently, a minimum wholesale margin, is also guaranteed, at US\$16/t (100 Y/t), and the Maximum Refinery Gate Price (or ‘ceiling’ refinery price) is effectively the wholesale price less US\$16/t (100 Y/ton). Wholesalers and retailers can vary their prices below these price ceilings, but not above (Maekawa and Kawamura, 2010).

<sup>29</sup> The deregulation of diesel prices began in January 2013, when OMCs were allowed to review diesel retail prices on a fortnightly basis and increase them every month to a maximum of Rs 0.50 per litre, until under-recoveries were eliminated. See Fattouh et al. (2013).

<sup>30</sup> The National Development and Reform Commission (NDRC) is a macroeconomic management agency which studies and formulates policies for economic and social development, maintains a balance of economic aggregates, and guides the overall economic system restructuring. The NDRC effectively aids China’s transition from a planned economy to a ‘socialist market’ economy. See <http://en.ndrc.gov.cn/mfndrc/>



**Figure 8: Build-up of Retail Prices of Gasoline and Diesel in China, 2013**



Source: Maekawa and Kawamura (2010), NDRC

The refinery gate price itself is based on a cost-plus formula that considers the 10-day moving average of a basket of international crude prices, plus refining costs, margins, and taxes. The government does not disclose the precise formula in an attempt to prevent speculation. Under this mechanism, the refining margin fluctuates depending on the level of international crude oil prices. For example, oil refineries may reap the benefit from a higher refining margin when the crude oil price falls below US\$80/bbl, but will have tighter margins when the crude price exceeds it (Maekawa and Kawamura, 2010). The NDRC directly sets the refinery gate prices (and not just the ceiling price) for sale to the military and for government storage, as these are considered strategic sectors. These ex-refinery prices also serve as benchmark prices for sales to state-owned wholesalers.

Price adjustments occur when changes in the international crude price result in a change in the retail petroleum product price greater than US\$8/t (50Y/t). However, the government officially has sole discretion to make these adjustments (Maekawa and Kawamura, 2010). Since March 2013, the price triggers and bands used for price adjustments, and consequently the time periods between adjustments, have become progressively shorter. For instance, gasoline and diesel prices have been adjusted downwards eight times since September 2014 alone, and at the end of December 2014 stood 33 per cent and 43 per cent lower, respectively, than they had been at the end of June 2014. Additionally, the basket of international crude oil prices used to benchmark domestic prices has also been progressively diversified. All of this signals the Chinese government's attempts towards strengthening the link between the international and domestic markets for petroleum products.

Simultaneous with pricing reform, the government has continued to provide subsidies targeted towards specific economic sectors in order to partially or entirely compensate them for the increase in prices. Since 2009, it has subsidized public transportation, fisheries, and state-owned





forestry firms when the state-regulated ex-refinery price for gasoline has risen above US\$710/t (4,400 Y/t) and diesel above US\$625/t (3,870 Y/t). Furthermore, for rural roads, ocean fishing firms, and water transportation companies, it pays half of the incremental costs when the ex-refinery price for gasoline is between US\$710/t (4,400 Y/t) and US\$887/t (5,480 Y/t) and diesel is between US\$625/t (3,870Y/t) and US\$820/t (5,070 Y/t). When prices exceed these upper limits, the government uses federal revenues to cover the entire incremental cost.<sup>31</sup> In 2012, the Finance Ministry earmarked a further US\$11 billion (67.4 billion yuan) to cover oil subsidies for fisheries, forestry, and public transport; it also allocated US\$3.9 billion (24.3 billion Yuan) for agriculture, to ensure that farmers' incomes were not adversely affected by oil price increases and possible price increases for agricultural materials later in the year (Kojima, 2013). In March 2012, a temporary monthly subsidy of about US\$49 (300 Yuan) was given to taxi drivers across the country to compensate for fuel price increases.<sup>32</sup>

## 5.2 Tax Adjustments by Governments

Another policy measure that has been used to influence petroleum product pricing is the adjustment of federal taxes – specifically excise taxes. This has been evident in Brazil and in India. In Brazil, to counter the effects of price increases at the refinery gate, the government has used downward adjustments to the federal excise tax on gasoline and diesel (CIDE<sup>33</sup>), in order to mitigate or offset the impact on retail prices. From 2008 to 2012, all but one adjustment of refinery gate prices occurred simultaneously with adjustments of the CIDE rate. In 2012, the CIDE rate reached zero for both gasoline and diesel, allowing no further adjustments via this avenue. CIDE adjustments were effectively a mechanism used to share the cost of subsidies with the industry. Consequently when the rate reached zero in 2012, the subsidy burden fell entirely on the industry.

Figure 9 plots the prices of gasoline and diesel (including federal taxes) at the refinery gate and at the retail level, as well as the international benchmark prices for diesel and gasoline (US Gulf – USG). The figure shows major upward and downward movements in the USG price alongside downward and upward adjustments to the CIDE, and the subsequent effect on the retail prices of gasoline and diesel. It shows that prices began a gradual upward movement after the CIDE was reduced to zero in June 2012.

Similar to Brazil, the Indian government has frequently adjusted the rates of excise duty to mitigate the impact of under-recoveries. Customs duty on imported gasoline and diesel was brought down from 20 per cent to 2.5 per cent on an *ad valorem* basis, and excise was brought down to a flat rate of US\$0.22/l (13.35 Rupees/l) for gasoline and US\$0.06/l (Rs3.6/l) for diesel by 2008.<sup>34</sup> In November 2014, taking advantage of the fall in oil prices, the Indian government increased excise taxes on petrol and diesel whilst successfully negotiating with the OMCs to

<sup>31</sup> 'Country's first fuel price linkage subsidy kicks off', China Internet Information Center, April 2009, [www.china.org.cn/business/2009-04/10/content\\_17585332.htm](http://www.china.org.cn/business/2009-04/10/content_17585332.htm).

<sup>32</sup> 'Taxis get subsidy to soften fuel hike blow', *China Daily*, March 2012, [www.chinadaily.com.cn/china/2012-03/22/content\\_14884875.htm](http://www.chinadaily.com.cn/china/2012-03/22/content_14884875.htm).

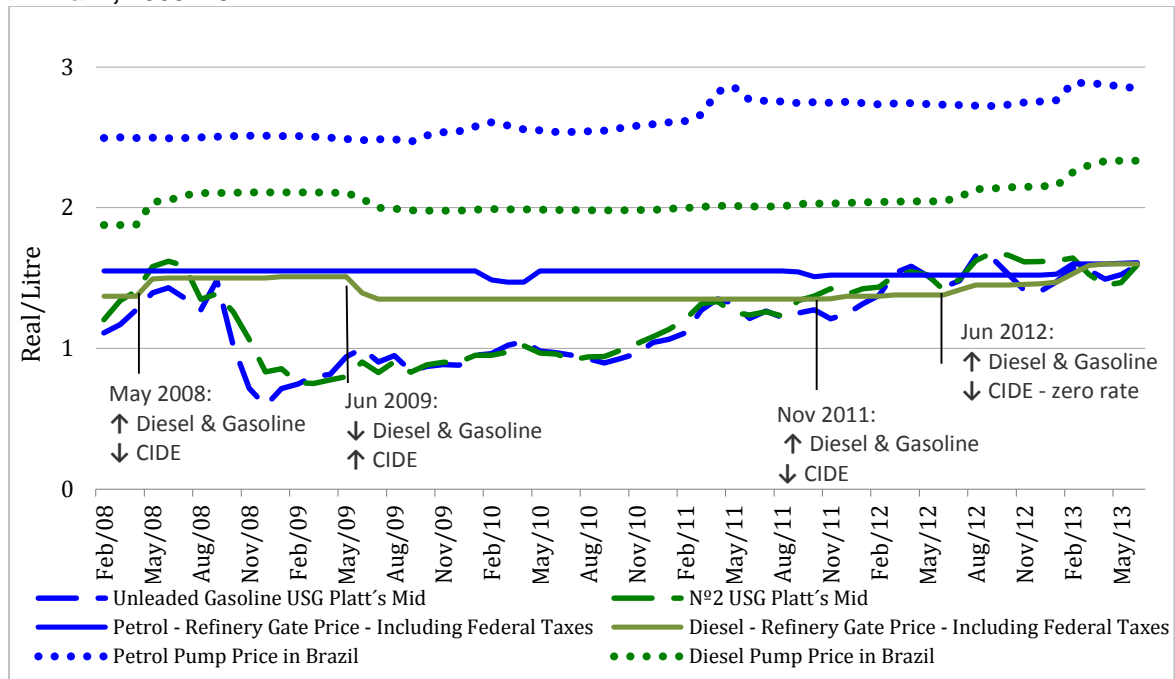
<sup>33</sup> CIDE (in Portuguese: Contribuição e Intervenção no Domínio Econômico) translated as: 'the contribution and intervention in the economic domain' is a federal excise tax on oil products that is mainly used by the federal government to offset price fluctuations.

