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## Reallocation of Investment from the Public to the Private Sector

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### Abstract

*Pakistan's economic growth has experienced a significant decline since the 1990s, with an average GDP growth reduction of 1.84 percentage points, coupled with a 3.11 percentage points decrease in investment growth (Ikram and Mahmood, 2022). A key factor contributing to this downturn is the decline in public investment, particularly in the electricity sector. During the 1990s, structural adjustment policies emphasized privatization, leading to the withdrawal of public investment from the electricity sector. This shift resulted in the establishment of 18 independent power plants (IPPs), based on the premise that private entities would operate more efficiently.*

*However, this privatization policy, particularly in the energy sector, raises critical questions about its effectiveness in reallocating resources from the public to the private sector. Using comprehensive data from sources such as the Ministry of Energy (MOE), Central Purchase Power Agency (CPPA), State of Industry Reports (SOIR), and Power Statistics, a detailed analysis reveals significant changes in the energy mix. The public-to-private electricity generation ratio shifted from 70:30 to 40:60, while the generation mix transitioned from low-cost hydel to high-cost thermal energy. Consequently, the electricity growth rate halved post-privatization (since 1994), and private sector electricity generation cost nearly doubled those of the public sector by 2023. The growing share of capacity purchase price relative to energy purchase price in total power purchase price implies a potential increase in costs for consumers. These findings challenge the efficiency hypothesis underlying privatization in Pakistan's energy sector. Policymakers are faced with two potential paths: restructuring the private sector or regaining control over electricity generation to ensure cost-effectiveness and sustainability. Addressing*

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*these issues is crucial for revitalizing Pakistan's energy sector and supporting broader economic recovery.*

## **Introduction**

The economic reforms of the 1990s marked a transformative period in Pakistan's policy framework, driven by structural adjustment programs introduced by the International Monetary Fund (IMF) and the World Bank. These reforms emphasized privatization, deregulation and liberalization, particularly targeting the energy sector. Public investment in electricity generation was withdrawn, and private sector participation was encouraged through the energy policies of 1994 and 1998, developed in collaboration with the World Bank and Asian Development Bank (ADB). These policies facilitated the establishment of Independent Power Plants (IPPs), assigning them electricity generation responsibilities while leaving transmission and distribution to the public sector.

The reforms of 1990's led to the unbundling of Pakistan's major public sector entity, Water and Power Distribution Authority (WAPDA), and initiated a comprehensive privatization program in the power sector. This transition was based on the expectation that private sector participation would enhance economic efficiency and improve resource allocation.

Arising from the policy shift of 1990's, this paper explores two plausible research questions:

- a) How effective has the reallocation of resources from the public to the private sector been?
- b) Does the empirical evidence support the argument that privatization has benefited the energy sector?

## **Literature review**

We now examine the literature on the role of public goods, the declining trend in public goods, and the influence of the regulatory policy environment on the provision of public goods, in context of the two plausible questions outlined in the introduction.

### ***The role of public goods***

There is considerable consensus in the literature that public investment in both developing and developed countries drives economic growth. Studies consistently show a strong positive correlation between GDP growth and public sector investment, particularly, the scaling up of public investment in infrastructure,

construction, transport (Aschauer, 1989; Cullison, 1993; Barro, 1989; Ramirez, 2000; Papagni et al., 2021).

Further, in low-income economies where public investment in energy and infrastructure is lacking, the resulting loss of productivity levels has been detrimental to GDP growth (Straub, 2008; Briceño-Garmendia et al., 2008).

Empirical simulations further underscore the growth impact of public investment in infrastructure. Calderón and Servén (2003, 2008) demonstrated that if low-income countries halved their infrastructure gap to match middle-income countries, their annual GDP growth rates could increase by 2 percent. For sub-Saharan Africa, achieving the infrastructure level of Mauritius could boost GDP growth by 2.3 percent annually. Furthermore, catching up with infrastructure levels in advanced economies like South Korea could raise GDP growth by 2.6 percent annually. Therefore, public investment in infrastructure has a well-observed and significant impact on output growth, while constraints on such public goods can be detrimental to output growth.

#### *The declining trend in public goods*

Despite the recognized importance of public investment, a declining trend in the provisioning of public goods has been observed globally. Low-income countries face an infrastructure deficit compared to middle-income countries, with the gap widening over time (Briceño-Garmendia et al., 2008). The drop in public investment growth is not limited to low-income countries; it is also evident in advanced and emerging economies, largely due to episodes of fiscal consolidation (Breunig & Busemeyer, 2012; Väilä & Mehrotra, 2005).

The literature identifies the regulatory policy environment as a key factor influencing public sector investment in advanced, middle, and low-income countries. This environment is shaped by both internal public sector policies and external advocacy.

#### *The role of government expenditure*

The role of government expenditure in economic growth is well-recognized in public policy and growth literature. Endogenous growth models, such as those by Barro (1990), Barro and Sala-i-Martin (1992, 1995), and Mendoza (1997), emphasize the mechanisms through which fiscal policy influences investment levels, output and steady-state growth rates. Empirical studies, including Kneller et al. (1999), support these models, highlighting that productive government expenditure on health, education, and infrastructure significantly enhance growth, while non-productive spending does not.

