

Case Studies from the Latin America and Caribbean Region

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PETROLEUM PRODUCT SUBSIDIES

Brazil

Context

Brazil's economic performance in the prereform era of the 1980s was characterized by low growth, high inflation, and substantial fiscal imbalances. Economic growth averaged about 3 percent and inflation averaged 272 percent. Fiscal policy was expansionary, with the overall budget deficit averaging 5 percent of GDP during the period and reaching 7 percent of GDP in 1989. Weak fiscal performance led to an increase in net public debt from 24 percent of GDP in 1981 to almost 40 percent of GDP in 1989. These deteriorating conditions put pressure on the authorities to alter Brazil's import-substitution policies and liberalize the economy (Giambiagi and Moreira, 1999), including in the energy sector.

The state-owned oil company, Petrobras, dominated the oil market in the 1980s. It held a monopoly on the upstream market and on the refining of liquid fuels in Brazil. In addition, Petrobras had a monopoly on crude oil and petroleum product imports. Even though the distribution of fuel products was open to private sector companies, including multinationals, the final consumer price was determined by the government. An oil stabilization fund was established in 1980 to smooth crude oil price volatility. The price of oil sold to the refineries was adjusted to keep the oil costs for Petrobras refineries at a set price determined by the government; the fund accumulated contingent liabilities to Petrobras when international crude prices were high, and these were offset when crude prices were low. The prices established for diesel and liquefied petroleum gas (LPG) were also consistently set below import-parity costs. As a result of increasing oil import costs, the crude oil stabilization fund and Petrobras ran up enormous deficits. To pay for these accumulated losses, the government transferred R\$5.8 billion (0.8 percent of 1995 GDP) to Petrobras in the mid-1990s, and Petrobras had to absorb other losses that were never transparently recorded on the budget.

TABLE 8.1

Brazil: Key Macroeconomic Indicators, 2000–2011					
	2000	2003	2008	2010	2011
GDP per capita (US\$)	3751	3104	8729	10816	12917
GDP growth (percent)	4.31	1.15	5.16	7.49	3.77
Inflation (percent)	6.18	13.72	8.33	8.23	6.97
Overall fiscal balance (percent of GDP)	–3.37	–5.31	–2.34	–5.93	–3.57
Gross public debt (percent of GDP)	51.1	59.6	58.5	63.7	62.2
Net public debt (percent of GDP)	47.7	54.9	38.1	40.2	38.6
Current account balance (percent of GDP)	–3.76	0.76	–1.71	–2.21	–2.12
Oil imports (percent of GDP)	1.19	1.16	1.84	1.21	1.25
Oil exports (percent of GDP)	0.16	0.33	0.33	0.19	0.23
Oil consumption per capita (liters)	412	394	482	624	n.a.
Poverty headcount ratio at US\$1.25 per day (PPP) (percent of population)	11.82	11.21	6.01	6.14	n.a.

Sources: International Energy Agency; IMF, *World Economic Outlook* (WEO); World Bank, *World Development Indicators*.

Note: PPP = purchasing power parity; n.a. = not applicable.

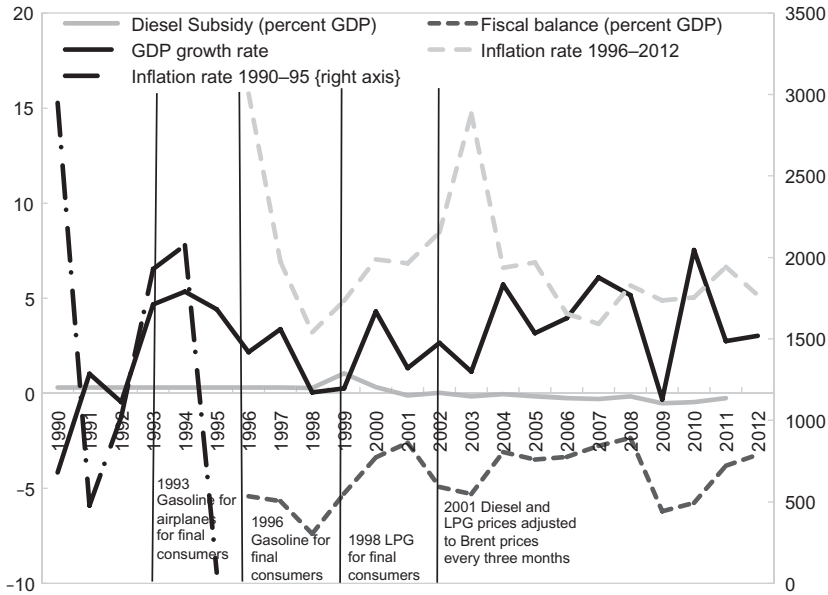
Fuel Pricing Reforms—Early 1990s to 2001

A gradual approach to the removal of subsidies was chosen by the government to deal with opposition from interest groups. To build public support for the reforms, the government promised consumers that privatization and liberalization would lower energy prices and improve services. Even though low prices to consumers had led to the subsidies, the authorities hoped that improvements in efficiency of the refinery would be sufficient to reduce these outlays without increases in consumer prices.

There were several steps involved in liberalizing fuel prices. The process of liberalizing the market began in the early 1990s with the liberalization of prices for petroleum products used primarily by firms, such as asphalt and lubricants (see Figure 8.1). This was followed by a more extensive liberalization that included gasoline prices for final consumers in 1996, LPG for final consumers in 1998, and diesel in 2001. The first products to lose subsidies were generally those consumed by politically weak stakeholders, whereas the politically more difficult subsidies (for liquid fuels used for transport and industry) were removed later. The removal of subsidies for ethanol producers and the suppliers of equipment and services to Petrobras was left to the end of the liberalization program.

Price liberalizations were associated with short-term increases in inflation. The dynamic effects of the liberalization reforms can be seen in Figure 8.1. After each reform, there was a spike in inflation in the short term that eventually died out over the longer term as prices were allowed to fluctuate with developments in international markets.

Petrobras maintained a dominant role in the market despite liberalization. In 1995, the formal monopoly of Petrobras on the upstream market, on refining liquid fuels, and on the imports of crude oil was revoked. In 1997, the Agência Nacional do Petróleo was created to oversee the deregulation and restructuring of the sector and to manage the auctioning of oil fields for exploration. Despite



Sources: IMF staff and authorities.

Note: LPG = liquefied petroleum gas.