<sup>34</sup> In June 2013, the excise rate for gasoline was US\$0.15/l (Rs 9.2/l) and for diesel US\$0.057 (Rs 3.46) (Petroleum Planning and Analysis Cell).



absorb the impact, leaving retail prices unchanged. This was done in an attempt to reduce India's fiscal deficit.

**Figure 9: Federal Tax (CIDE) Adjustments to Influence Retail Prices of Gasoline and Diesel in Brazil, 2008–13**



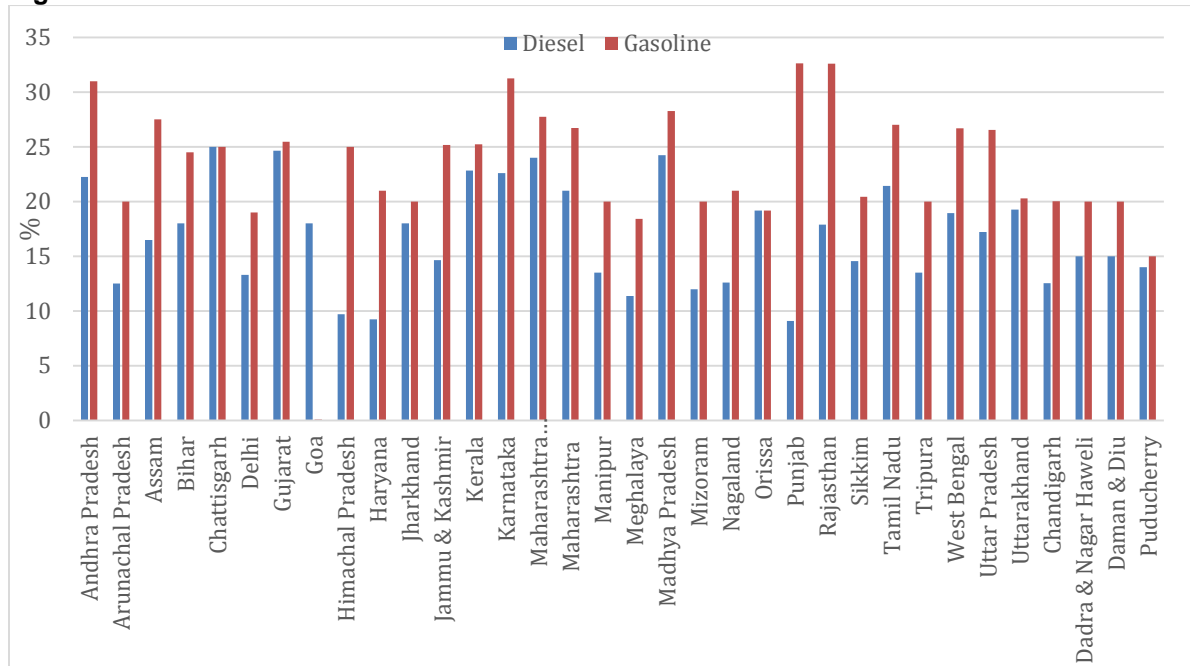
Source: ANP Prices and Antitrust Coordination<sup>35</sup>

In the longer term, despite federal tax adjustments, the system of fiscal federalism that exists in both Brazil and India allows state or provincial governments to set their own rates of VAT – these subsequently vary across different states or provinces. Figures 10 and 11 show these rates. Given that tax revenues from gasoline and diesel form a significant proportion of state or provincial revenues, local governments are reluctant to cut these taxes and often resist pressure from the federal government to do so; this implies that the impact of federal tax cuts on petroleum products is often rendered ineffective. For India, roughly 20 per cent of the retail price of petroleum products can be attributed to state taxes (Fattouh et al., 2013). In Brazil, state taxes are estimated at 14 per cent of retail price for diesel and 28 per cent for gasoline.<sup>36</sup>

<sup>35</sup> Agência Nacional de Petróleo, biocombustíveis e gás natural; see [www.anp.gov.br/?id=2368](http://www.anp.gov.br/?id=2368).

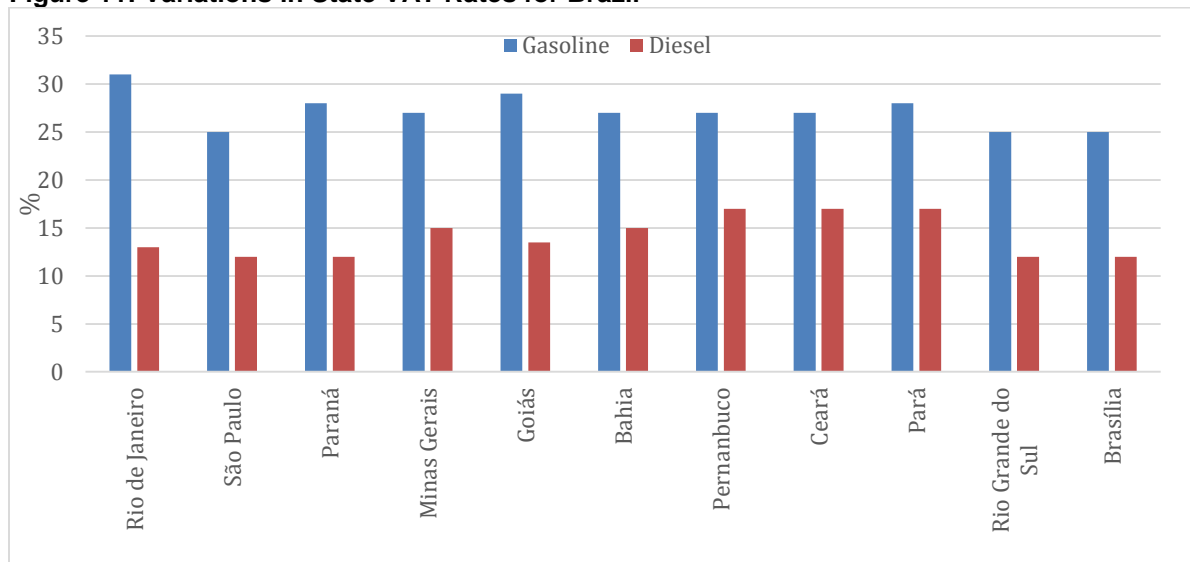
<sup>36</sup> Build-up of pump prices published by Petrobras for June 2013 at [www.petrobras.com.br/pt/produtos/composicao-de-precos/](http://www.petrobras.com.br/pt/produtos/composicao-de-precos/).