However, pursuing fiscal discipline often reduces public investment. The literature on achieving fiscal discipline suggests that the governments' ability to allocate resources to public investment decreases as pressures for fiscal consolidation increase. In most economies, whether rich or poor, there is a tendency for discretionary government expenditures to shrink, with most of these falling under public investment expenditures (Streeck & Mertens, 2011; Breunig & Busemeyer, 2012). Additionally, policymakers typically increase spending on current expenditures during favorable economic conditions but adjust capital expenditures during downturns (Ardanaz & Izquierdo, 2017).

Martner and Tromben (2005) show that from 1998 to 2003, when Latin American countries implemented fiscal reforms, governments postponed public investment projects rather than cutting current expenditures. Similarly, Tellez et al. (2020) argue that public investment in advanced economies has been at historical lows since the 1980s, primarily due to rigid fiscal rules exerting downward pressure on public investment.

Fedelino and Hemming (2005) propose modifying traditional fiscal policy frameworks by examining fiscal indicators and targets better suited to safeguarding public investment. They conclude that public investment should be financed from public resources, with borrowing for such investments delinked from overall borrowing or public debt.

Empirical evidence from Ardanaz et al. (2021) shows that a fiscal consolidation of at least 2 percent of GDP is associated with an average 10 percent reduction in public investment in countries with no fiscal rule or with rigid fiscal rules. Conversely, under flexible fiscal rules, the negative effect of fiscal adjustments on public investment disappears. Thus, fiscal rules significantly impact GDP growth.

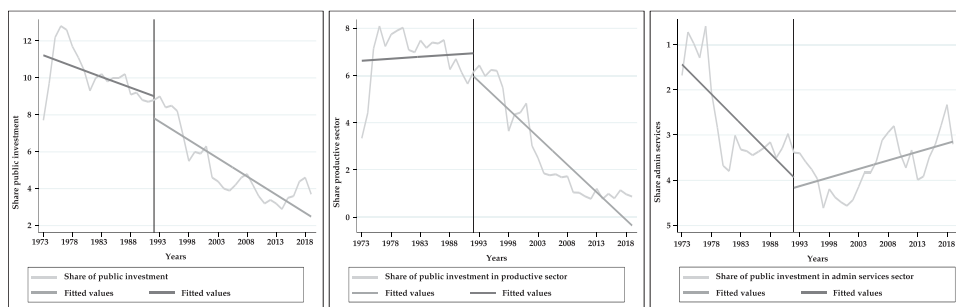
The literature demonstrates that public investment has significantly declined globally, with developing countries experiencing more severe consequences than developed ones. This decline is attributed largely to the regulatory policy environment, shaped by multilateral institutions, which negatively impacts fiscal indicators, such as development and public investment expenditures. These findings are particularly relevant to Pakistan's structural reforms in the 1990s, which shifted the energy sector from public to private sector.

The following sections will examine the decline in macroeconomic determinants of GDP growth during the 1990s, analyze the privatization policy in the energy sector, and provide a description of the data and discussion of the two research questions.

### Drop in the Macro Determinants of GDP growth in Pakistan

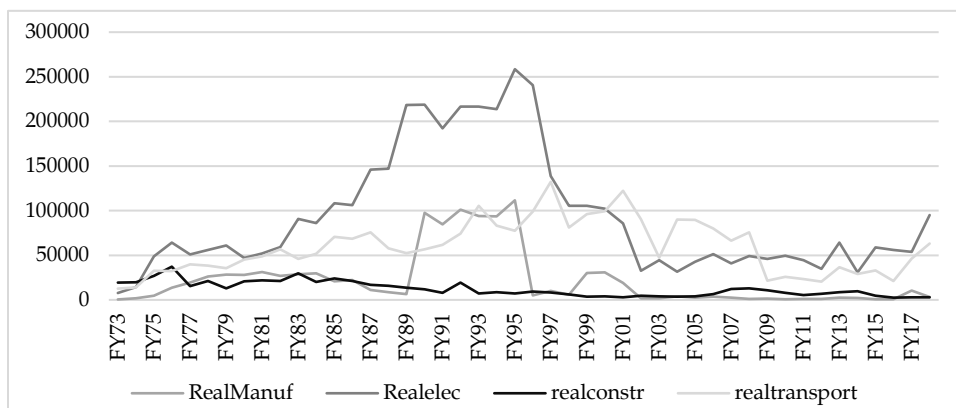
Ikram (2022) highlight that Pakistan's GDP growth dropped by an average of 1.84 percentage points, aligning with a decline in investment growth by 3.11 percentage points. This reduction is primarily attributed to a significant drop in public investment over time, while the private sector remained constant (Figure 3). The decline in public investment has been particularly pronounced in the productive sectors (Figure 1) with electricity sector experiencing the most substantial decrease (Figure 2). Figures 1 through 3 illustrate these trends.