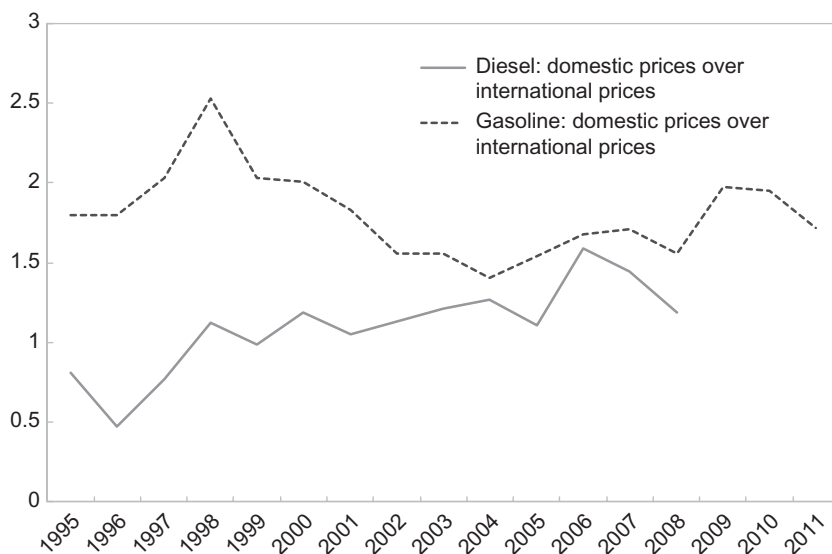
Figure 8.1 Brazil: Macroeconomic Developments and Energy Subsidy Reforms, 1990–2012 (Percent of GDP or rate)

the wide-ranging scope of the authorities' privatization efforts, Petrobras has still managed to preserve a de facto monopoly in refining and distribution.

High rates of inflation and currency depreciation posed significant challenges for containing the fiscal costs of subsidies. To avoid the emergence of subsidies, frequent price increases were necessary in an environment of high inflation. However, diesel price increases did not keep pace with exchange rate depreciation in the late 1990s, leading to an upward spike in diesel subsidies to about 1 percent of GDP in 1999 (Figure 8.1).

Fuel Price Setting Since 2002

Official price liberalization for all fuel products has been in effect since 2002, and this has helped prevent the recurrence of subsidies. Prices were increased and remained above international levels, despite significant pressure on the currency between 2001 and 2003. Fuel prices continued to rise steadily until 2005 and after that remained mostly flat despite fluctuations in international prices (Figure 8.2). There is no official government price setting in the chain of fuel production and marketing. Under the new regulatory scheme, the Agência Nacional do Petróleo monitors fuel prices through its "survey of fuel prices and margins," which includes gasoline, fuel ethanol, diesel, natural gas for vehicles, and liquefied natural gas.



Sources: Country authorities and IMF staff estimates.

Figure 8.2 Brazil: Fuel Price Developments, 1995–2011

Durability of the Reforms

Although officially oil prices are determined by Petrobras, in practice the government has used prices as a tool to control inflation. For instance, the government reduced taxes on gasoline and diesel in 2004 and removed the taxes on LPG and fuel oil so as to keep petroleum prices constant for final consumers. As a result of the lower levy rate and narrower coverage, the aggregate total amount of petroleum taxes has not increased in spite of growing consumption. In most years, the price received by Petrobras, net of fuel taxes, has been insufficient to cover its costs on the sale of these products. The operational losses on this downstream business have been offset by profits on Petrobras's upstream operations.

More recently, the incomplete pass-through of changes in import prices has also had consequences for Petrobras's profits. With the increase in international fuel prices and the sharp exchange rate depreciation between 2010 and 2012, fuel import prices rose substantially and were not fully passed on to consumers. The ratio of domestic prices to international prices for gasoline fell from 1.95 to 1.47 between 2010 and 2012, and the ratio for diesel fell from 1.44 to 1.02. Despite the fuel tax cuts, the net prices received by Petrobras were not enough to compensate for rising import prices. In 2012, Petrobras had profits of US\$10 billion, the lowest level since 2004 and a reduction of 36 percent compared with 2011. In 2013, however, domestic prices were raised twice, and as of May 2013 the ratio of domestic to international prices was 1.55 for gasoline and 1.11 for diesel.

Mitigating Measures

- *Fuel subsidies.* Subsidies for the supply of fuels to thermal power plants in Amazonia, a politically sensitive region, were maintained for a period of 10 years, until 2012.
- *Import tax.* In 2001, the government introduced a new tax on the importation and marketing of petroleum products. The levy raised revenues that were then used to fund (1) subsidies for ethanol producers and the transportation costs of hydrocarbons; (2) LPG used by low-income families; (3) projects oriented to environmental protection; and (4) the construction of roads.
- *Gas voucher.* After the withdrawal of LPG subsidies in 2001, the government introduced a new LPG subsidy in 2002 to assist low-income families' purchase of LPG through a gas voucher. Eligibility was based on a means test.
- *Conditional cash transfers.* A conditional cash transfers program, the Bolsa Escola, was implemented in 2001.

Both of these targeted programs (the gas voucher and Bolsa Escola) were consolidated under a new national flagship conditional cash transfer program, the Bolsa Familia, in 2003.

Lessons

A gradual approach in implementing subsidies removal can help minimize the resistance of opposition groups that benefit from subsidies. The phased removal of subsidies in Brazil was carefully tailored to ensure that the process would be politically acceptable. The first products to lose subsidies (asphalt, lubricants, and gasoline for airplanes) were those that generally benefited politically weak stakeholders, and the politically more difficult subsidies (for liquid fuels used for transport and by industry) were removed last.

Liberalization reforms have more chance to succeed with a popular government. After controlling hyperinflation, which had been chronic for over a decade, President Cardoso's administration was able to capitalize on this political support to undertake his liberalization agenda.

Discretionary policies to adjust oil prices and stabilization funds do not work under unstable macroeconomic conditions and can have adverse consequences for the sector. The oil price stabilization fund had run up an enormous deficit in the 1980s, and the government had to transfer an equivalent of 0.8 percent of the 1995 GDP to Petrobras in the middle of the 1990s to pay for oil fund losses. Moreover, underpricing contributed to low investment in exploration and refining capacity.

Macroeconomic instability can contribute to the emergence of subsidies for products with controlled prices. Diesel subsidies emerged in 1999 in the wake of large currency depreciation and the failure to rapidly adjust fuel prices. The liberalization of prices soon afterward allowed the subsidy reform to remain durable, as prices automatically adjusted with fluctuations in the exchange rate.