**Figure 10: Variations in State VAT Rates for India**



Source: Fattouh et al. (2013)

**Figure 11: Variations in State VAT Rates for Brazil**



Source: Obtained by Authors from State Finance Secretaries in June 2013



In contrast with India and Brazil, taxes on petroleum products are centralized in China and Russia, and a single VAT rate is applied to the sales of these products across the entire country – this is 17 per cent in China and 18 per cent in Russia. During the period 2008–13, it appears that neither the Chinese nor the Russian government explicitly used the central VAT to offset price changes. However, both countries have utilized other taxation measures which have affected the prices of gasoline and diesel, but for purposes officially stated as being unrelated to the control of domestic prices.

For instance, in 2009, China increased a ‘consumption tax’ on gasoline from US\$0.03/litre to US\$0.16/litre and on diesel from US\$0.016/litre to US\$0.12/litre.<sup>37</sup> Although this increased domestic prices, the officially declared purpose of this measure was to rationalize consumption in order to reduce energy intensity and import dependency, and mitigate the environmental impact of fossil fuel consumption. In November 2014, the Chinese government increased its consumption fuel tax – leaving the price of gasoline and diesel unchanged despite the sharp fall in crude prices. According to an official statement:

... increasing the fuel consumption price to a suitable level can not only help to curb pollution, reduce emissions, guide rational consumption demand, promote efficient usage of oil, but also can help the development of a new-energy industry.<sup>38</sup>

There was another increase in the consumption tax on gasoline in December 2014 from 1 Yuan (US\$0.16) to 1.12 Yuan per litre, while that on diesel increased from 0.8 Yuan to 0.94 Yuan per litre.<sup>39</sup> This was followed by another downward adjustment in retail prices and an increase in consumption taxes in January 2015. Essentially, these measures demonstrate that while retail prices have been adjusted downwards in line with the drop in global crude oil prices, the consumption tax has conversely been adjusted upwards in line with the government’s broader domestic policy objectives.

Russia adopted a graded excise tax for gasoline and diesel, set according to the quality of the product; the stated purpose was to encourage investments in refinery upgrades. Russia also adopted the ‘60/66’ tax regulation which reduced the profitability of fuel oil exports (described in the next section). This regulation indirectly influenced supply, and therefore prices in the domestic market.

### 5.3 Price Control through National Oil Companies (NOCs)

In countries where the NOC controls a large share of the market and is effectively a price-setter, the government may send signals to the NOC to keep prices low and also to prioritize domestic supply – this subsequently impacts the finances of NOCs. There is evidence of this in Brazil, India, and China. As Russia is the only net oil exporter amongst the BRIC countries, it can be assumed that the impacts of state influence on NOCs will be more difficult to identify as NOC’s finances are cushioned by export revenues. Thus in the case of Russia, the impacts of implicit price controls can be said to lead to foregone income, rather than losses.

<sup>37</sup> In Chinese local currency, the consumption tax on gasoline was hiked to US\$0.16/l (1 y/l) from US\$0.03/l (0.2 y/l) and on diesel to US\$0.12/l (0.8y/l) from US\$0.016/l (0.1 y/l).

<sup>38</sup> ‘China to Increase Fuel Tax to Curb Pollution, Carbon Emissions’, *Bloomberg*, 28 November 2014, [www.bloomberg.com/news/2014-11-28/china-to-increase-fuel-tax-to-curb-pollution-carbon-emissions.html](http://www.bloomberg.com/news/2014-11-28/china-to-increase-fuel-tax-to-curb-pollution-carbon-emissions.html).

<sup>39</sup> ‘China to raise fuel consumption tax, cut retail prices’, *China Daily*, 12 December 2014, [www.chinadaily.com.cn/business/2014-12/12/content\\_19076190.htm](http://www.chinadaily.com.cn/business/2014-12/12/content_19076190.htm).



Petrobras has a dominant position in the Brazilian oil market, and accounts for 98 per cent of refining. In 2002, the first year of price liberalization, Petrobras adjusted gasoline and diesel prices at the refinery gate six times. However, over the past 11 years gasoline prices have been adjusted just 12 times, and diesel prices 14 times. Petrobras’s official gasoline and diesel pricing policy is stated as:

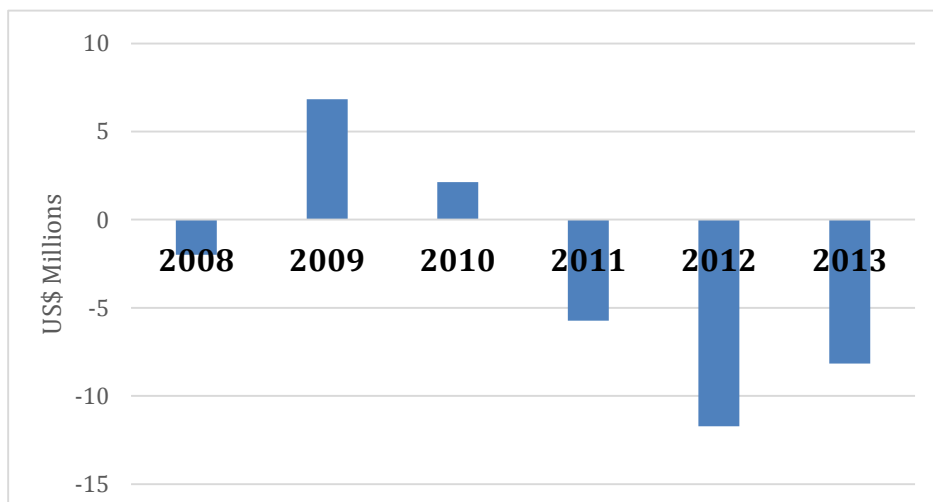
international parity in the medium term, based on supply and demand fundamentals, whilst avoiding the pass-through to the domestic market of international volatility caused by weather, political crises or other temporary and specific events.

Indeed, long periods of price stability in the domestic market imply that the linking of domestic prices to international price movements has become weaker over time.<sup>40</sup> It has been noted that Petrobras:

sells imported fuel at below-market prices to distributors, as part of a government policy to control inflation. Petrobras is unable to make more fuel domestically because its refining capacity is stretched to the limit.<sup>41</sup>

As distribution and retail prices remain liberalized, the losses from implicit price controls are concentrated in the refining industry. This is in stark contrast with Brazil’s official policy of liberalized pricing and investment, and both public and private investment are thus impeded. Figure 12 shows the impact of implicit price controls on Petrobras’s finances.