**Figure 1: Share of Public Investment in Productive sectors and Administrative and Services**



a) Share of Public Investment      b) Share of Public investment      c) Share of Public Investment  
in Productive sectors      in Administrative and Services  
Sector

**Figure 2: Public Investments by Sector (Millions - Rs)**

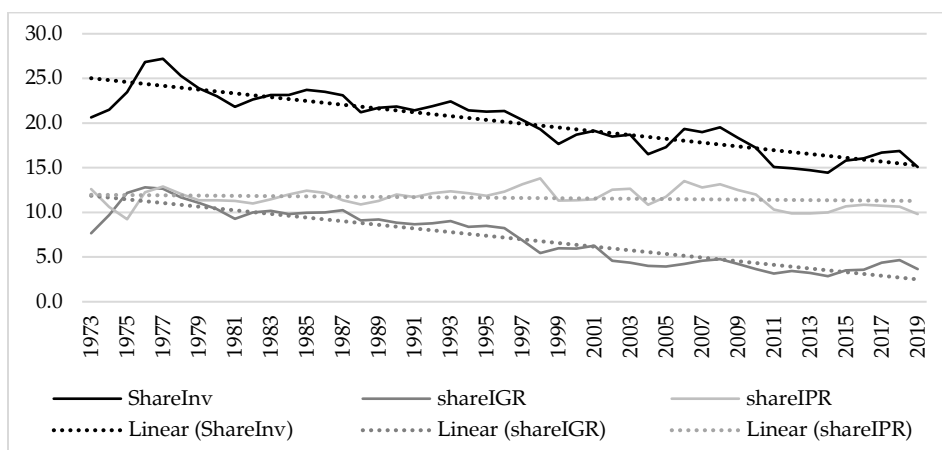


Four major productive sectors, manufacturing (RealManuf), electricity (Realelec), construction (realconstr) and transport (realtransport). were analyzed on the basis of the relative share value and fluctuations of each subsector in the

total productive sector investment. The real values of public investment in the selected subsectors are plotted in Figure 2 above.

The analysis of public investment trends in Pakistan's productive sectors reveals a consistent decline across all selected subsectors. Public investment in electricity rose until 1993, peaked that year, and then experienced a sharp decline. Similarly, public investment in transport increased until 1996 before declining. Construction showed a steady downward trend throughout the period, while manufacturing saw growth until 1994, followed by a significant drop.

**Figure 3: Share Total Investment (shareInv), Share Public Investment (ShareIGR), and Share Private Investment (ShareIPR) as % of GDP**



### Privatization of Energy Sector

In the period leading up to the mid-1980s, Pakistan's energy requirements were met by two public sector organizations: WAPDA and KESC. These entities were responsible for generating, transmitting, and distributing electricity, primarily using hydropower (Kamal & Naqvi, 2008).

However, inefficiency, mismanagement, low productivity, and mounting debt plagued these organizations. By the mid-1980s, public sector's inability to address electricity shortages became increasingly evident.

In response, Pakistan sought assistance from the World Bank in 1987 to encourage private sector participation in the energy sector and attract private investors. In June 1988, the World Bank sanctioned a US\$150 million Private Sector Energy Development Project to support this initiative. The project aimed to mobilize the private sector resources to address power shortages and reduce widespread load shedding (Fraser, 2005).

Furthermore, Pakistan's dependency on the IMF further acted as a catalyst for significant policy changes, particularly through the Structural Adjustment Program (SAP) initiated in 1988 in cooperation with Government of Pakistan (GOP) (Anwar & Iqbal 1996; McGillivray 2003; Jafarey 1992). The program emphasized privatization of the public sector, and deregulation of economic structures and institutions. A primary focus was the power sector, with policies in the early 1990s aimed at withdrawing public investment, especially from the electricity sector. The energy policies of 1994 and 1998, developed in collaboration with the World Bank and Asian Development Bank, sought to increase private sector involvement through the establishment of Independent Power Plants (IPPs). Under these policies, IPPs were tasked slowly with electricity generation, while the public sector retained responsibility for purchasing electricity from the IPPs, and handling transmission and distribution to consumers (Parish, 2006).

These reforms led to institutional changes, including the unbundling of WAPDA. The economic efficiency hypothesis argued that privatization in the power would enhance private sector involvement and improve efficiency.

This economic efficiency associated with privatization in Pakistan's power sector hypothesis had several implications:

- 1) Private sector capacity for power generation would substitute public sector capacity.
- 2) Adding private sector capacity for power generation would increase the rate of capacity growth.
- 3) Private sector capacity would be more efficient in production costs than public sector capacity.
- 4) The gains from cheaper production costs by private sector capacity would be passed on to the consumer, enhancing welfare.
- 5) The increase in investment in more efficient private sector capacity would at least compensate for the drop in investment in less efficient public sector capacity.

While the process of privatization in the power sector has been accomplished, none of the other implications (2 to 5) have followed.

## **Data**

The data for our analysis on the electricity sector is sourced from multiple government sources, including the Central Power Purchase Agency (CPPA), state of industry reports by the National Electric Power Regulatory Authority (NEPRA) (2006–2023) and the National Transmission and Distribution Company (NTDC).