Targeted social programs can reduce opposition to subsidy reform and enhance its durability. Brazil adopted a gas voucher to compensate low-income households for the increase in LPG prices after the liberalization in 2001, and subsequently it has adopted a conditional cash transfer program, which supports the durability of the subsidy removal.

The incomplete pass-through of fuel prices to consumers can adversely affect the earnings of state-owned enterprises in the energy sector. The profits of Petrobras declined sharply between 2010 and 2012 as the exchange rate depreciated. Even though energy taxes were reduced, this did not fully compensate for rising import prices.

Chile

Context

Chile depends heavily on fossil fuel imports. The share of crude petroleum production to imports has been declining steadily over the past three decades, from 27 percent in 1990 to under 3 percent in 2011.¹ This reflects the combination of shrinking domestic production (which declined by 75 percent in the past two decades) and buoying consumption (which increased by more than 160 percent since the early 1990s), reflecting strong economic growth.

Oil markets in Chile have a long history of deregulation. From the 1920s until the 1970s, the state played a dominant role in Chilean oil markets—from direct involvement in exploration and production to the creation of the national oil company (ENAP). Government involvement kept prices relatively low over this period through implicit subsidies (O’Ryan and others, 2003). In the 1970s, as part of the general push for economic liberalization in Chile, fuel markets (including LPG) were deregulated. This included opening up markets for pro-

TABLE 8.2
Chile: Key Macroeconomic Indicators, 2000–2011

	2000	2003	2008	2010	2011
Nominal GDP per capita (US\$)	5174.3	4834.8	10710.7	12570.7	14403.1
Real GDP growth (percent)	4.5	3.4	3.0	6.1	5.9
Inflation (percent)	3.8	2.8	8.7	1.4	3.3
Overall fiscal balance (percent GDP)	−0.7	−0.4	4.1	−0.4	1.3
Central government gross debt (percent GDP)	13.3	12.6	4.9	8.6	11.3
Current account balance (percent GDP)	−1.1	−1.1	−3.2	1.5	−1.3
Oil imports (percent GDP)	2.5	2.8	4.0	2.0	2.6
Oil exports (percent GDP)	0.0	0.0	0.0	0.0	0.0
Oil consumption per capita (liters)	577.3	541.7	833.2	984.2	n.a.
Poverty headcount ratio at US\$1.25 per day (PPP) (percent of population)	2.3	2.0	n.a.	n.a.	n.a.
Fuel subsidies (percent GDP)	0.0	0.0	0.0	0.0	0.0

Sources: IEA; IMF, WEO; World Bank, *World Development Indicators*.

¹Balance Nacional de Energia 1988–2011, available at <http://bit.ly/GNmVHP>.

duction, import, distribution, and sale of fuel products. Nevertheless, ENAP maintains exclusive rights to explore and refine and remains an important player in the oil market. In 2010, ENAP supplied about 70 percent of the Chilean demand for gasoline, diesel, and kerosene.²

Reforms Since the Early 1990s

Recognizing the need to smooth the impact of international oil price shocks on domestic consumers, Chile introduced a stabilization mechanism in the early 1990s. Following the spike in oil prices associated with the Gulf War (1990–91), Chile established the Oil Prices Stabilization Fund, Fondo de Estabilización de Precios del Petróleo (FEPP), with an initial fund of US\$200 million (0.5 percent of 1991 GDP). Under this mechanism, the authorities set a reference price based on the expected evolution of c.i.f. prices of crude oil in the medium and long term. The fund operated when international prices deviated by more than 12.5 percent from the reference price, by fully subsidizing the difference between international prices and the upper band and imposing a 60 percent tax on deviations below the lower band. The reference price was updated on an ad hoc basis, and the formula behind its calculation was not made public. There was only one fund covering different products (gas, kerosene, diesel, and LPG), which allowed for cross-product subsidization.

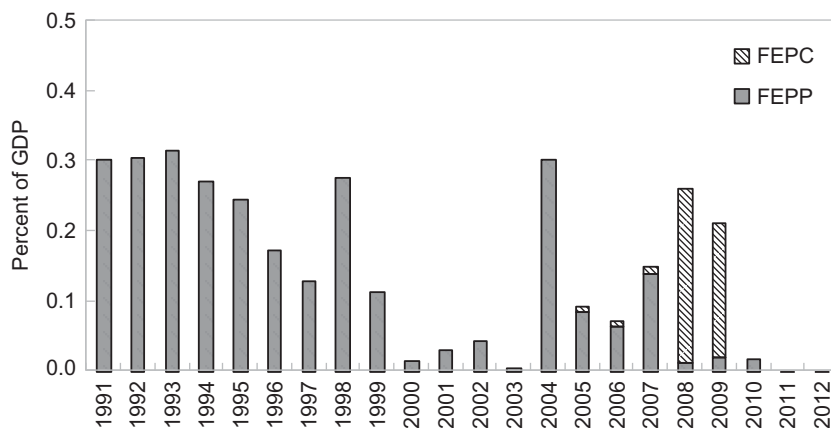
The FEPP operated satisfactorily for nearly a decade but required some reforms in the early 2000s to remain financially sustainable (Figure 8.3). The fund remained relatively healthy for the first eight years of operation. However, the sharp increase in oil prices in the late 1990s nearly depleted the fund (the balance reached US\$50 million in January 2000), and the mechanism failed to operate in late 1999 (Márquez, 2000). At this point, the fund required an emergency injection of capital to continue operating.

The adjustment mechanism was also modified in a number of ways to increase the financial viability of the fund. These included establishing weekly updates to the reference price (which continued to be based on the current and expected evolution of oil prices in the medium term); introducing an explicit limitation to operate the fund subject to the availability of funds; eliminating the asymmetry in the adjustment mechanism (increasing the tax on deviations below the lower band to 100 percent); increasing transparency by making public the formula to adjust the reference price; and introducing separate funds for gas, kerosene, diesel, and LPG. Nevertheless, even after these adjustments, the fund was nearly depleted by 2003. The total fiscal cost of the FEPP over 2000–2005 is estimated at 0.15 percent of 2012 GDP (Vagliasindi, 2013).³

A temporary stabilization fund was established in 2005 in response to supply disruptions. Chile introduced the Fuel Prices Stabilization Fund, Fondo de Estabilización de Precios de los Combustibles (FEPC) as a temporary measure to respond to the spike of prices resulting from the disruption of supply following

²See <http://bit.ly/TsxzGV>.

³See <http://bit.ly/VN9Jo5>.



