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Impact of corporate governance norms on the performance of Indian utilities

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ABSTRACT

This paper investigates the role of corporate governance (CG) on the financial and operational (technical-cum-commercial) performance of India utilities. The Indian power sector, in the past, was mainly driven by electoral and political considerations that led to an unsustainable level of performance. The Indian Electricity Act 2003, brought a common framework of reforms at the national level. After more than fifteen years of reforms, results at the distribution end are still mixed. We argue that the 'external causes' unleashed from the reform process should be a catalyst to more significant internal management changes. To quantify these changes, we compute the CG index and then employ data of 48 power utilities from 19 Indian states for the year 2016-17 to see the impact of this index on their performance. We find a positive relationship between the CG index and the performance of the utilities. An important policy implication is that improvement in CG is worth pursuing even in utilities where arm's length between government and the utility is not possible, as the government is the owner of these utilities.

1. Introduction

One of the objectives of power reforms in India has been to improve the commercial viability and financial turnaround of the sector (Srivastava and Kathuria, 2014; MoP, 2005). As in other developing countries, the power sector reforms have been linked to the overall policy objective of achieving higher levels of economic growth and, in turn, facilitating the reduction in poverty of the citizens (Sen and Jamasb, 2012).

Starting from the early 1990s, the reform process in India has passed through three phases.[1] Phase 1 started in 1991 with the amendment of the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948. The focus in this phase was on adding and incentivizing private power generation to bridge demand and supply gap. The phase 2 of the power sector reforms started with the passage of the Electricity Regulatory Commission Act in 1998, which facilitated the creation of the state regulatory commissions to delink tariff setting from the government functioning (Srivastava and Kathuria, 2014). In the third phase, a comprehensive and updated legislation, the Electricity Act, 2003 was enacted,[2] which superseded all previous Acts of the electricity supply. The primary focus of this Act was on promoting competition, mandatory unbundling, minimization of licensing requirements in the generation, promotion of captive power generation, and provision for open access even to retail customers and making 100 percent metering compulsory (Singh, 2006). Table A1 in the Appendix compares the key differences between the Electricity Act, 2003 and the earlier Acts with respect to different parameters.

Organizationally, reforms in the power sector have set in changes at two levels: a) to set-up independent and transparent governance mechanism (i.e., setting up of the state and central level regulators) delinked from electoral and political consideration (Shukla and Thampy, 2011); and b) to establish the distinct corporate bodies with independence to bring transparency in operational performance and incentivizing commercial viability (Pargal and Mayer, 2014). Fig. 1 summarizes the present governing structure of the power sector in Indian states.

Despite several initiatives and reforms, the overall financial performance of the power sector remains under stress (Khurana and Banerjee, 2015; IEG, 2016). Sector-wide financial losses stood at USD 25 billion in 2011 (1.3 percent of GDP), which is more than twice than in 2003 (in real terms) (IEG, 2016). The increase in sector losses has been mostly plugged by state subsidies and heavy borrowing. The subsidies received

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[1] For a brief outline of the reforms, kindly refer Srivastava and Kathuria (2014); Singh (2006).

[2] The Act with amendments in 2004, 2007 and 2008 is now called as Electricity (Amendment) Act, 2014.

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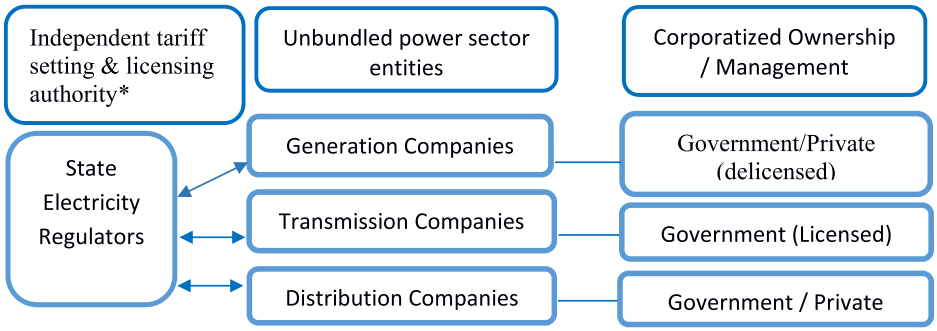