***How effective has the reallocation of resources from the public to the private sector been?***

To answer the first research question, the analysis focuses on the energy sector and examines the transfer of resources from the public to the private sector. Using long-run time series data for public and private sector electricity production, Tables 1 and 2 illustrate sector-wise and source-wise generation data. These tables highlight the gradual substitution of public sector capacity by private sector capacity for power generation.

The reallocation has shifted from the public sector to the private sector and from hydropower to thermal electricity production. Total electricity generation increased tenfold from 14 GWh in 1981 to 141 GWh by 2021. Until 1995, all electricity was generated by the public sector but private generation began following investments around 1992. By 2022, private sector generation accounted for 62% of total production, compared to the public sector's 38%.

Table 1 shows a shift in Pakistan's electricity generation sources. Until 1995, hydropower accounted for 60% and thermal power for 40%, with hydropower produced by the public sector. The introduction of IPPs led to a reliance on thermal source, changing the ratio to 25% hydro and 75% thermal. This reflects a transfer of resources from the public to the private sector, aligning with privatization policies emphasizing private sector efficiency.

***Does the empirical evidence support the efficiency hypothesis, privatization has been beneficial for the energy sector?***

To assess the efficiency hypothesis favoring privatization, we consider three key indicators:

- i. Rate of growth of electricity generation
- ii. Cost of production of electricity
- iii. Financial implications for the GOP

The substitution of public sector investment by private sector investment in electricity generation should have raised the growth rate of total electricity generation. However, Figure 4 shows the opposite. The growth rate of total electricity generation was 8 percent before 1992 but halved to 4 percent per afterward. This decline coincides with the reduction in public investment around 1992.

Electricity generation growth dropped from 8% to 4%. Therefore, we conclude that the first argument for efficiency does not hold, as the rate of growth of electricity decreased rather than increased after private sector involvement.

**Table 1: Source Wise Energy Generation (GWh)**

| Year    | Public |         |         |              | Private      |         |       |      |               | Public and Private total |
|---------|--------|---------|---------|--------------|--------------|---------|-------|------|---------------|--------------------------|
|         | Hydro  | Thermal | Nuclear | Total Public | Hydro (IPPs) | Thermal | Solar | Wind | Total Private |                          |
| 1981-82 | 9526   | 4660    | 0       | 14186        | 0            | 0       | 0     | 0    | 0             | 14186                    |
| 1982-83 | 11366  | 4554    | 0       | 15920        | 0            | 0       | 0     | 0    | 0             | 15920                    |
| 1983-84 | 12822  | 4737    | 0       | 17559        | 0            | 0       | 0     | 0    | 0             | 17559                    |
| 1984-85 | 12245  | 5907    | 0       | 18152        | 0            | 0       | 0     | 0    | 0             | 18152                    |
| 1985-86 | 13804  | 6661    | 0       | 20465        | 0            | 0       | 0     | 0    | 0             | 20465                    |
| 1986-87 | 15251  | 7058    | 0       | 22309        | 0            | 0       | 0     | 0    | 0             | 22309                    |
| 1987-88 | 16689  | 9015    | 0       | 25704        | 0            | 0       | 0     | 0    | 0             | 25704                    |
| 1988-89 | 16196  | 9555    | 0       | 25751        | 0            | 0       | 0     | 0    | 0             | 25751                    |
| 1989-90 | 16925  | 12153   | 0       | 29078        | 0            | 0       | 0     | 0    | 0             | 29078                    |
| 1990-91 | 18298  | 13653   | 0       | 31951        | 0            | 0       | 0     | 0    | 0             | 31951                    |
| 1991-92 | 18647  | 16010   | 0       | 34657        | 0            | 0       | 0     | 0    | 0             | 34657                    |
| 1992-93 | 21111  | 15157   | 0       | 36268        | 0            | 0       | 0     | 0    | 0             | 36268                    |
| 1993-94 | 19436  | 17494   | 0       | 36930        | 0            | 0       | 0     | 0    | 0             | 36930                    |
| 1994-95 | 22858  | 17158   | 0       | 40016        | 0            | 0       | 0     | 0    | 0             | 40016                    |
| 1995-96 | 23206  | 18457   | 0       | 41663        | 0            | 161     | 0     | 0    | 161           | 41824                    |
| 1996-97 | 20858  | 17068   | 0       | 37926        | 0            | 10740   | 0     | 0    | 10740         | 48666                    |
| 1997-98 | 22060  | 15200   | 0       | 37260        | 0            | 13580   | 0     | 0    | 13580         | 50840                    |
| 1998-99 | 22448  | 13769   | 0       | 36217        | 0            | 15326   | 0     | 0    | 15326         | 51543                    |
| 1999-00 | 19288  | 19064   | 0       | 38352        | 0            | 17418   | 0     | 0    | 17418         | 55770                    |
| 2000-01 | 17196  | 16798   | 1565    | 35559        | 63           | 22773   | 0     | 0    | 22836         | 58395                    |
| 2001-02 | 18941  | 18620   | 1662    | 39223        | 115          | 21458   | 0     | 0    | 21573         | 60796                    |
| 2002-03 | 22253  | 19570   | 1386    | 43209        | 97           | 20658   | 0     | 0    | 20755         | 63964                    |
| 2003-04 | 27372  | 21012   | 1559    | 49943        | 105          | 18931   | 0     | 0    | 19036         | 68979                    |
| 2004-05 | 25588  | 22181   | 2295    | 50064        | 83           | 23233   | 0     | 0    | 23316         | 73380                    |
| 2005-06 | 30751  | 22479   | 2170    | 55400        | 104          | 26535   | 0     | 0    | 26639         | 82039                    |
| 2006-07 | 31846  | 21587   | 1944    | 55377        | 96           | 32163   | 0     | 0    | 32259         | 87636                    |
| 2007-08 | 28536  | 20497   | 2455    | 51488        | 131          | 34439   | 0     | 0    | 34570         | 86058                    |
| 2008-09 | 27636  | 19568   | 1058    | 48262        | 547          | 35340   | 0     | 0    | 35887         | 84149                    |
| 2009-10 | 27927  | 565     | 2095    | 30587        | 19632        | 38452   | 0     | 0    | 58084         | 88671                    |
| 2010-11 | 31685  | 305     | 2930    | 34920        | 13044        | 42342   | 0     | 0    | 55386         | 90306                    |
| 2011-12 | 28166  | 436     | 4413    | 33015        | 12652        | 43711   | 0     | 6    | 56369         | 89384                    |
| 2012-13 | 29326  | 662     | 3668    | 33656        | 13838        | 40072   | 0     | 38   | 53948         | 87604                    |
| 2013-14 | 31084  | 989     | 4431    | 36504        | 14248        | 43721   | 28    | 230  | 58227         | 94731                    |
| 2014-15 | 31525  | 1020    | 5033    | 37578        | 14223        | 44441   | 231   | 464  | 59359         | 96937                    |
| 2015-16 | 33151  | 1132    | 3885    | 38168        | 17294        | 44650   | 657   | 780  | 63381         | 101549                   |
| 2016-17 | 31084  | 1016    | 5860    | 37960        | 19821        | 47316   | 664   | 1339 | 69140         | 107100                   |
| 2017-18 | 27431  | 1137    | 8800    | 37368        | 17087        | 62487   | 665   | 2118 | 82357         | 119725                   |
| 2018-19 | 31146  | 1432    | 9038    | 41616        | 13590        | 62571   | 657   | 3166 | 79984         | 121600                   |
| 2019-20 | 37431  | 1795    | 9735    | 48961        | 8205         | 60753   | 662   | 2457 | 72077         | 121038                   |
| 2020-21 | 37144  | 1922    | 10936   | 50002        | 7079         | 68896   | 727   | 2550 | 79252         | 129254                   |
| 2021-22 | 33449  | 2374    | 18304   | 54127        | 6596         | 76154   | 0     | 4411 | 87161         | 141288                   |