**Figure 12: Profits & Losses of Petrobras Downstream or Refining, Marketing and Transportation Sectors in US\$ millions**



Source: Annual Reports, Petrobras (2008–13)

In India, prior to the recent diesel price deregulation, price controls were imposed through the OMCs. In theory, the OMCs were permitted to review and adjust prices every fortnight, but this was not always the case and price pass-throughs were sometimes prevented. In 2012, following continual obstacles being put in the way of price adjustments (due to government concerns over

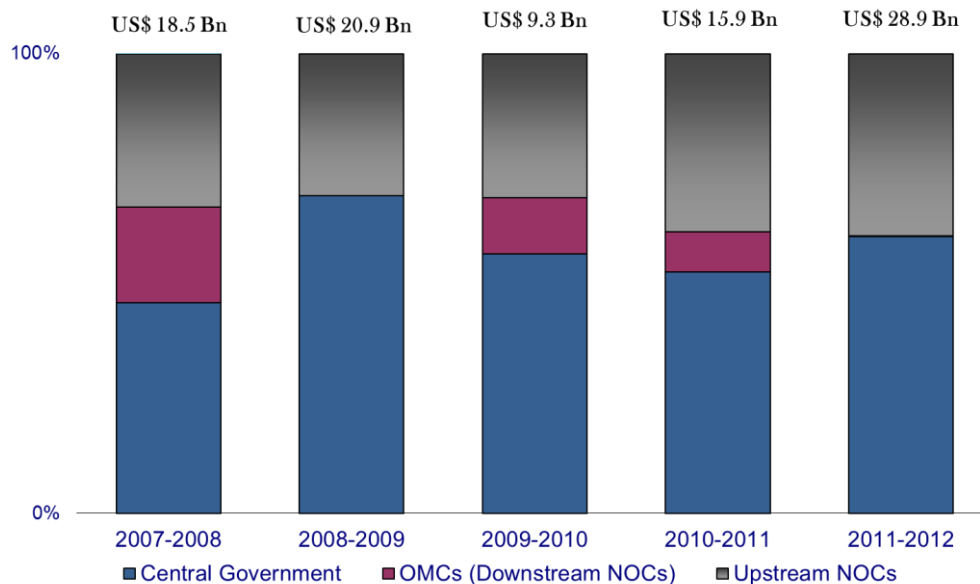
<sup>40</sup> Also seen earlier in Figure 5.

<sup>41</sup> 'Brazilian government mulls gasoline, diesel price increase: report', *Platts*, 14 August 2013, [www.platts.com/latest-news/agriculture/london/brazilian-government-mulls-gasoline-diesel-price-26183091](http://www.platts.com/latest-news/agriculture/london/brazilian-government-mulls-gasoline-diesel-price-26183091).

inflation) the largest OMC, Indian Oil Corporation Limited (IOCL), requested the Oil Ministry to explicitly reverse the process of price deregulation, so that a subsidy could be made available to make up for revenue lost on sales. In IOCL's point of view, it was therefore better to bring gasoline under a subsidized regime, rather than maintain a situation where price increases continued to be held back implicitly under a liberalized regime.<sup>42</sup>

LPG and kerosene continue to be heavily subsidized in India, and the OMCs (due to their position in the value chain) are the first to absorb the commercial losses, as they buy diesel at the refinery gate at the international market price but sell it domestically at controlled retail prices. These losses are shared with the upstream NOCs (who sell crude at heavy discounts to the OMCs), and with the federal government. Figure 13 shows the extent to which total losses, or under-recoveries, in the Indian petroleum product sector are shared between the public sector NOCs and the government. It must, however, be noted that the finances of the OMCs have improved considerably since under-recoveries from both gasoline and diesel have been eliminated.

**Figure 13: Losses (Under-recoveries) of Indian Public Sector Oil Companies shared with the Federal Government**



Source: Calculated from financial year data from MOPNG (2011) and annual average exchange rates from the IMF.

In a similar way to India, in China, the NOCs bear the immediate impacts of changes in the international oil price, as domestic retail prices can only be changed through government direction and there is often a lag between movements in the international price and domestic price changes. The NOC's refinery gate prices therefore insulate the domestic market. NOCs are partially compensated for the losses resulting from this through cash transfers from the government. However, the criteria for these transfers are *ad hoc* and undisclosed. Private companies seldom get government subsidies, and it has been argued that the large size of

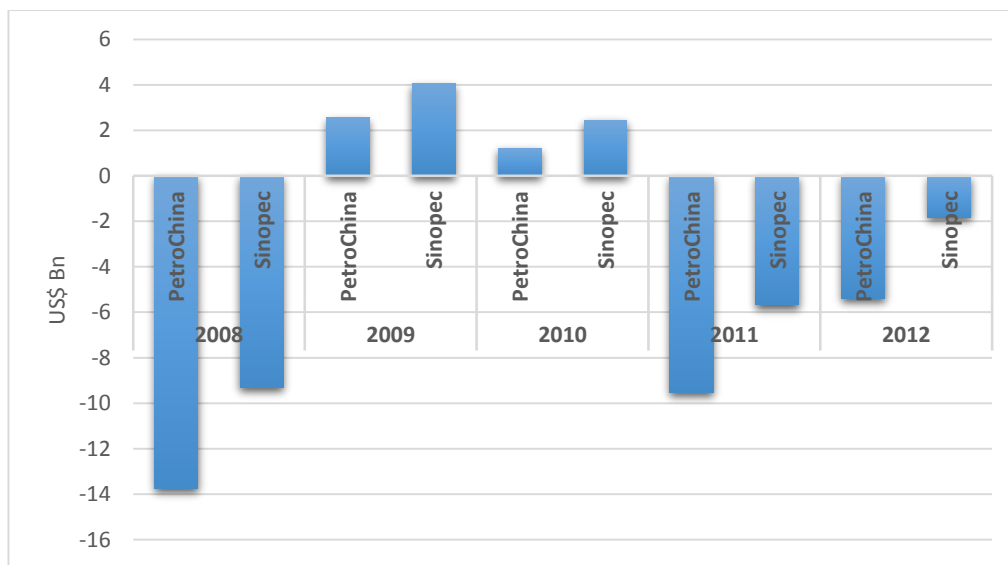
<sup>42</sup> 'Bring back petrol price control, says IOC after worst-ever quarterly loss', *The Financial Express*, 10 August 2012, <http://archive.indianexpress.com/news/bring-back-petrol-price-control-says-ioc-after-worst-ever-quarterly-loss/986303/>.



subsidies to state-owned companies is unfair to private firms.<sup>43</sup> China's two major oil producers, PetroChina and Sinopec, received a total of US\$1.98 billion (12.2 billion Yuan) in government subsidies in 2012 towards their losses from refining.

Figure 14 shows the losses in China's refining sector that have resulted from price controls, based on data published by the two NOCs Sinopec and PetroChina; these companies account for 46 per cent and 32 per cent of China's capacity, respectively.

**Figure 14: Profits & Losses from Refining for China's NOCs in US\$ billion**



Source: Annual Reports, Sinopec and PetroChina

As mentioned earlier, there is less direct evidence of implicit government control of pricing through the NOCs, for the finances of Russia (being a net oil exporter) are cushioned through export revenues. However, there is evidence of implicit control through government intervention in NOC investments and exports, as discussed later in this section.

### 5.4 Influencing Prices through General Regulation

In a liberalized market, governments can use anti-monopoly and anti-competitive regulation to influence the structure of the domestic market, however, these measures could also be used to impose implicit price controls. There is evidence of this in Russia, where the Federal Antimonopoly Service (FAS) has, since 2008, placed petroleum product pricing under 'critical observation', initiating proceedings and imposing fines upon Russia's major oil companies. While the FAS's average fines were around US\$750 (€650) in 2005, US\$867 (€750) in 2006 and US\$1,215 (€1050) in 2007, penalties for the year 2008 (during which there was a steep rise in international oil prices) showed a dramatic increase primarily due to a change in the manner in

<sup>43</sup> 'Oil giants' huge subsidies may fade under reforms', *Global Times*, 2 May 2013  
[www.globaltimes.cn/content/778956.shtml#.UjMcmsZwo0M](http://www.globaltimes.cn/content/778956.shtml#.UjMcmsZwo0M).



which fines were imposed.<sup>44</sup> Four major Russian oil companies were fined, in aggregate: Gazpromneft, US\$38 million (1,356 billion Roubles), TNK-BP US\$31 million (1,112 billion Roubles), Lukoil US\$41 million (1,443 billion Roubles), and Rosneft Oil Company US\$42 million (1, 508 billion Roubles).