Fig. 1. Governance structure of the power sector in the Indian States. *Notes:* * Besides tariff setting and licensing, the regulators play other important roles as well. The bi-directional arrows show an interactive relationship. For more details, see http://www.mercindia.org.in/Aboutus.htm.

by state utilities from 2003 to 2011 totaled USD 28 billion equaling 2 percent of GDP in 2011, and total debt stood at USD 77 bn (5 percent of GDP). The subsidy as a percentage of revenue is still very high at 13.05 percent in 2015 as compared to 14 percent in 2006. Privatization and competition have not been happening in many states. The average cost of electricity unit remains nearly 11 percent above the average tariff charged. The financial crisis is heavily rooted in the distribution sector from which it spills over to the generation and transmission sector. The power utilities or the distribution companies (referred to as DISCOMs in India) account for more than 70 percent of the total sector-wide accumulated losses and thus have become heavily indebted. The aggregate booked losses for the Indian DISCOMs are 9 billion USD in 2015-16 (Agrawal and Tripathi, 2019).

In November 2015, the Government of India (GoI) initiated the financial restructuring plan of state utilities with a new scheme, termed as Ujwal DISCOM Assurance Yojana (UDAY).[3] This scheme is the third bailout since the year 2000[4] aims at the financial turnaround of utilities by enabling states to take over 75 percent of utility debt. This will reduce the interest cost on the debt taken over by the States to around 8–9 percent, from as high as 14–15 percent, thus improving overall efficiency (PFC report, 2014–15). It is expected that such a financial turnaround of utilities would result in the availability of uninterrupted power supply to all. This is because the financial viability of the electricity sector has been identified as one of the key drivers of performance towards universal electricity access (IEG, 2015).

There is a vicious cycle of poor financial performance to structural financial performance to poor access to electricity. The cycle, which starts from poor financial performance, results in underinvestment and poor maintenance practices, thereby leading to poor service quality, to weak payment discipline (or non-payment), and often theft. This gets manifested in low net revenue and internal cash generation, financial losses, and then growing indebtedness to finally resulting in structural financial weakness (IEG, 2016). Among the key factors identified in influencing the sector's financial performance, three stand out. These are a) market structure through private sector participation, b) regulatory governance geared towards cost recovery and service quality standards, and c) corporate governance or internal organization of state-owned utilities (IEG, 2016).

As discussed earlier, phase 1 and phase 2 of reforms in the electricity sector looked at the role of the private sector and an independent regulator explicitly. However, the crucial third aspect, the internal governance of the utilities, which are still mostly state-owned, has not been given enough attention. This study fills the gap. The role of the internal organization of utilities, in light of their repetitive financial unsustainability, assumes significance, and raises several questions. Do these utilities have sufficient organizational checks and balances to meet their objectives? Are objectives of the shareholders (in most of the cases, the governments) and the management aligned? What kind of supervisory mechanisms exist to make a suitable course correction in time. From the perspective of agency theory, the lack of commonality of objectives between principals, i.e., the governments, and the agents, i.e., the utility management, could be at play (Eisenhardt, 1989). The corporate governance literature links governance structures with good and bad financial performances of companies, even bankruptcies (Daily and Dalton, 1994; LoPucki and Whitford, 1992). With such concerns, the study of corporate governance (CG) structures of the utilities becomes very relevant.

Several researchers have studied the impact of Indian power sector reforms at the macro level through policies and regulation design on the sector's performance (see for example, Shukla and Thampy, 2011; Sen and Jamasb, 2012; Ghosh and Kathuria, 2016 among others). Shukla and Thampy (2011) look into the role of market structure in the increase in electricity prices in the wholesale electricity market post the EA 2003. Sen and Jamasb (2012), on the other hand, carry out dynamic panel data models to see the impact of electricity reforms on key economic variables that determine efficiency, prices, and investment for 19 states over 1991 to 2007 period. They find that individual reform variables have affected key economic variables differently. Ghosh and Kathuria (2016) use the stochastic frontier technique to investigate the impact of regulatory governance on the performance of 77 thermal power plants in India for the period 1994-95 to 2010–11.