Source: General Treasury of the Republic of Chile (<http://bit.ly/Wm0e1e>).

Note: FEPC = Fondo de Estabilización de Precios de los Combustibles; FEPP = Fondo de Estabilización de Precios del Petróleo.

Figure 8.3 Chile: Balance of Fuel Stabilization Funds, 1991–2012 (Percent of GDP)

Hurricane Katrina. The mechanism operated in a similar way to the FEPP but relied on a narrower band (5 percent) around a reference price based on the recent and expected evolution of West Texas Intermediate (WTI) prices in the medium term plus a refining fee instead of the price of each derivative product (Organization for Economic Cooperation and Development, 2013). This mechanism was originally intended to be used for about a year but was extended until 2010. The total fiscal cost of the FEPC over 2006–9 is estimated at 0.65 percent of 2012 GDP (Vagliasindi, 2013).

More recently, the stabilization fund was replaced by a tax adjustment mechanism. In 2011, Chile introduced the Consumer's Protection System for Fuel Excise Taxes (Sistema de Protección al Contribuyente ante las Variaciones en los Precios Internacionales de los Combustibles [SIPCO]). Instead of a fund, this adjustment mechanism relies on excise taxes to smooth transmission of changes of international prices to domestic prices. The mechanism reduces excise taxes for fuel when international prices jump above a 10 percent band around a reference price and increasing excise taxes when international prices fall below the band.⁴ The reference price is based on the recent and expected evolution of WTI prices in the medium term plus a refining fee for each derivative product. What is important is that by focusing on excise taxes, this excludes large industries (mining, electric generators) that can recover these taxes through deductions (Larrain, 2010).

⁴SIPCO was originally introduced with a 12.5 percent band, which was narrowed to 10 percent in September 2012. See <http://bit.ly/VRAadr>.

Mitigating Measures

Chile has a range of well-targeted safety net programs that it uses to protect low-income groups from economic and other shocks (World Bank, 2010b). In 2005, Chile compensated five million low-income households to offset the impacts of rising fuel prices and another 1.6 million households whose electricity consumption was less than 150 kWh per month. A further payment to low-income families was made in 2006.

Lessons

The costs of smoothing mechanisms depend on their design. For example, there is some evidence that narrowing the bands from 12.5 percent over 1991–2005 to 5 percent over 2006–10 greatly increased cost. In addition, the asymmetric nature of the original adjustment mechanism contributed to the depletion of the fund. These suggest that, when thinking about the parameters of an adjustment mechanism, specific details can have a great impact on the cost of these programs. Thus, countries considering introducing these smoothing devices should carry out illustrative scenarios, including sensitivity analysis of the parameters, to ensure that the cost of the program would be in line with expectations.

Adjustment mechanisms should be transparent. Initially, the FEPP used a secret formula and allowed for ad hoc adjustments in the reference band. This added unnecessary uncertainty regarding the timing and size of future fuel price adjustments and the extent to which international shocks would be transmitted to local prices. Such uncertainty is at odds with the goal of stabilizing prices. The reform of the early 2000s shows that it is possible to use a transparent rules-based approach to meet these goals.

It is possible to target the smoothing adjustment to smaller consumers. One important characteristic of the latest Chilean reform is that it excludes large energy consumers by applying the adjustment through an excise tax that is generally deducted by industries in mining, electricity, and other large fuel consumers. This sends a clear signal that these large consumers should be able to hedge on their own and helps to buy in support for reforms from the general population.

Smoothing mechanisms should offer only temporary relief. In Chile, the fuel market has been liberalized since the 1970s. Thus, these smoothing mechanisms have been in part a product of popular outcry related to higher fuel prices (in the context of the Gulf War and Hurricane Katrina, for example). Nevertheless, Chile has used these mechanisms for temporary support—all of the adjustment schemes intended that the increases to international prices be eventually transmitted to local prices in full. It is important to note that Chile has achieved this while devoting important resources to a well-targeted safety net (World Bank, 2010b).

Peru

Context

Peru is a net importer of oil, and its import bill is highly dependent on developments in international prices. Diesel accounts for the largest share of fuel

consumption (47 percent) followed by LPG (19 percent). Historically, the consumer prices of these commodities have been politically sensitive. Diesel is primarily consumed by public transportation vehicles, and most households use stoves fueled with LPG.

Peru's oil market is a duopoly controlled by two companies responsible for refining and distribution, the private Relapasa and the public PetroPerú. Before the creation of the fuel product stabilization fund in 2004, the authorities regulated consumer prices by managing the prices of fuels sold by PetroPerú. Because PetroPerú controlled a significant share of the market, Relapasa had to adjust its prices based on that benchmark, incurring losses when international prices were above domestically regulated retail product prices.

Reforms Since 2004

Price smoothing mechanism. In May 2004, beleaguered by increasing prices amid a global hike in commodity prices, a smoothing price mechanism was put in place. The mechanism sought to smooth changes in domestic prices by adjusting excise taxes. Excise taxes were adjusted downward (upward) each time international prices breeched an upper (lower) price band in order to keep the consumer price constant. However, this initial attempt to limit the pass-through from international to domestic prices did not perform well, mainly because rising prices created sizeable revenue losses. These losses, in turn, caused liquidity shortfalls in the treasury because of the shortfall in expected revenues.

In September 2004, the authorities created a stabilization fund—the Fondo de Estabilización de Precios de Combustibles (FEPC). The fund involved a complex payment system financed directly by the treasury. All types of gasoline and LPG were included as products whose prices were to be regulated by the FEPC. The objective of the FEPC was to prevent the full transmission of international to domestic prices. This was to be achieved by providing transfers to the refineries in periods when international prices were rising to compensate them for their increase in supply costs. When reference prices were above the upper limit of the

TABLE 8.3
Peru: Key Macroeconomic Indicators, 2000–2011

	2000	2003	2008	2010	2011
Nominal GDP per capita (US\$)	1334.7	2258.9	4481.5	5290.8	6007.9
Real GDP growth (percent)	2.8	4.0	9.8	8.8	6.9
Inflation (percent)	3.76	2.3	5.8	1.5	3.4
NFPS balance (percent of GDP)	–3.4	–1.7	2.4	–0.3	1.9
Gross public debt (percent of GDP)	n.a.	46.9	25.9	23.3	21.2
Current account (percent of GDP)	–2.9	–1.5	–4.2	–2.5	–1.9
Oil imports (percent of GDP)	3.1	2.3	4.1	2.6	3.2
Oil exports (percent of GDP)	1.1	1.0	2.1	2.0	2.7
Oil consumption per capita (liters)	n.a.	332.5	380.2	377.2	317.8
Poverty headcount ratio at US\$1.25 per day (PPP) (percent of population)	n.a.	9.5	6.2	4.9	n.a.