Notes: The Table 1 shows Source Wise Energy Generation (GWh). Energy mix has changed From Public to Private and from Hydro to Thermal. Pre 1982, there was no private energy generation. Post 1997, the private energy generation was 3/4th of total energy generation in Pakistan.

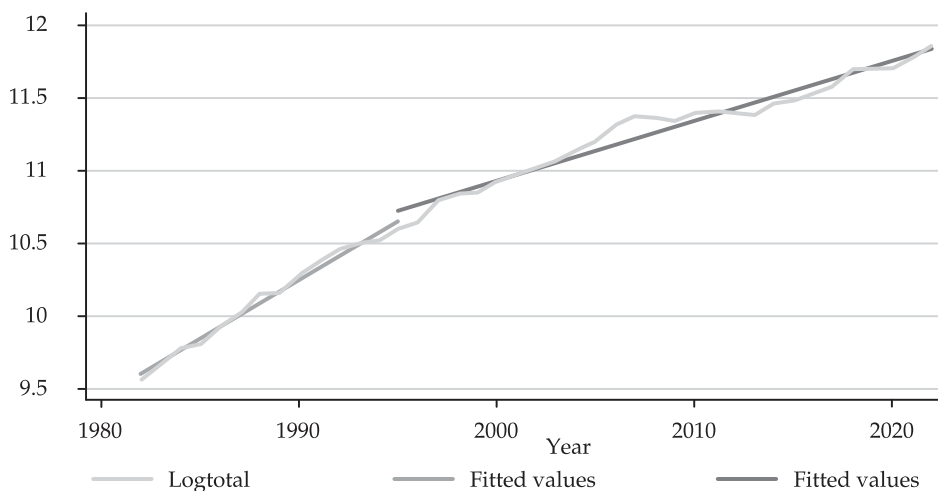
Source: NEPRA and NTDC.