The FAS alleged that these companies had abused their market power in the domestic oil product market. However, it has been argued that the FAS fines were actually intended to apply implicit pressure on oil companies in order to influence the domestic oil market. For instance, it was alleged in October 2011 that Russian authorities had put unofficial pressure on the NOCs to 'rein in' retail prices in the run up to general elections in December 2011 and a presidential poll in March 2012.<sup>45</sup> This was in addition to a previous unofficial directive to companies to 'put a lid' on gasoline prices at pumping stations in August 2011, which had resulted in retail prices flat-lining across Russia despite sky-rocketing wholesale oil product prices, squeezing retail margins to almost zero.<sup>46</sup> In 2012, the government reached an agreement with oil companies to keep gasoline prices at December 2011 levels until the March 2012 presidential elections, and subsequently extended the price freeze to May 2012 (Kojima, 2013). Over the past few years the Russian government has also directed oil companies to sell diesel at a discount to farmers twice a year. For the first agricultural season of 2012, the price discount offered was 30 per cent, up from 10 per cent in 2010 and 2012.<sup>47</sup>

## 5.5 Export Constraints to Influence Domestic Pricing

In countries where domestic prices are lower than export parity, companies may prefer to sell products abroad due to the high opportunity cost of selling domestically (Baig et al., 2001). This can lead to a tighter domestic market, necessitating price increases. Export constraints are used to address this situation. This has happened in Russia where, for instance in 2011, a combination of price controls and tightening quality specification in the domestic market encouraged exports of gasoline, while domestic demand continued to grow, resulting in shortages in the domestic market and a sharp rise in gasoline prices. The government's response was the temporary suspension of the quality shift (postponing it to January 2013), and an increase in gasoline export tax, enough to act as a de facto export ban,<sup>48</sup> which has since been retained.

In China, gasoline and diesel exports are subject to government control on volumes, in order to ensure that domestic demand is satisfied. Oil export quota volumes are determined by China's

<sup>44</sup> The dramatic increase in the size of penalties was due to the introduction of turnover-based fines in May 2007; by Russian standards these have become extremely significant. Under this system, the FAS can fine companies 1–15% of their turnover for participating in cartels or for having been deemed to have abused their dominant market position. It has also been suggested that the FAS crackdown on oil companies was influenced by government pressure. See 'FAS fines are growing', Freshfield Bruckhaus Deringer LLP, 26 January 2009 [www.lexology.com/library/detail.aspx?g=aaa38916-03a1-405d-b3fe-34ef8d435259](http://www.lexology.com/library/detail.aspx?g=aaa38916-03a1-405d-b3fe-34ef8d435259). Also see 'Russian oil: the death knell for easy downstream profits', Trusted Sources, 11 March 2010 [www.trustedsources.co.uk/russia/natural-resources/Russian-oil-The-death-knell-for-easy-downstream-profits](http://www.trustedsources.co.uk/russia/natural-resources/Russian-oil-The-death-knell-for-easy-downstream-profits).

<sup>45</sup> See 'Russia caps fuel prices before elections – sources', *Reuters*, 6 October 2011, [www.reuters.com/assets/print?aid=USL5E7L60R220111006](http://www.reuters.com/assets/print?aid=USL5E7L60R220111006).

<sup>46</sup> 'Russia caps fuel prices before elections – sources', *Reuters* 6 October 2011, [www.reuters.com/assets/print?aid=USL5E7L60R220111006](http://www.reuters.com/assets/print?aid=USL5E7L60R220111006).

<sup>47</sup> 'Russia to decide on H2 fuel discount for farmers shortly: ministry', *Platts*, 29 May 2012.

<sup>48</sup> In Russia, export duties on petroleum products are charged as a function of the export duty on crude oil. For gasoline, it was 67% of the oil export duty and it was raised to 90% of the oil export duty. In May 2011 this corresponded to US\$0.55/litre. See E&Y (2011).





Ministry of Commerce and the National Development and Reform Commission (NDRC), based on domestic demand and supply, and import and export trends. These quotas are issued quarterly and companies that have exhausted their quotas have to apply for new quotas in order to continue exporting surplus barrels.<sup>49</sup> In 2011, amid a scenario of power shortages and peak summer demand, China imposed a temporary ban on diesel exports to help meet domestic energy demand.<sup>50</sup>

Government influence can also be exercised by directing NOCs to supply the domestic market even when prices in export markets are higher, to the detriment of NOCs' finances and/or the country's balance of payments. For instance, in Brazil, despite low domestic prices during the period 2009–13, Petrobras's exports of petroleum products decreased by 16 per cent and imports increased by 147 per cent, to ensure that the increase in domestic demand was met.<sup>51</sup> Similarly, India's state-owned refineries are primarily concerned with supplying the domestic Indian market, even if prices abroad are more attractive, though this is not the case for the country's private refiners (controlling 37 per cent of India's refining capacity) who are allowed to export products without restrictions. As mentioned earlier, in India and Brazil, despite the fact that there is no formal control of petroleum product exports either through quotas or taxes, NOCs have to satisfy domestic demand; this amounts to a *de facto* export restriction.

### Summary

This section has shown the variety of instruments that governments of the BRICs have resorted to in order to influence domestic petroleum product prices. It is evident that implicit (or indirect) measures are less transparent or measurable than direct measures, and hence tend to be applied when price liberalization has officially already been carried out. This has led to some counterintuitive impacts – most visibly on investments in the downstream sector and particularly in refining. The next section discusses how these impacts have been different for each of the BRICs.

## 6. The Impact on Downstream Investment

A conventional argument against petroleum product pricing controls is that the financial losses that it inflicts upon NOCs and the sector as a whole constrains downstream investment, leading to a highly concentrated downstream market, as against the competitive structures that governments wish to encourage. However, evidence from the BRICs challenges this expectation suggesting, in fact, that in India and China, price controls have led to counterintuitive outcomes, with downstream investments in refining experiencing a boom (Clarke and Graczyk, 2010), whereas in Brazil and Russia downstream investments have been severely constrained, despite price liberalization. This implies that the manner in which pricing controls have been implemented, and pricing reforms carried out, has impacted downstream investments; consequently, policies based on similar reform objectives have led to differing outcomes.

<sup>49</sup> 'China's Sinopec, PetroChina to skip gasoil exports in Aug, likely in Sep too', *Platts*, 19 July 2013, [www.platts.com/latest-news/oil/singapore/chinas-sinopec-petrochina-to-skip-gasoil-exports-27210583](http://www.platts.com/latest-news/oil/singapore/chinas-sinopec-petrochina-to-skip-gasoil-exports-27210583).

<sup>50</sup> 'China bans diesel exports', *Financial Times*, 13 May 2011, [www.ft.com/intl/cms/s/0/ad165aa8-7d8e-11e0-b418-00144feabdc0.html#axzz2f2pEpeBJ](http://www.ft.com/intl/cms/s/0/ad165aa8-7d8e-11e0-b418-00144feabdc0.html#axzz2f2pEpeBJ).

<sup>51</sup> Based on average volume in thousand barrels per day (kb/d) based on company data at [www.investidorpetrobras.com.br/](http://www.investidorpetrobras.com.br/).

Exports in 2009 were 227 kb/d and in the 1<sup>st</sup> trimester of 2013 were 191 kb/d. Imports in 2008 were 152 kb/d and in the 1<sup>st</sup> trimester of 2013 were 376 kb/d.