Sources: IEA; IMF; WEO; World Bank, *World Development Indicators*.

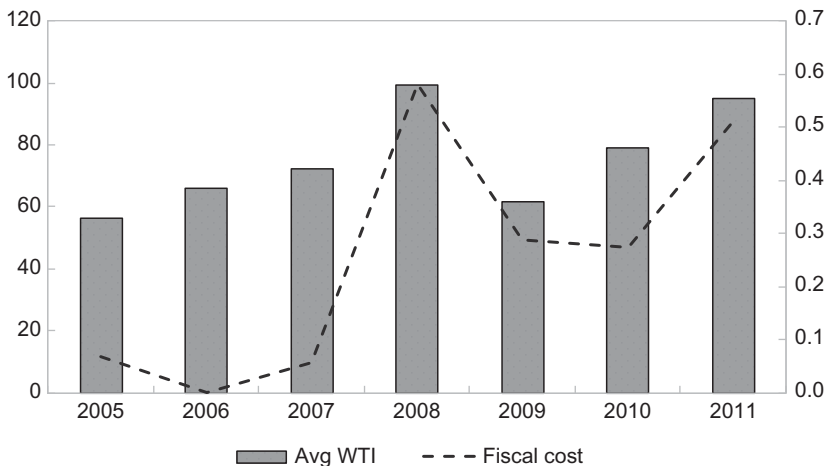
Note: NFPS = Non-financial public sector.

price band, a contingent credit for refineries (payable by the treasury) was created. Similarly, if reference prices were below the lower limit, a contingent liability for refineries (payable to the treasury) was created.

The performance of the FEPC prior to the reforms was mixed. Although it has been successful in limiting the pass-through from international to domestic prices, the FEPC has also generated sizeable fiscal costs (Figure 8.4). The latter is the consequence of the upward trend in oil prices and the authorities' reluctance to increase the upward limit of the band. This combination of higher prices and frozen bands has proven to be a drain on fiscal resources. Another problem has been the accumulation of contingent liabilities. There is no legal obligation of the treasury to pay the refineries; instead, the treasury has paid when it has had sufficient cash on hand. This has created acute liquidity issues, particularly in 2008, for the refineries, which have made repeated requests to the treasury to honor its obligations.

Stabilization fund. Reforming the FEPC had long been an objective of the authorities. By mid-2008, when the FEPC had accumulated a record amount of liabilities (equivalent to the total cost of the extreme-poverty alleviation program), the authorities disseminated a study on the distributional impact of the subsidy. The study confirmed the regressive impact of this untargeted subsidy. It found that the subsidy received by the wealthiest 20 percent of the population was eight times the amount received by the poorest. The study received widespread media coverage. Nevertheless, the authorities could not reach a consensus among stakeholders to proceed with a comprehensive reform, although they managed to implement a modest increase in the pricing bands.

In 2010, amid a reduction in international prices, the authorities saw a window of opportunity to introduce reform measures. In April they introduced a rule to



Source: IMF staff estimates based on data from the Peruvian authorities.

Note: Avg WTI = average based on the West Texas Intermediate.

Figure 8.4 Peru: International Price and the Fiscal Cost of Fuel Subsidies, 2005–11

TABLE 8.4

Peru: Spending of the Oil Price Stabilization Fund by Type of Product, 2011		
	Million US\$	Percent
Total	871.8	100.0
Diesel	440.6	50.5
LPG	261.0	29.9
Gasolines	106.5	12.2
Industrial petroleum	28.1	3.2
Gasohols	35.7	4.1

Source: Country authorities.

automatically update the band limits every two months. Price changes would nevertheless be limited to 5 percent, with an exception for domestic consumption of LPG, whose maximum price change was 1.5 percent. The authorities also created a special subaccount in the treasury to finance the FEPC, thus reducing uncertainty regarding payments to refineries. In October 2011, all types of high-octane gasoline, which is used by luxury cars, were excluded from the FEPC, with international price changes being fully passed on to domestic prices. In August 2012, regular gasoline was also removed, with only diesel and LPG for household consumption remaining (LPG for industrial consumption was excluded).

The reform has been successful in reducing the fiscal cost of the subsidy without provoking widespread opposition. At the same time, the reform did not touch on the most politically sensitive products, diesel and LPG, which also represent the largest share of subsidy spending (80 percent—see Table 8.4). As a result, the total fiscal savings of the reform have been modest: around 0.1 percent of GDP.

Mitigating Measures

Mitigating measures were not implemented, because reforms did not reduce subsidies for the products most heavily consumed by the poor.

Lessons

Regulating consumer prices by adjusting taxes can lead to challenges for fiscal management. Fuel products are widely consumed, so the fiscal impact of even minor changes in taxation could be significant. Although a smoothing mechanism can help shield households from the shock of higher oil prices, it can create challenges for fiscal management, even when there is fiscal space to accommodate some price smoothing. For example, the transfer of resources from the treasury to the FEPC put pressure on the treasury's liquidity and complicated its cash management, particularly because of the strong seasonal behavior of revenues and spending in Peru. Varying commodity taxation according to international prices can also create uncertainties with respect to projected revenues, given the volatility of commodity prices. To address these concerns, either more automatic adjustment mechanisms or a larger reserve of funding built up during good times is needed.

Price smoothing mechanisms should incorporate automatic adjustments of pricing bands. The core principle of a price smoothing mechanism is that it mod-

erates only volatility. However, if prices are on an upward trend, the smoothing mechanism must have some method to adjust to this. In the case of Peru, the decision to keep the bands untouched in the wake of an upward trend in oil prices has proven to be fiscally costly. This has in effect converted a price smoothing mechanism into a pure subsidy.

Rules for the payment of refineries for subsidies should be explicit. This can be done with a special subaccount, which ideally should be integrated into the Treasury Single Account to ensure transparency. This will make explicit the size of the subsidy and also give certainty to the amounts that could be compensated to refineries.

Introducing subsidy reforms during “good times” can enhance the chances of success. The decision to introduce the reform in early 2010, during a period of stable prices and strong economic growth, helped make the reform politically more palatable.