There are few studies (Jamasb et al., 2018; Bobde and Tanaka, 2018; Thakur et al., 2006) that have specifically looked into the impact of reforms on the efficiency of utilities using either stochastic frontier approach or data envelopment approach. However, to the best of our knowledge, there does not exist any study, barring Pargal and Mayer (2014) that looks into the impact of the CG on the utilities' performance. We specifically look into the CG perspective in this study using data for 48 utilities spread in 19 Indian States[5] for the year 2016-17. These utilities cover over 85 percent of the area and 95 percent of the population. Fig. 2 provides the geographical location of various utilities in India considered for this study.

The remaining paper is organized as follows: Section 2 provides the literature review that links corporate governance and financial performance. The section also delves into the literature describing the stakeholder interest in corporate strategy and how the learning from this knowledge can be applied in the realm of utilities. Section 3 explains the

[3] Figuratively, in native Indian language - UDAY means 'rise'. For details about the scheme, refer http://pib.nic.in/newsite/PrintRelease.aspx?relid=130261last accessed in June 2019.

[4] The other two bailouts happened in 2001-02 and 2012, respectively. Refer Khurana and Banerjee (2015) for a comparison between the earlier two bail-outs.

[5] The state of Jammu & Kashmir, North-eastern hilly states, and very small states and territories governed by the central government are excluded from this study, as special economic conditions prevail there.

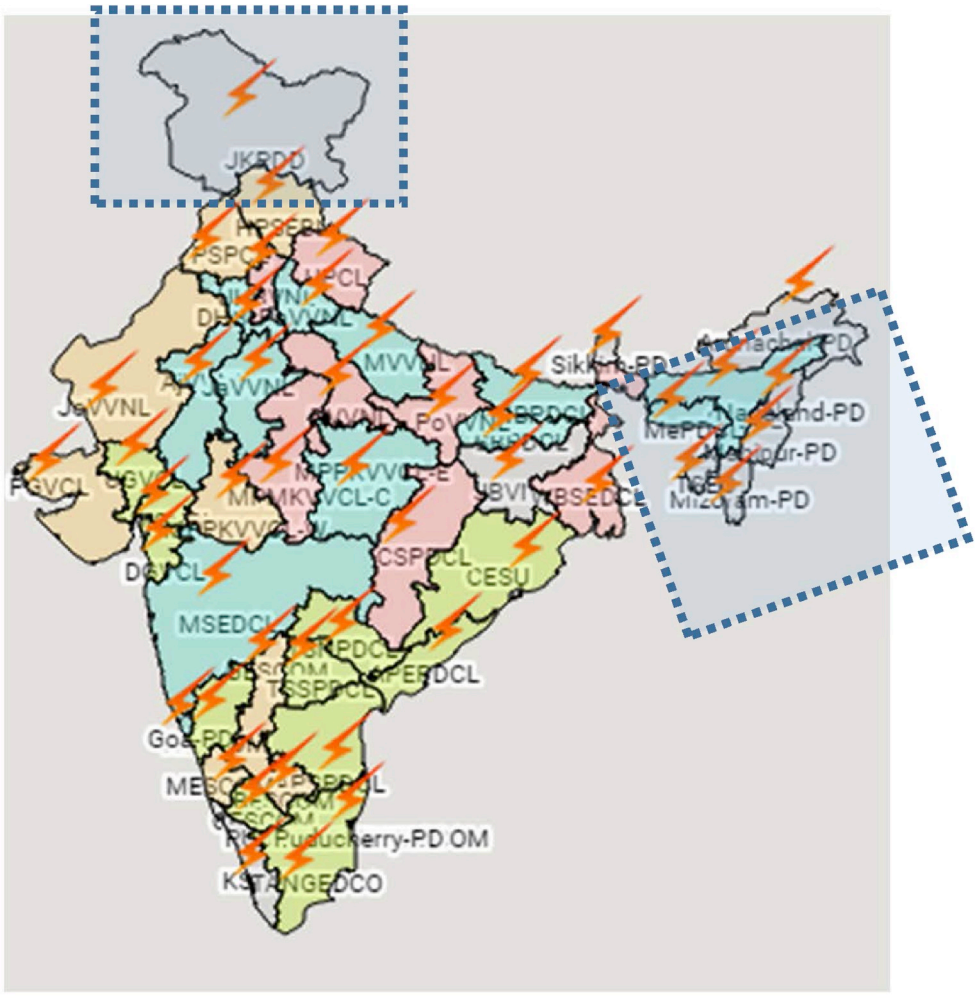

Fig. 2. Geographical map of Indian Utilities
Source: https://urjaindia.co.in/statewise_india_map.php?level=complain&type=discom&date=dec 2018 last accessed in June 2019.
Note: The area enclosed in two boxes – Jammu & Kashmir and North Eastern states are not included in the analysis.

methodology employed in the present work. Since corporate governance is a broad concept, the section also gives different indicators used to construct the CG index. Section 4 describes the data, followed by the results in Section 5. Section 6 concludes the study with some discussion on policy implications.