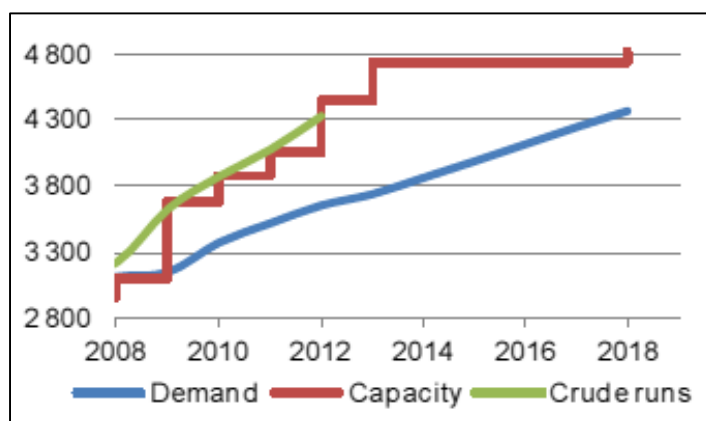


## 6.1 India and China

In India, price controls and the 'gradualist' approach to price liberalization resulted in two positive impacts on downstream investment (Clarke and Graczyk, 2010). First, governments directly compensated the OMCs for their losses from subsidies in refining as well as from retail sales. The OMCs were consequently able to pursue ambitious state-supported refinery investment and expansion plans (Clarke and Graczyk, 2010). As described earlier, this was carried out through cash transfers, through directing the NOCs to provide discounts on the sale of crude to OMCs, and through issuing oil bonds (although the latter, as discussed earlier, has had limited effectiveness). Second, this strategy inadvertently created a space for private investment in refining, as private refiners were able to purchase crude at the controlled prices, process it, and sell it to state-owned retailing companies. This space expanded as private refiners began to import crude and export petroleum products.

Refining in India has therefore developed into a commercially viable and profitable business, where refiners can supply the Indian retail market<sup>52</sup> through the OMCs (gaining market-based refining margins and without under-recoveries) and also have the opportunity to export products (provided that state-owned refineries are primarily focused on supplying the domestic Indian market, but with prices linked to the international market). Despite being a net oil importer, with 75 per cent of its oil consumption being met by imports, Indian net exports of petroleum products more than doubled from 2008 to 2011. According to the IEA, India's refining capacity is projected to increase further (by 11 per cent to 2018), growing from 4.4 mb/d in 2012 to 4.9 mb/d, shown in Figure 15.<sup>53</sup> In India, while the OMC sector is defined by heavy handed regulation and lacklustre commercial performance, the country has seen robust investment, capacity addition, and growth, although reliance on government transfers has come at a tremendous fiscal cost (Clarke and Graczyk, 2010).

**Figure 15: India – Oil Demand versus Refining Capacity (kb/d)**



Source: IEA (2013, 102).

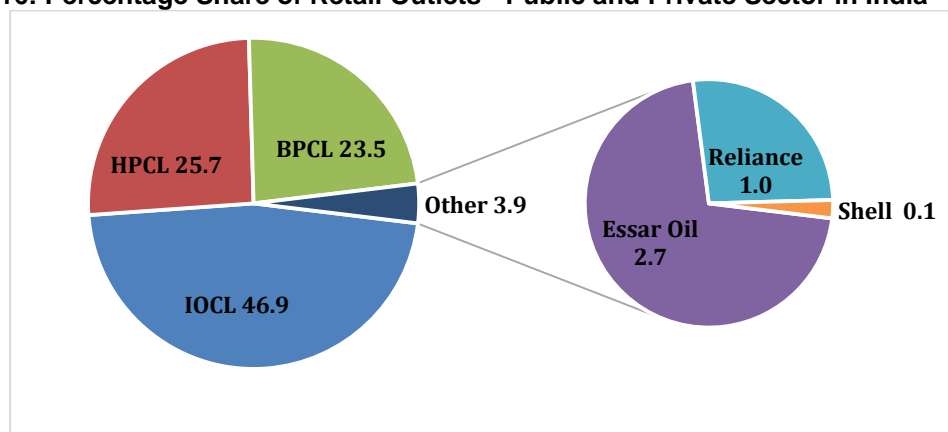
<sup>52</sup> As well as others sectors which are not subject to price controls, such as OMCs' established base of customers for industrial fuels and lubricants.

<sup>53</sup> IEA (2013). The expansion will come from new investments which include: IOCL in Paradip (300 kb/d), Nagarjuna Oil Company in Cuddalore (120 kb/d), and IOCL in Koyali (80 kb/d).

In contrast with refining, private sector investment in retailing has been crowded out by subsidized petroleum products sold by state-owned retailing companies as, in contrast with state-owned retailing firms, private retailers did not receive compensation for selling below market prices. Consequently, the share of the market controlled by state-owned retailing firms (96 per cent) has eclipsed the private sector, as Figure 16 shows. In Figure 16, the 'other' category represents private sector retailers' share of the market at roughly 4 per cent.

The liberalization of gasoline prices in 2010 led to a change in the structure of the retail market (primarily the automobile sector) which in 2010 was 70 per cent gasoline, but had turned into an 80 per cent diesel market by 2012 (Fattouh et al., 2013). The liberalization of diesel prices, beginning in January 2013, led to a gradual shift back towards gasoline within this sector. Following the complete liberalization of diesel prices in October 2014, market dynamics in retail sectors may begin to be increasingly set by international price movements rather than the government's subsidy policy.

**Figure 16: Percentage Share of Retail Outlets - Public and Private Sector in India**



Source: MOPNG (2011); Financial Express (2013)

Similar to the position in India, China's downstream refining sector has been heavily dominated by its state-owned companies, with the latter receiving financial support from the government. Its refining industry is divided into two groups: the major state-owned refiners<sup>54</sup> and the independent refiners. The independents are commonly known as 'teapot' refiners, given their lack of complexity and secondary processes, and they account for less than a quarter of total refining capacity.<sup>55</sup> Vulnerable to domestic spreads, teapots are largely the swing players – increasing production when refining margins are healthy and reducing output when they are weak. Teapot refineries are adversely affected during periods of tight or regulated crude supply<sup>56</sup> (that, when available, will be at market prices) and controlled petroleum product prices. Due to this squeeze, teapot refiners are increasingly being forced to merge, or to enter into joint ventures, with China's

<sup>54</sup> There are about 80 major refineries belonging to China National Petroleum Corporation (CNPC), China Petrochemical (Sinopec), China Offshore Oil Corporation (CNOOC), Shaanxi Yanchang Petroleum Group (SYPG), and China North Industries Group Corporation (CNGC) with 10.1 mb/d refinery capacity (estimated by the IEA in 2012).

<sup>55</sup> 3.3 mb/d out of a total of 13.41mb/d (IEA, 2013).

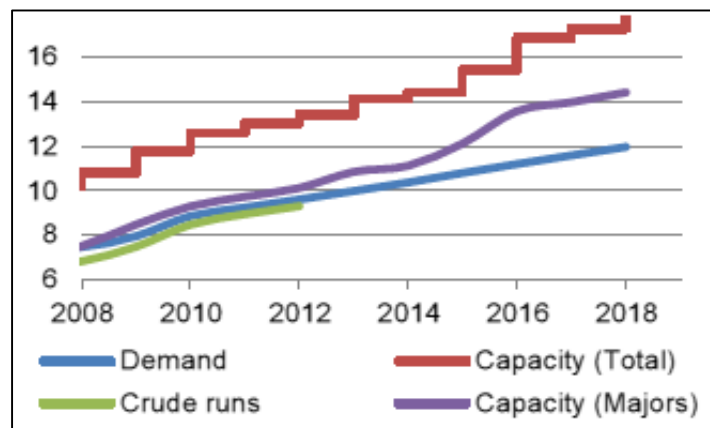
<sup>56</sup> Beijing maintains control over the teapots' operations by controlling their supply of crude, which leaves them reliant on processing imported fuel oil.

state-owned oil firms, which currently own, or have joint ventures with, 20 per cent of teapot refining capacity.<sup>57</sup>

Despite the losses resulting from price controls, the investments in refining capacity made by Chinese state-owned firms have remained robust, due to the fact that these firms (similar to the position of India's OMCs) have access to government finances which have supported their capital expenditure plans.<sup>58</sup> According to the IEA, Chinese refining capacity grew by 34 per cent between 2008 and 2012 and is projected to increase further by 32 per cent in 2018 to 17.7 mb/d.<sup>59</sup> This expansion also includes joint ventures with China's oil producing NOCs, to enable further security of supply.<sup>60</sup> Thus despite being a net oil importer, with roughly 60 per cent of oil consumption being met by imports, net exports of gasoline and diesel have continued to rise. Figure 17 shows the IEA projections for China's refining capacity to 2018.