To ensure public support, subsidy reforms can most fruitfully begin with the products consumed most heavily by higher-income groups. In the case of Peru, this meant starting the reform by raising high-octane gasoline prices. Despite the fact that fiscal savings under this approach can be limited, such a strategy may be warranted to allow stakeholders to see the effects of the reform and allow more time to muster support for a broader reform. This approach also signals the direction of reform and can pave the road for further, more ambitious reforms. There is nevertheless a trade-off involved between fiscal savings and safeguarding against adverse effects on lower-income groups, as indicated by the modest savings that subsidy reform has achieved thus far for Peru.

ELECTRICITY SUBSIDIES

Brazil

Context

During the 1980s, Brazil’s economy was characterized by low growth and macro-economic imbalances. Growth averaged about 3 percent and inflation was high, averaging 272 percent. Fiscal policy was expansionary, with the overall budget deficit averaging 5 percent of GDP during the period and reaching 7 percent in 1989. The weak fiscal performance led to an increase in net public debt from 24 percent of GDP in 1981 to almost 40 percent in 1989. These deteriorating conditions put pressure on the authorities to alter Brazil’s import-substitution policies and liberalize the economy (Giambiagi and Moreira, 1999).

Privatizing the power sector was part of the authorities’ reform efforts in this area and was attractive for three reasons. First, privatizing some of the assets of the sector held out the promise of raising substantial revenues for the treasury and clearing debt from the federal government off the books. In 1993, this external debt contracted by the electricity companies amounted to almost 25 percent of Brazil’s external debt. Second, selling off the state-owned distribution companies meant that a significant amount of state-level debt owed to the national government

would be paid. Third, the federal government believed that it would be difficult to raise sufficient amounts of capital on its own to invest in the facilities needed to meet growing demand. Electricity investment dropped by almost half, in the 1990s, relative to the decade before.

Other sector-specific factors also motivate the privatization. These included high construction costs incurred because of cartels among contractors, excessive employment, and high power losses throughout the system. Finally, private distribution companies would establish tariff structures that were more reflective of costs.

The performance of the sector in the 1980s was poor and provided the primary impetus for structural change. A number of factors contributed to this weak performance, including the regulatory framework for determining prices. This was determined by the Planning Secretary of the President's Office. Price adjustments were influenced by the desire to contain inflation and were unrelated to developments in costs and the need to ensure an adequate rate of return to capital. This approach to pricing resulted in declining electricity tariffs in real terms, and it undermined incentives for improving productivity. It led to a worsening of the companies' financial positions and an increase in external debt to finance expansion of the electricity supply. As a result, debt accumulated in the CRC (Cuenta de Resultados a Compensar) reached US\$26 billion in 1993, which was absorbed by the central government in the same year. Assuming this represented the accumulation of losses over the preceding five years, the subsidy to the electricity sector had averaged 0.7 percent of GDP per year in 1987 (Figure 8.5).

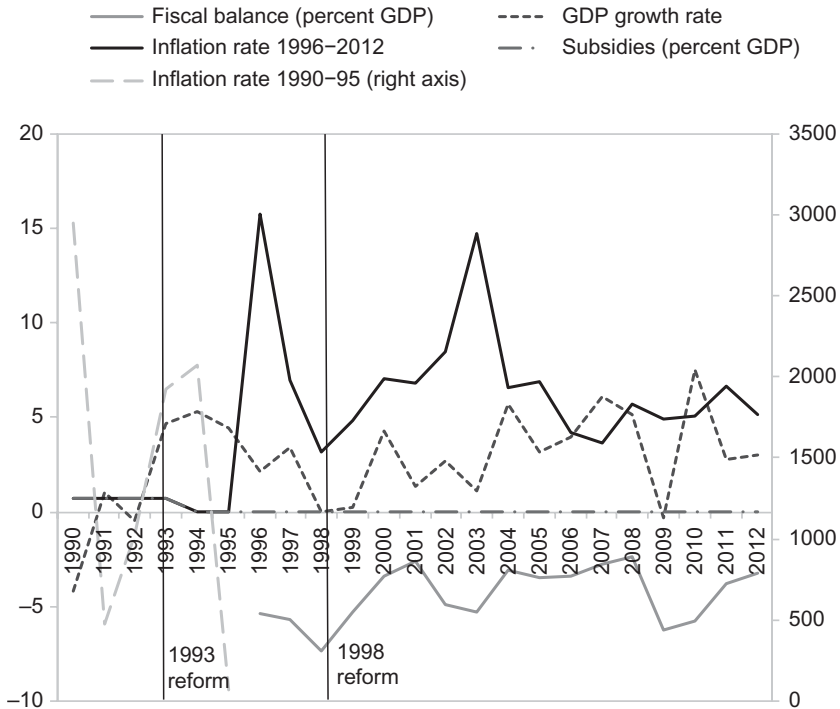
Reforms Since 1993

The overall plan devised for the power sector was for all assets to be privatized to the fullest extent possible. In order to remove constraints for privatization, in 1993 the requirements of uniform national tariffs and of a mandated 10 percent rate of return on capital were removed. Significant pricing reforms were also undertaken. To increase the transparency of the pricing system in the electricity sector, a law was enacted in 1998 to unbundle the electricity sector system.

The government decided to begin the electricity sector privatization with the distribution companies. This was motivated by the fact that substantial productivity gains could be realized in these activities. In addition, the financial problems in these companies had ripple effects in the entire sector, because financially insolvent distribution companies were not paying electricity generation companies. Fixing the finances of the distribution companies and making them credit-worthy buyers of energy had a positive effect on the power generation sector and helped pave the way for privatizing these assets.

The privatization program took place over a 10-year period, from 1993 to 2003, and resulted in a competitive generation market with a number of private companies competing. The distribution sector was privatized under a series of monopoly licenses, although over time the end users could obtain third-party access to the grid and the industry was under regulatory jurisdiction.

The 1993 reforms were successful, from a fiscal point of view, in eliminating subsidies. However, the privatization of the sector was not accompanied by a



Sources: IMF staff estimates; IMF WEO database.

Note: Data on fuel subsidy were calculated from the average of debt accumulated under the Fuel Consumption Account from 1987 to 1993 and paid by the treasury in 1993; from 1990 to 1994 annual inflation was over 500 percent.

Figure 8.5 Brazil: Macroeconomic Developments and Electricity Subsidy Reforms, 1990–2012 (Percent of GDP or rate)

strong regulatory framework. This led to an uncertain investment climate and the suspension in the construction of some distribution lines. The lack of investment in electricity generation, combined with a drought in 2001, caused Brazil's hydro-electricity reservoirs to become dangerously depleted. To avoid a larger energy supply crisis, the government introduced regulations that forced producers to ration the electricity they supplied to consumers and allowed distributors to raise their tariff levels to compensate for their losses during the rationing period. These decisions produced a sudden drop in GDP and a steep increase in tariff levels. This undermined public support for privatization and contributed to a slowdown in progress in liberalizing the energy sector.