**Table 2: Public and Private Energy Generation (GWh)**

| Year    | Public |                | Private |                | Total   |
|---------|--------|----------------|---------|----------------|---------|
|         | GWh    | Percentage (%) | GWh     | Percentage (%) | GWh     |
| 1981-82 | 14,186 | 100%           | 0       | 0%             | 14,186  |
| 1982-83 | 15,920 | 100%           | 0       | 0%             | 15,920  |
| 1983-84 | 17,559 | 100%           | 0       | 0%             | 17,559  |
| 1984-85 | 18,152 | 100%           | 0       | 0%             | 18,152  |
| 1985-86 | 20,465 | 100%           | 0       | 0%             | 20,465  |
| 1986-87 | 22,309 | 100%           | 0       | 0%             | 22,309  |
| 1987-88 | 25,704 | 100%           | 0       | 0%             | 25,704  |
| 1988-89 | 25,751 | 100%           | 0       | 0%             | 25,751  |
| 1989-90 | 29,078 | 100%           | 0       | 0%             | 29,078  |
| 1990-91 | 31,951 | 100%           | 0       | 0%             | 31,951  |
| 1991-92 | 34,657 | 100%           | 0       | 0%             | 34,657  |
| 1992-93 | 36,268 | 100%           | 0       | 0%             | 36,268  |
| 1993-94 | 36,930 | 100%           | 0       | 0%             | 36,930  |
| 1994-95 | 40,016 | 100%           | 0       | 0%             | 40,016  |
| 1995-96 | 41,663 | 100%           | 161     | 0%             | 41,824  |
| 1996-97 | 37,926 | 78%            | 10740   | 22%            | 48,666  |
| 1997-98 | 37,260 | 73%            | 13580   | 27%            | 50,840  |
| 1998-99 | 36,217 | 70%            | 15326   | 30%            | 51,543  |
| 1999-00 | 38,352 | 69%            | 17418   | 31%            | 55,770  |
| 2000-01 | 35,559 | 61%            | 22836   | 39%            | 58,395  |
| 2001-02 | 39,223 | 65%            | 21573   | 35%            | 60,796  |
| 2002-03 | 43,209 | 68%            | 20755   | 32%            | 63,964  |
| 2003-04 | 49,943 | 72%            | 19036   | 28%            | 68,979  |
| 2004-05 | 50,064 | 68%            | 23316   | 32%            | 73,380  |
| 2005-06 | 55,400 | 68%            | 26639   | 32%            | 82,039  |
| 2006-07 | 55,377 | 63%            | 32259   | 37%            | 87,636  |
| 2007-08 | 51,488 | 60%            | 34570   | 40%            | 86,058  |
| 2008-09 | 48,262 | 57%            | 35887   | 43%            | 84,149  |
| 2009-10 | 30,587 | 34%            | 58084   | 66%            | 88,671  |
| 2010-11 | 34,920 | 39%            | 55386   | 61%            | 90,306  |
| 2011-12 | 33,015 | 37%            | 56369   | 63%            | 89,384  |
| 2012-13 | 33,656 | 38%            | 53948   | 62%            | 87,604  |
| 2013-14 | 36,504 | 39%            | 58227   | 61%            | 94,731  |
| 2014-15 | 37,578 | 39%            | 59359   | 61%            | 96,937  |
| 2015-16 | 38,168 | 38%            | 63381   | 62%            | 101,549 |
| 2016-17 | 37,960 | 35%            | 69140   | 65%            | 107,100 |
| 2017-18 | 37,368 | 31%            | 82357   | 69%            | 119,725 |
| 2018-19 | 41,616 | 34%            | 79984   | 66%            | 121,600 |
| 2019-20 | 48,961 | 40%            | 72077   | 60%            | 121,038 |
| 2020-21 | 50,002 | 39%            | 79252   | 61%            | 129,254 |
| 2021-22 | 54,127 | 38%            | 87161   | 62%            | 141,288 |

Notes: Table 2 shows public and private source wise energy generation (GWh). In 1997 public constituted 78 % of energy generation as compared to 22 % of energy generation by the private sector. Compared to 2022 where public sector constituted 38 % of energy generation as compared to 62 % of energy generation by the private sector. This clearly exhibits that the energy mix has changed from the public to the private sector. Source: NEPRA and NTDC.

**Figure 4: Substitution of Public Sector Investment by Private Sector  
Investment in Electricity Generation**



| Regression Equations – log Total (Public + Private) |                                                    |
|-----------------------------------------------------|----------------------------------------------------|
| Pre 1996                                            | $\log \text{ total} = -150.77 + 0.08 \text{ year}$ |
| Post 1996                                           | $\log \text{ total} = -69.80 + 0.04 \text{ year}$  |

### The cost of production of electricity

The second indicator for evaluating the efficiency hypothesis is the cost of electricity production, comparing public and private sector performance. Privatization was expected to reduce costs through economies of scale, but the data does not support this claim. Table 3 and Figure 5 provide comparative production costs for 2006–2023. In 2006, the public sector's cost of electricity generation was PKR 2 per kWh, while the private sector, operating for a decade by then, produced electricity at PKR 8 per kWh— four times higher. By 2023, public sector costs rose to PKR 17 per kWh, but private sector costs increased even more sharply to PKR 31 per kWh.