Although some joint ventures exist between foreign firms and the state-owned companies, price controls have adversely affected the returns of foreign investors, who have struggled to negotiate with Chinese companies to secure greater retail marketing rights. The recent move to align domestic petroleum product prices with international prices may benefit teapot refiners as well as foreign firms in joint ventures; however, in contrast with India, where prices have been recently liberalized and there are spaces for private sector entry into refining and retailing, pricing decisions remain under the control of the government in China, while the expansion of refining continues to be facilitated primarily by the state.

**Figure 17: China – Oil Demand versus Refining Capacity (mb/d)**



Source: IEA (2013, 99)

<sup>57</sup> 'China's teapot refiners plot expansions to escape government crackdown', *Hydrocarbon processing*, 19 October 2012, [www.hydrocarbonprocessing.com/Article/3106054/Chinas-teapot-refiners-plot-expansions-to-escape-government-crackdown.html](http://www.hydrocarbonprocessing.com/Article/3106054/Chinas-teapot-refiners-plot-expansions-to-escape-government-crackdown.html).

<sup>58</sup> 'When you have the Chinese government as a partner, financing your operations and objectives becomes a lot easier. With deep pockets of Chinese Central Bank in their corner, they (Chinese NOCs) can take an aggressive approach.' See 'Chinese Oil Companies: Who they are and how to play', Investment U White Paper Report, [www.investmentu.com/content/detail/chinese-oil-companies](http://www.investmentu.com/content/detail/chinese-oil-companies).

<sup>59</sup> IEA (2013).

<sup>60</sup> Three joint refinery projects are currently being developed, two led by China National Petroleum Corporation (one with Venezuela's PDVSA – 400 kb/d and the other with Russia's Rosneft – 260 kb/d) and one by Sinopec (with KPC – 300 kb/d).



## 6.2 Russia and Brazil

The impact of price controls on downstream investment is less obvious in Russia, which at first glance has a surplus of refining capacity. However, the main challenge facing the country's downstream refining sector relates to the need to upgrade and reconfigure its refining system to meet the rising demand for light oil products, as well as to improve the quality of exported products. Thus, refining investment needs to be oriented towards improving product quality and yields, rather than on increasing capacity, as the country is already in net surplus. The implicit measures adopted to influence pricing in a liberalized market, described in earlier sections, have impeded this investment. Despite officially liberalizing gasoline and diesel prices, government pressure on companies to keep prices low in the domestic market has squeezed the margins of companies in relation to their capital expenditure plans, as has export taxation (up to 2011, the export duty on light oil products was 67 per cent of the crude oil export duty and the export duty on fuel oil was 46.7 per cent of the crude oil export duty).<sup>61</sup>

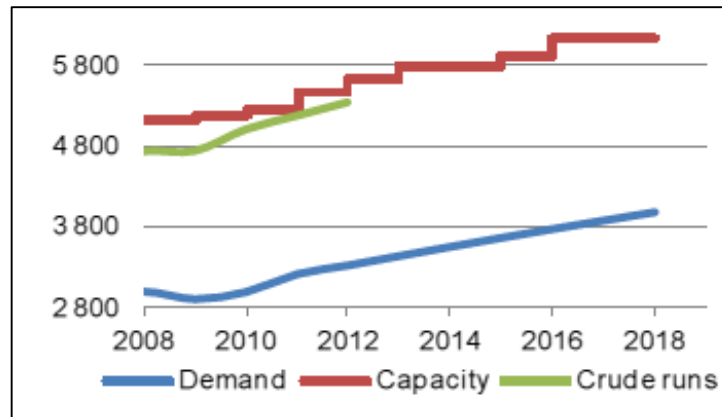
There is evidence that implicit measures were also used to gain the consensus of oil companies in adopting a large-scale investment plan for the refining sector. In 2011, then Prime Minister (now President) Putin called a meeting with the leaders of Russia's major oil companies to discuss the strategic priorities for the country's refining industry. He demanded a formal commitment to investment plans from the oil companies, with the implicit threat that if they were not met there would be punishment by the FAS that, in Putin's words, would

not allow oil companies to profit at the expense of Russian consumers and will respond with appropriate measures, including the appropriation of windfall profits. (Fattouh and Henderson, 2012).

While the exact details of the commitments subsequently obtained have not been made public, Putin made clear that he wanted to see the implementation of the main targets of the Russian Energy Strategy to 2030 (published in 2009); this involved raising Russia's overall refining capacity to 285 mt, increasing overall refining depth from 72 per cent to 85 per cent by 2015, and decreasing fuel oil production by at least 17 per cent (Fattouh and Henderson, 2012).

<sup>61</sup> In Russia, the export duties on petroleum products are charged as a function of the export duty on crude oil. The difference between duties on crude oil and on light oil products, and the even larger difference between duties on crude oil and dark oil products (e.g. fuel oil) were aimed at permitting Russian oil refineries to retain a greater share of their revenue, as a means of financing modernization. In practice, however, this has resulted in the stimulation of primary refining and the export of fuel oil to European refineries. Modernization has been very limited so far (E&Y, 2011).

**Figure 18: Russia – Oil Demand versus Refining Capacity (kb/d)**



Source: IEA (2013, 93).

The Russian government implemented a new '60/66' tax regulation in 2011, which diminished the profitability of fuel oil exports by increasing its taxation from 46.7 per cent of the oil export duty to 66 per cent of the oil export duty. It simultaneously decreased excise tax rates on gasoline and diesel on domestic sales (depending on the standard quality of the product). Using a 'carrot and stick' approach, the Russian government thus provided a clear fiscal incentive to encourage its domestic oil industry to upgrade the country's refining complex, combined with the implicit FAS threat to any non-compliance by the oil companies (Fattouh and Henderson, 2012). As a result, the oil companies presented a massive investment plan; in particular Rosneft, 75 per cent owned by the state, announced the largest investment plan (Fattouh and Henderson, 2012). Figure 18 above shows the IEA projections for Russia's refining capacity to 2018, and Table 3 below shows the capital investment commitments obtained by President Putin from the major oil companies.