Even after the privatization, cross-subsidies were maintained. They were designed to support rural electrification and establish special rates for low-income households. But no uniform method to implement these cross-subsidies was developed, and each concessionaire was at liberty to fashion its own. The result is a potpourri of subsidies whose targeting efficiency is almost impossible to measure.

In summary, the electricity market reform in Brazil was successful in many respects. It eliminated government subsidies to the sector, depoliticized tariff

increases, secured the expansion of electricity generation (post-2001), and reduced vulnerabilities associated with the external debt acquired by electricity sector companies. Mota (2003) evaluated the effects of the electricity sector privatization on supply quality and cost and found that the efficiency gains resulting from cost reduction were substantial. These were obtained through the reduction, by half, in the number of employees from 1994 to 2000. With respect to the impact of privatization on quality, there has been an improvement in security and availability of energy supply.

Mitigating Measures

- *Cross-subsidies.* Even after the liberalization of the sector, regional cross-subsidies remained.
- *Regional fuel subsidy.* A levy on electricity tariffs was introduced in 1993 to subsidize the supply of fuels to the inefficient thermal power plants of Amazonia, a politically sensitive region, and was maintained for an extended period.
- *Income-based tariff relief.* In 1995, legislation was approved to provide lower electricity tariffs for low-income households.
- *Free power to rural areas.* In 2003, the government introduced a program to finance free electricity to ten million rural people, which is funded by levies on electricity tariffs.

Lessons

The need to correct macroeconomic imbalances can provide political support for reforms. The low economic growth, hyperinflation, and high external debt burden of Brazil in the 1980s forced politicians to react and consider subsidy reform as an option to confront these imbalances.

Controlling increases in electricity prices as an anti-inflationary tool can have adverse fiscal consequences. The adoption of this policy in the 1980s resulted in financial losses for the sector, the accumulation of debt, and underinvestment.

Reforms have a better chance of success with a popular government. After controlling the hyperinflation, which had been chronic for over a decade, President Cardoso's administration was able to capitalize on this political support to undertake his agenda for energy sector liberalization.

Targeted social programs can reduce opposition to subsidy reform and assist the poor. Brazil has adopted a policy to reduce electricity tariffs for low-income people and has adopted a conditional cash transfer program, which facilitated the implementation of the subsidy reforms.

Privatization of electricity companies without a strong regulatory framework can have serious consequences and undermine popular support for energy reform. The unclear rules in the first years of the privatization process resulted in low levels of investment and contributed to the energy crisis in 2001.

TABLE 8.5

Mexico: Key Macroeconomic Indicators, 2000–2011

	2000	2003	2008	2010	2011
Nominal GDP per capita (US\$)	6858.8	6864.7	10050.5	9218.5	10153.3
Real GDP growth (percent)	6.0	1.4	1.2	5.5	4.0
Inflation (percent)	9.5	4.6	5.1	4.2	3.4
Overall fiscal balance (percent GDP)	–3.1	–2.3	–1.1	–4.3	–3.4
Public debt (percent GDP)	42.6	45.6	43.1	42.9	43.8
Current account balance (percent GDP)	–2.8	–1.0	–1.4	–0.3	–0.8
Oil imports (percent GDP)	1.1	1.2	3.3	2.9	3.7
Oil exports (percent GDP)	2.4	2.7	4.6	4.0	4.9
Oil consumption per capita (liters)	505.6	529.9	653.8	607.0	n.a.

Sources: IEA; IMF; WEO; World Bank, *World Development Indicators*.

Mexico

Context

Mexico has a sound macroeconomic policy framework but suffers from high income inequality and poverty. Fiscal and monetary fiscal policies are underpinned by a fiscal rule and inflation targeting. Mexico's Gini coefficient averaged 0.48 in the late 2000s, which indicates a significantly higher degree of inequality than the OECD average. About 46 percent of Mexico's total population lives in poverty, while about 10 percent lives in extreme poverty.

The electricity sector is dominated by the government-owned Comisión Federal de Electricidad (CFE). CFE is a major electricity generator, accounting for about three-quarters of total generation capacity of the country, and monopolizes transmission and distribution functions.⁵ Although independent power producers entered the market after deregulation in the generation sector in 1992, they account for only about one-quarter of generation assets. The dominance of the public sector in the electricity market is mandated by constitutional provisions.⁶ The Comisión Reguladora de la Energía is the regulator of the electricity sector.

Electricity tariffs have been set below cost-recovery levels. A study of tariff structures in 2005–6 showed that tariffs were below cost-recovery levels for most residential users (by about 40 percent) and the agricultural sector (by about 30 percent). Subsidies were smaller for other sectors, but tariffs still failed to cover costs. The benefit incidence of these subsidies is highly regressive (Komives and others, 2009). The Ministry of Finance and Public Credit has tariff-setting authority, and tariffs have been adjusted monthly in propor-

⁵Before 2009, electricity distribution was operated under a duopoly by CFE and Luz y Fuerza del Centro (LFC), a government-owned company that served customers in metropolitan Mexico City. In 2009, the government closed down LFC to eliminate direct government subsidies to LFC to cover operating losses and let CFE take over LFC's service areas.

⁶The Public Electricity Service Act, which was amended in 1992 and opened electricity to the private sector, lists the following areas as falling outside of "public service" and thus open to private sector participation: self-supply, cogeneration, independent power production, imports, exports, and small-scale generation.

tion to changes in input prices for electricity generation, transmission, and distribution, rather than based on actual service costs. Tariff systems are highly complex, with over a hundred different billing possibilities for residential users. They are built on block tariffs, which provide larger subsidies for users who consume less. In addition, a scheme of “summer subsidies” provides a discount to residential customers residing in warm areas to compensate for higher air-conditioning costs.

Electricity subsidies impose a substantial fiscal burden. Electricity subsidies were estimated at about 0.5 percent of GDP in 2011, a similar ratio as 10 years earlier (Figure 8.6).⁷ The government does not record the subsidies explicitly. Under the so-called *aprovechamiento* system, CFE must pay the government a return on the fixed assets (9 percent), but this is transferred back from the government to CFE to cover tariff subsidies and infrastructure investment (OECD, 2004). Since 2002, the amount collected under such a system has fallen short of what was needed to cover tariff subsidies, thus eroding CFE’s capital base (Komi-ve and others, 2009).