We now have a three-agent game, with possible welfare gains for consumers and public and private sector producers. However, there have been no efficiency gains which can be passed on to enhance consumer welfare. The private sector's generation costs have consistently exceeded those of the public sector, reaching nearly twice the cost by 2023. This indicates that privatization has not led to the expected cost reductions or efficiency improvements that could benefit consumers.

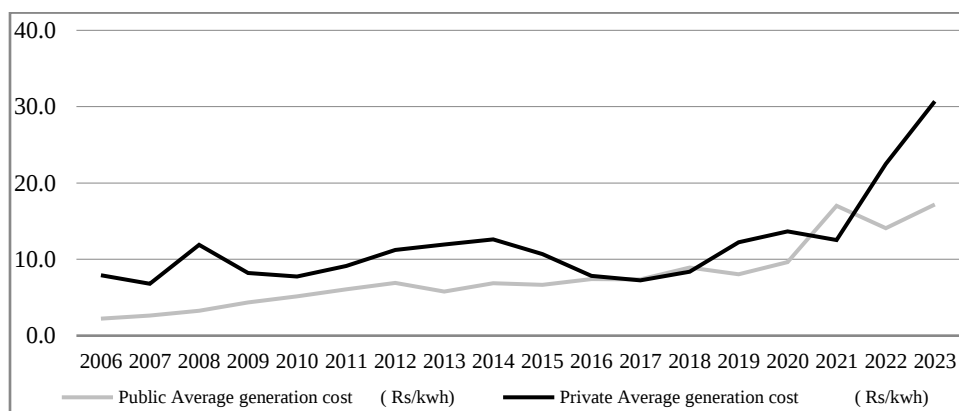
**Table 3: Estimated Average Generation (Public Vs. Private)**

| <b>Table 3: Estimated Average Generation cost Public vs. Private from FY 2006 to 2023</b> |                                                    |                                                     |
|-------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
|                                                                                           | <b>Public Average generation cost<br/>(Rs/kwh)</b> | <b>Private Average generation cost<br/>(Rs/kwh)</b> |
| 2006                                                                                      | 2.2                                                | 7.9                                                 |
| 2007                                                                                      | 2.7                                                | 6.8                                                 |
| 2008                                                                                      | 3.3                                                | 11.9                                                |
| 2009                                                                                      | 4.4                                                | 8.2                                                 |
| 2010                                                                                      | 5.2                                                | 7.7                                                 |
| 2011                                                                                      | 6.1                                                | 9.2                                                 |
| 2012                                                                                      | 6.9                                                | 11.2                                                |
| 2013                                                                                      | 5.8                                                | 11.9                                                |
| 2014                                                                                      | 6.9                                                | 12.6                                                |
| 2015                                                                                      | 6.6                                                | 10.7                                                |
| 2016                                                                                      | 7.4                                                | 7.8                                                 |
| 2017                                                                                      | 7.4                                                | 7.3                                                 |
| 2018                                                                                      | 8.9                                                | 8.4                                                 |
| 2019                                                                                      | 8                                                  | 12.2                                                |
| 2020                                                                                      | 9.7                                                | 13.7                                                |
| 2021                                                                                      | 17                                                 | 12.5                                                |
| 2022                                                                                      | 14.1                                               | 22.5                                                |
| 2023                                                                                      | 17.2                                               | 30.7                                                |

Source: Authors own calculation

Note: Table 3 shows estimated Average Generation cost Public vs. Private from FY 2006 to 2023. In 2006, the Private Sector Generation Cost was much higher than the Public sector Generation Cost. Source author's estimation based on data from State of Industry report (2006 to 2023), NEPRA, Power System Statistics (48th Edition to 38th Edition), NTDC and Electricity Marketing Data, NTDC.

**Figure 5: Estimated Average Generation cost Public vs. Private from FY 2006 to 2023**



Note: Figure 5 shows estimated average generation cost public vs. Private from FY 2006 to 2023. Private sector generation cost is much higher than public sector generation cost.

Source: state of Industry Report (2006 to 2023), NEPRA, power system statistics (48th edition to 38th edition), NTDC and electricity marketing data, NTDC.

## Financial cost of generation to the Government of Pakistan

We now examine the third indicator to examine the financial cost to the GOP and, ultimately, to consumers, focusing on payments made to IPPs from the GOP.

Figure 6 estimates gains for public- and private-sector electricity producers from 2014 to 2025, using a methodology outlined in Box 1. The total power purchase price is divided into two components: the energy purchase price (EPP), representing production cost and capacity purchase price (CPP), which the GOP pays private producers for installed capacity, regardless of actual electricity generation. The capacity purchase price effectively serves as a guaranteed gain for private producers.

Table 4 shows that in 2014, the capacity producer price was a small fraction of the energy purchase price. However, by 2025, this capacity producer price is projected to double the purchase price, doubling the gains for private electricity producers.