**Table 3: Refinery Upgrade Plans of Russian Oil Companies to 2020**

Company	Planned Capital Expenditure (US\$ bn)
Lukoil	18.0
Rosneft	10.3
SurgutNG	7.0
GazpromNeft	6.2
Tatneft	3.0
Bashneft	1.8
TNK-BP	1.3
Slavneft	1.2
Alliance	1.0
<i>Total Expenditure</i>	<i>48.8</i>

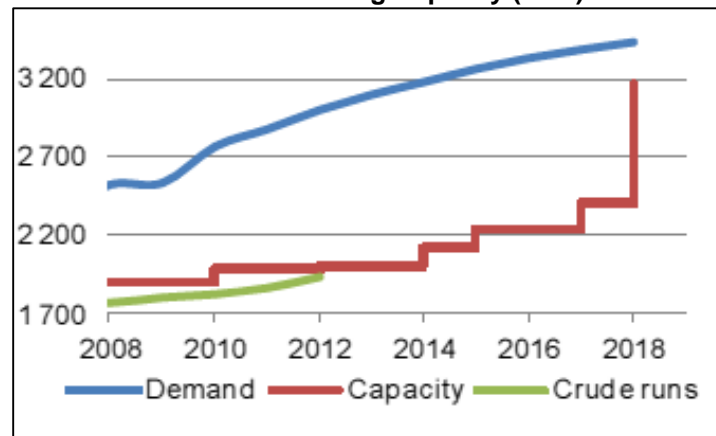
Source: Fattouh and Henderson (2012).

In contrast with Russia, Brazil, which had officially liberalized gasoline and diesel prices by 2002, has faced greater problems in attracting investments into the expansion of its refining capacity, particularly given robust domestic demand. This has pushed Petrobras to increase gasoline and diesel imports over the last few years, resulting in losses in its refining operations largely due to

the use of implicit measures (discussed above) to keep domestic prices low (Chauhan et al., 2014).

Consequently, Petrobras faces difficulties in financing its downstream expansion plans, estimated at US\$ 43.2 billion in its 2013-2017 business plan – these planned projects are very likely to be delayed. Additionally, the dominant position of Petrobras in the Brazilian oil sector has meant that private investment in the downstream sector has also not been forthcoming. In 2013, Petrobras announced a US\$9.9 billion financial restructuring plan, focusing on disinvestments and cost optimisation – but it will still need to find strategic partners to operationalise its ambitious business plan. China’s Sinopec and Petrobras have already begun discussing the construction of the ‘Premium’ refinery.<sup>62</sup> Assuming that Petrobras secures financing for its investment plans, Figure 19 shows the IEA’s forecast for the increase in Brazil’s refining capacity to 2018.

**Figure 19: Brazil – Oil Demand versus Refining Capacity (kb/d)**



Source: IEA (2013, 88).

The discussion above shows that a crucial difference amongst BRIC countries relates to the manner in which governments have incentivized downstream investment irrespective of the existence of price controls. In India and China, government support contributed to the propping up of the finances of state-owned companies, enabling them to undertake investments in spaces where private investment was scarce or not forthcoming. Admittedly the fact that the government was explicitly and officially intervening in pricing policy eased this process. This, however, has not been the case in either Russia or Brazil; liberalization has led governments here to resort to implicit methods of influencing pricing and investment.

## 7. Conclusion and Policy Lessons

This paper has shown that of the four ‘BRIC’ economies, India and China (the two countries that are the largest net importers of oil) have accounted for the largest downstream investments and expansions in refining capacity. (India’s capacity is roughly 300 per cent higher than its domestic production while China’s is 200 per cent higher). However, these are also the two BRIC economies where price controls for petroleum products have been retained by governments,

<sup>62</sup> IEA (2013). Planned investments include: Abreu e Lima 115 + 115 kb/d (2014/2015); COMPERJ 165 + 165 kb/d (2017/2018); Premium I Maranhão 300 kb/d (2018); and Premium II Ceará 300 kb/d (2018).



which have preferred a 'gradual' approach towards the deregulation and liberalization of prices. In contrast, Brazil and Russia, where petroleum product prices were officially liberalized early on (in the early 1990s and early 2000s), have experienced serious constraints in attracting downstream investments and have struggled to expand (in the case of Brazil) or upgrade (in the case of Russia) their refining capacity. These outcomes run counterintuitive to conventional expectation, according to which price liberalization and the alignment of domestic petroleum product prices with international oil prices should be conducive to fostering competition and investment along the entire value chain.

In investigating the reasons for this counterintuitive outcome, an analysis of the 'pass-through' of international price movements to domestic prices for gasoline and diesel, carried out in Section 4 of this paper, has shown broad evidence of price controls being exercised in Brazil and Russia despite the official liberalization of gasoline and diesel prices. These measures, described in Section 5, have been implicit or indirect, with governments typically influencing domestic pricing through intervention in the operations and capital expenditure plans of the NOCs (as is the case in Brazil and Russia where Petrobras and Rosneft – both vertically integrated companies – dominate the refining sector), or by using general business regulation to influence the behaviour of oil companies. The use of implicit measures could be due to the fact that the official policy of price liberalization prevents direct government intervention in principle. As a result, the impact of these implicit price controls is opaque and difficult to measure. In contrast, governments in India and China have used direct measures such as setting prices directly, adjusting federal taxes, and compensating NOCs and marketing/retailing companies as well as specific consumer groups affected by price changes directly using cash transfers. Typically, this has meant that governments in India and China have been visibly compensating their NOCs and oil marketing companies, either partially or entirely, for their losses from selling at a domestic price below international oil prices.

The impacts of price controls are most visible on investments in refining, as losses have typically been concentrated in the refining part of the value chain. Price controls squeeze the margins of oil marketing companies and constrain the amount of capital available for investments into refining. Explicit price controls in India have led to state-supported refinery expansions and have also inadvertently created a space for private sector export-oriented refineries. Similarly in China, the state has driven massive expansion in refining capacity through capital infusions into state-owned oil companies, supporting their investment plans. However, in Brazil and Russia, despite the evidence that price controls have constrained capital expenditure on investment in refinery expansion and upgrades, no such explicit state-supported capital expenditure schemes exist. Furthermore, the impacts are more apparent in Brazil than in Russia, as the finances of Russian NOCs are cushioned to some extent by export revenues. For instance, the use of the 'CIDE' (a federal tax on petroleum products in Brazil) to mitigate the impact of high international oil prices had a limited impact – to the point that the CIDE rate was reduced to zero.

The experiences of the BRIC economies highlight three important lessons. The first is that the impacts of price controls generally tend to be concentrated in one part of the value chain which governments may view as 'manageable' or 'containable' – given that most state-owned oil companies are vertically integrated and there is the perception that they can survive in unprofitable sectors.<sup>63</sup> But these impacts, in fact, have a knock-on effect, as shown in this paper. The knock-on effects in Brazil and Russia relate primarily to investments in refining capacity. However, in India and China, although government support has contributed to the expansion of refining capacity, the knock-on effect of price controls is evident; in India, private sector

<sup>63</sup> Therefore, losses in one part of the vertically integrated company can be offset by profits elsewhere.





investment in petroleum product retailing was crowded out, and in China independent (teapot) refiners have taken the hit.

The second lesson relates to the fact that petroleum product price liberalization is not irreversible – demonstrated by the experiences of Brazil and Russia where price controls were reintroduced implicitly. The continued success of the Chinese and Indian governments' recent price reforms will depend on their ability to sustain them in the long term. The direct transfer mechanism for subsidies being put in place by India serves as an example in this regard; its complete separation from the pricing system *per se* will hopefully prevent intervention in pricing that would otherwise be justified on grounds of pursuing poverty reduction and distributional objectives.

Following on from this, the third lesson relates to the need, post-liberalization (in the case of Brazil and Russia), for policies and price adjustment mechanisms which are both coherent and transparent, and which take into account the potentially negative impacts of price controls on downstream capital expenditure. This ideally necessitates a resolve by governments not to implicitly intervene in NOCs' capital expenditure plans to the detriment of their finances, and to instead institute a compensation scheme targeted directly at consumers – such as the cash transfers used in China and India. In the event that price controls are, nevertheless, reinstated, it is likely that oil companies in net importing countries will be unable to support their capital expenditure plans without compensation for any resulting losses, leading to adverse effects on downstream investment.



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