Reforms Since 1999

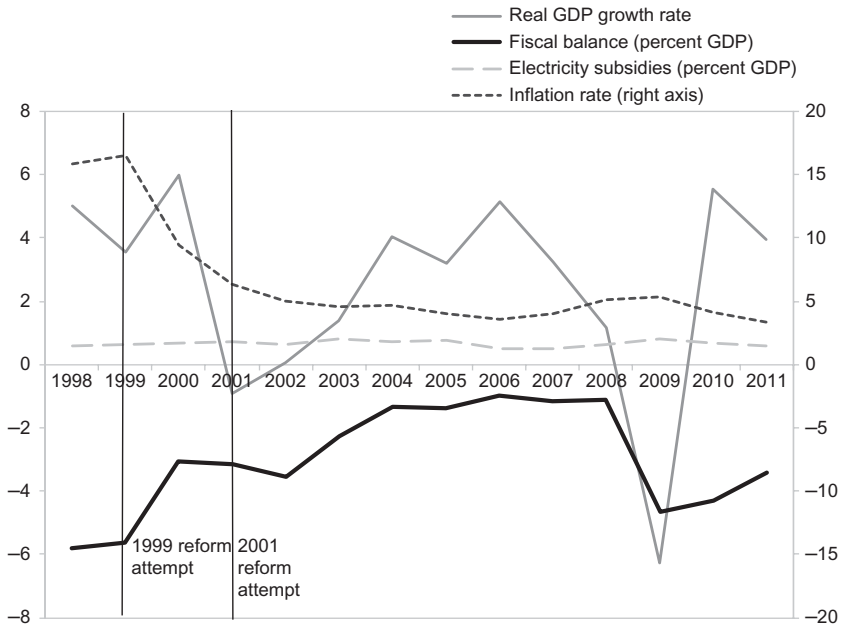
Reform initiatives for the electricity sector and subsidies have been unsuccessful.

A comprehensive reform proposed in 1999, to include market privatization, failed on account of legal impediments, opposition from interest groups, lack of public awareness, and political impasse. In 1999, President Zedillo proposed a comprehensive reform package that included unbundling of generation, transmission, and distribution; creation of a wholesale market; privatization; and strengthening of the regulator’s power. It failed for a number of reasons. These included legal impediments, such as the need for a constitutional amendment to allow broad private sector participation; opposition from powerful interest groups, mainly consumers and labor unions for CFE employees, who opposed tariff reform and privatization; limited public awareness about problems in the electricity sector and public opinion against privatization;⁸ and a political impasse in the period leading up to the 2000 presidential election (Carreón-Rodríguez, San Vicente, and Rosellón, 2003).

A reform proposal launched by President Fox in April 2001, although it de-emphasized privatization, also failed. The president could not forge a consensus in the congress to turn the bill into a law. In addition to the obstacles against President Zedillo’s reform, President Fox also had to cope with political fragmentation after a drastic change in the political landscape. In particular, after

⁷This estimate of the cost of subsidies, from the authorities, exceeds the figure provided by the IEA, which indicates subsidies were about 0.1 percent of GDP or smaller in 2007–10. The reason is that the IEA approach only measures consumer subsidies using the price-gap approach and does not measure the total budget support that also compensates producers for inefficiencies (producer subsidies).

⁸According to a public opinion poll in 2002, 49 percent of respondents acknowledged problems in the electricity sector. Thirty-five percent of respondents opposed private investment, while 17 percent supported a strategy of encouraging it (Carreón-Rodríguez, San Vicente, and Rosellón, 2003).



Sources: Comisión Federal de Electricidad; IMF staff estimates; IMF, WEO.

Figure 8.6 Mexico: Macroeconomic Developments and Electricity Subsidy Reforms, 1998–2011

seven decades of continuous ruling, the Partido Revolucionario Institucional (PRI) was defeated in the 2000 presidential election, and political parties were forced to compromise with labor unions and powerful conglomerates, which had earlier been submissive to presidential administrations under the PRI. Various reform proposals made by opposition parties, as well as their petition to the Supreme Court on the constitutionality of President Fox's proposal, complicated the debate.

Tariff reform was implemented in 2002 to reduce electricity subsidies. In particular, a tariff was introduced that exceeded the long-term marginal cost for customers with high consumption volumes. However, the reform did not lead to a permanent reduction in subsidies, as the scheme of “summer subsidies” allowed customers to be reclassified into highly subsidized categories.

Mitigating Measures

- *Tariff structure.* The residential tariff structure is characterized by an extensive list of subsidized categories. Tariffs are subsidized for customers who consume less and reside in warm areas. The latter, called a scheme of “summer subsidies” applicable during the summer season, classifies customers into six categories based on average real temperatures (cutoffs are 25°C, 28°C,

30°C, 31°C, 32°C, and 33°C), with customers living in warmer areas receiving higher subsidies. More customers were reclassified from lower-temperature categories to higher-temperature ones during the 2000s, further increasing the overall subsidy bill (Komives and others, 2009).

- *Social safety net, including cash transfers.* Mexico has a well-developed safety net program, Oportunidades, that has not yet been used in the context of subsidy reform. Oportunidades is a cash transfer targeted for families of extreme poverty and is conditional on school attendance and medical check-ups of family members. In 2008, about five million families benefited from the program. Benefits consist of not only direct cash transfers and education grants but also cash compensation for energy consumption expenses. Oportunidades offers more effective and better-targeted pro-poor subsidies than fuel and electricity subsidies do (authorities also acknowledge that the incidence of the electricity subsidy is highly regressive), while it cost only one-fifth of total fuel subsidies (including subsidies for petroleum products and electricity) in 2008.

Lessons

The failure of the electricity sector reform in Mexico reveals the numerous obstacles to successful reform. A long history of tariff subsidies and the vertical and horizontal dominance of a state-owned company created strong interest groups against reform, especially consumers and labor unions. Political fragmentation, the constitutional mandate for the public sector to run the electricity sector, and public opinion against privatization made the reform even more challenging. The extensive list of subsidized customer categories has contributed to an increase in overall subsidies, as customers have been reclassified into highly subsidized categories. Mexico's case also suggests that the existence of a targeted safety net and commitment to sound macroeconomic policies are not sufficient to successfully reform electricity subsidies. A thorough public information campaign, as well as transparent accounting of electricity subsidies, would be a key first step for successful reform.