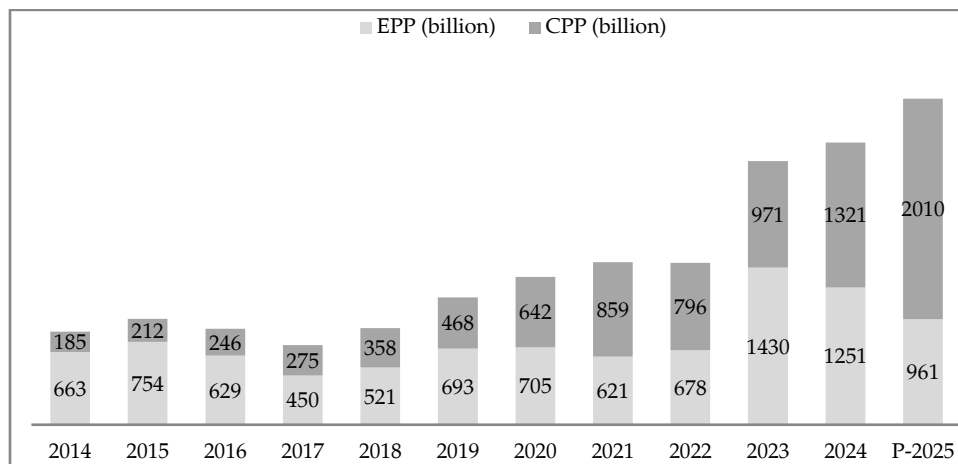
The government of Pakistan is paying high financial costs to IPPs. The share of CPP is increasing relative to the share of EPP, resulting in the government paying high-capacity charges. Consequently, consumers are burdened with higher electricity rates per unit.

**Table 4 : Energy Purchase Price (EPP ) Vs. Capacity Purchase Price (CPP)**

| Year   | Energy Purchase Price<br>EPP (billion) | Capacity Purchase Price<br>CPP (billion) | Power Purchase Price<br>PPP (Billion) |
|--------|----------------------------------------|------------------------------------------|---------------------------------------|
|        | A                                      | B                                        | A+B                                   |
| 2014   | 663                                    | 185                                      | 848                                   |
| 2015   | 754                                    | 212                                      | 966                                   |
| 2016   | 629                                    | 246                                      | 875                                   |
| 2017   | 450                                    | 275                                      | 725                                   |
| 2018   | 521                                    | 358                                      | 879                                   |
| 2019   | 693                                    | 468                                      | 1161                                  |
| 2020   | 705                                    | 642                                      | 1347                                  |
| 2021   | 621                                    | 859                                      | 1480                                  |
| 2022   | 678                                    | 796                                      | 1474                                  |
| 2023   | 1430                                   | 971                                      | 2401                                  |
| 2024   | 1251                                   | 1321                                     | 2572                                  |
| P-2025 | 961                                    | 2010                                     | 2971                                  |

Source: Ministry of Energy, GOP

**Figure 6: Energy Purchase Price, Capacity Purchase Price and Power Purchase Price**



Note: Figure 6 shows PPP (Power Purchase Price) = EPP (Energy Purchase Price) + CPP (Capacity Purchase Price). The share of CPP is increasing relative to the share of EPP, resulting in a sharp increase in the PPP.  
Source: Ministry of Energy, GOP

**Box 1: Components of capacity purchase price (CPP) and energy purchase price (EPP).**

**The CPP comprises:**

- Project Debt payments (inclusive of interest and principal).
- Return on Equity over the project life.
- Fixed element of the Operating and Maintenance Cost.
- Insurance Cost for the plant.
- Foreign Exchange Risk Insurance Cost (FERI), which is the cost of hedging the loans against foreign exchange risk.

**The EPP comprises:**

- Fuel Cost, which is set by the Government of Pakistan and is above the world oil prices by an amount of a surcharge.
- Variable element of the operating and maintenance cost.

$$\text{Power Purchase Price} = \text{Energy Purchase Price} + \text{Capacity Purchase Price}$$

Note: definition from Power Purchase Price Forecast, Central Power Purchasing Agency (CPPA), Pakistan

## **Conclusion and Policy Recommendations**

There are two parts to the private efficiency argument. Firstly, the more efficient private sector should be allowed to substitute for the less efficient public sector, enabling cheaper costs of production and welfare gains for consumers. This has not happened in power generation in Pakistan. The private sector electricity generation costs have been much higher, burdening the consumers with high electricity prices, resulting in welfare losses. Consequently, the efficiency hypothesis supporting privatization appears ineffective in Pakistan's energy sector, highlighting a need for reform. The government faces two potential paths: restructuring the private sector or regaining control over the electricity sector under public ownership.

Secondly, the private efficiency argument posits that public investment crowds out private investment. However, this has not happened in Pakistan. Public investment dropped post-1992, but private investment failed to substitute for this drop, reducing aggregate investment and GDP growth. Instead of crowding out, public investment appears to have crowded in private investment (Ikram, 2022).

This investment behavior can be explained by the regulatory policy environment developed since the 1990s. It was strongly influenced by multilateral advice, particularly from the IMF under loan agreements to address fiscal deficits. These policies mis-sequenced reforms like opening the capital account prematurely, leading to the advent of increased capital outflows. This undermined private investment's ability to compensate for reduced public investment.

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