2. Theoretical perspective and literature review

2.1. Theoretical perspective

The business model that utilities have in most places, including India, does not allow a real competition. This is because of the high cost of infrastructure required to carry out power distribution. It is often not possible to have more than one independent service provider available to the consumers in a geographical region (although, with the provision of open access regulation, this condition is somewhat corrected). The regulatory oversight though tries to incentivize the good performance and penalize the bad performance (Comnes et al., 1995; Lodge and Stern, 2014), the fact remains that utilities enjoy an exclusive nature of business (Rappa, 2004). An implication of this is the slow pace of innovations (Brynjolfsson et al., 2010) in the sector.

On the other hand, the performance of a public utility, which is in the business of selling public goods or services, needs to be measured with some caution. The approach becomes even more cautious when the government owns them, and historically, their financial performances have been weak. The governments, at least some of them, that own these utilities, may not allow or encourage these utilities to device their business plans, strategies, and execution. The utilities may also be used as an extended arm of government for doling out the political patronage (Irwin and Yamamoto, 2004)[6] or as a tool to protect the public interest (Sugden, 1993). Similar to market failures, where markets fail to incentivize the efficiency, government failure may also influence the economic activity happening in the governed areas. The governments may not take the decision, which they are supposed to take (Buchanan and Tollison, 1984).

In the context of India, which is a federal system, the state

[6] An interesting anecdotal example of this patronage is in the case of three small towns - Kannauj, Rampur and Mainpuri in Uttar Pradesh, a Northern State in India. These three towns, despite having very high Aggregate Technical & Commercial (AT&C) losses (>50%), received 24 h power supply. This privilege was not available to most of the towns in the State, as the regulator's previous directive linked power availability in an area with area's AT&C losses. The reason for their privileged status was that these towns were the electoral constituencies of the then ruling party's top brass. The company, which is responsible for the power in the area, has justified for the exceptions citing it to delivering the function of "state" as per a high court ruling. Interestingly, reducing the AT&C losses in these towns is not part of this justification (for details, refer http://www.uppcl.org/tariff/dvvnl _220615.pdf last accessed on 10.01.2019).

governments are the owners of the utilities and follow a broad policy framework laid by the Union Government. Before looking at the role of corporate governance (CG) in influencing the performance of utilities, it is important to visit some of the objectives laid out in the National Electricity Policy (NEP) 2005, a follow-up document of The Electricity Act 2003. The NEP has laid out the following objectives representing the owner's perspective: a) supply of reliable and quality power of specified standards in an efficient manner and at reasonable rates; b) per-capita availability of electricity to be increased to over 1000 units by 2012; c) financial turnaround and commercial viability of electricity sector; and d) protection of consumers' interests (MoP, 2005).

As is well documented, the Indian utilities had inherited a legacy of a weak financial position (Planning commission, 2011–12). The process of financial distress in firms begins with a period characterized by a set of bad economic conditions and poor management, which commit costly mistakes (Elloumi and Gueyie, 2001). The corporatization, together with improved CG adds to the synergy for growth even in the revival phase of the companies (Ramaswamy et al., 2008). From the firm's point of view, the shareholder's objectives in NEP, 2005, should translate the vision/mission statement to the operational level by the management. The response to such objectives, by unbundled corporatized utilities as against vertically integrated SEBs, is expected to be more effective and visible because the corporatization brings the management of these companies under the direct supervision of the board of Directors. This mechanism is expected to check the management from pursuing their own vested goals other than maximizing shareholder's interests (Bertrand and Mullainathan, 2003). This is well substantiated by a recent study (Agrawal and Tripathi, 2019), which argues that the Indian distribution sector has not been able to turnaround under the existing power sector reforms policies and a new set of policy tools need to be explored.

Additionally, the way change is driven has a profound impact on the outcome. At times, it is observed that the change process is over-managed from the top, and the local leadership, which has to implement it, is not given enough say. It is often seen that without a strong sense of commitment as well as participation by local-level leadership, the program does not succeed. The top management role is thus to set higher standards and hold managers accountable for them, adapt to the situation with learning that emerges out of the ground-level experience in this process of change (Beer et al., 1990). Thus, the role of leadership as a contributor to the outcome(s) is an important dimension of CG to be looked into.

Despite a similar set of conditions, some organizations out-perform others, because of their leadership. The effectiveness of leadership arises from two factors – their ability and internal and external checks on the leadership itself. The Board of Directors having the power to hold management accountable for outcomes, power to hire and fire the chief executive officer (CEO),[7] thereby bringing an internal check on the management (Hermalin and Weisbach, 1998).

2.2. Literature review

Corporate governance (CG) and performance of the firms have been widely studied from the perspective of their performance in stock markets and profitability (see for example, Kathuria and Dash, 1999; Brown and Caylor, 2006; Gruszczynski, 2006; Agrawal and Knoeber, 2012 among others). The investors tend to sell the stock if they are not satisfied with the management. In some countries, corporate investors can reach deep into the inner workings of portfolio companies to affect fundamental management change (Bhide, 1990). The CG provisions improve financial and operational transparency by mitigating management's ability to distort information disclosures, i.e., it minimizes the agency costs (Shleifer and Vishny, 1997). These provisions make it less likely that management, even if acting in its self-interest, does not fully disclose relevant information to its shareholders or discloses information that is less than credible (Chung et al., 2010).

The literature on CG of Indian utilities have proposed either termination of public ownership and transfer control to the private sector (Sagar, 2003) or at least evaluate the same (Galal, 1990; Galal et al., 1994). Some researchers have highlighted the structural absence of managerial focus in Indian utilities despite the presence of strong technical and managerial competencies (Ruet, 2006; Gupta, 2005). This implies that there are opportunities for less clear-cut solutions than the simplistic privatization paradigm. Recent studies (see for example, Pargal and Mayer, 2014; Shungalu Report, 2011 among others) have reported that although power sector reforms were expected to bring about a more accountable and commercial performance culture, utilities' board of Directors have remained state-dominated, besides lacking sufficient decision-making authority in practice, and are hardly evaluated on performance. Political interference in appointments to the board and in decision making on business aspects is relatively common (Pargal and Mayer, 2014). Indeed, professionalizing and empowering boards is a key agenda item for the future. There is evidence where some of the State governments without changing the ownership, subjected the respective utilities to more rigorous, though not mandatory, CG norms than the bare minimum mandated in the Companies Act to turn around them financially (Pargal and Mayer, 2014). It is argued that more than the ownership change through privatization, the adherence to institutional scrutiny seems to be more effective for the companies with a legacy of working in centrally planned, government-controlled economies (Black et al., 1999).

As can be seen from the brief literature review, there does not exist any study (except Pargal and Mayer, 2014) in the Indian context that looks into the role of CG in influencing utilities performance. The study by Pargal and Mayer (2014) however, uses more traditional measures of CG, such as Board size, presence of independent directors, the share of executive directors in the Board, and the tenure of chairman of the Board on the performance. In contrast, our study, as we shall see later, employs the Institutional Shareholder Service (ISS) methodology perspective for quality of governance, which is much broader in approach. The different indicators chosen are utilities' response to external stakeholders, i.e., the investors and the customers, respectively, and also the response to the internal stakeholder, i.e., the management.

The present study thus fills an important gap in the literature. Besides, a typical State in India is larger in population and area than most countries in the world, and this implies that devolution of power even below the provincial state governments may still keep control very much centralized. This political governance structure adds an important dimension to utility reforms. In our study, we have tried to fill this gap in the literature by collecting the data even at the sub-state level, i.e., at utility level within a state and have tried to see how internal governance and performance are different at that level. In our knowledge, no other previous study has captured this aspect of utility functioning.

3. Methodology

Given the theoretical perspective discussed in the previous section, where we have argued how the corporatization of utilities (through unbundling), along with improved CG and effective leadership, can translate into better performance. The utilities' performance, however, can be measured in two ways – financial performance and operational performance. The operational performance has two different aspects of

[7] In the context of State-owned enterprises (SOEs) or public sector units (PSUs) as they are called in India, the governments do the CEO/directors' assessment unlike private companies, where the Board does it. The SOEs are exempted from the requirement of Section 134(3)(p) of The Companies Act, 2013. According to which, the Board of Directors need not submit a statement indicating how formal Annual evaluation has been made by the Board of its performance and that of its Committees and individual director. This exemption from check gets manifested in the performance of these SOEs.

operations – a) reduction in technical and distribution (T&D) losses and b) efficiency in billing and collection aspect. Together these are termed as aggregate technical and commercial (AT&C) losses, and they reflect both technical as well as commercial performance of the utilities. Thus, our study has two objectives: a) whether utilities with better adherence to CG norms perform better in financial terms? and b) whether utilities with better adherence to CG norms perform better as regards to operational (technical-cum-commercial) parameters? These two objectives are operationalized through two hypotheses.

3.1. CG and financial performance

As discussed in the literature, a clear manifestation of better CG is improved financial performance. Since most of the utilities are still government-owned and are not listed in the stock market, their financial performance can be assessed through price-cost margins (PCM). We expect that the utilities with better CG will have better PCM. The improvement in PCM may be occurring with subsidies (PCMWS) from the government and also without subsidies (PCMWoS). The second variant of PCM captures the role of governments in meeting their obligation to pay the subsidies to the utilities in line with the NEP, 2005. Thus, we have the following hypothesis:

H1. Utilities with better CG norms are more likely to improve the price-cost margins (PCM).

For calculating the PCM, the difference between average electricity price and the average cost of supply (ACS) is considered. The ACS includes power purchase cost, employee cost, operation and maintenance (O&M cost), the interest cost, depreciation cost, administrative and General (A&G) cost. The respective regulators approve all of these costs. It is to be noted that the difference between ACS and the average price is not the same as economic profit. Historically, the utilities have not been able to recover their costs. Thus, PCM without subsidy shows the basic sustainability of business without any external support.

PCM with subsidy, however, indicates the commitment of respective State governments to fund[8] the legitimate non-economic services being rendered by the utilities and keep them economically viable.

3.2. CG and operational performance

The literature on utilities performance has decomposed utilities losses in three different categories: distribution losses above the international norm of 10 percent, losses due to under-collection of bills and losses due to below cost-recovery pricing (Ebinger, 2006). Together these represent AT&C losses. One of the well-articulated key reforms objectives of the power sector has been the proposed reduction in AT&C Losses (Srivastava and Kathuria, 2014). AT&C losses are nothing but the difference between the total energy inputted to the utility and the energy for which it can realize the tariff from its customers. AT&C losses are a combination of both energy loss (technical loss, theft and inefficiency in billing) and commercial loss (default in payment and inefficiency in the collection). Thus, they include both technical as well as commercial losses and are computed using the following four parameters – Transmission and Distribution losses, collection efficiency, units realized, and Distribution and Billing losses (refer https://npp.gov.in/glossary and Srivastava and Kathuria, 2014 for details). This implies that higher AT&C losses may come from poor infrastructure, unbilled supplies, and energy theft. This variable shows a critical aspect of the operational capabilities of the utilities.[9] With the improvement in internal governance, any deficiency in several of these aspects would be questioned. Therefore, we hypothesize that the utilities having better CG will operate at lower AT&C losses.

H2. Utilities with better CG norms are more likely to reduce AT&C losses

Thus, the model to test the relationship between utility performance and CG, controlling for other factors that are expected to affect utility's performance is as follows:

$$\textbf{Utility's Performance}_i = \alpha + \beta_1 CG_i + \beta_k Z_{ik} + \varepsilon_{ij} \quad (1)$$

Where *i* is a utility, CG denotes corporate governance in the utility, Z is a vector of control variables influencing the performance of the utility. ε is a random error term assumed to follow a standard normal distribution with mean zero and constant variance. If $\beta_1$is positive and statistically significant, this implies that higher CG has resulted in improved utility performance. Since performance at time 't' is determined by the governance in time 't-1', to account for this, CG in the utility is computed for 2015–16, whereas the performance variables are measured for 2016–17.

Among control variables, we have used initial per-capita power consumption (*IPCPC*), the extent of urbanization (*URBAN*), ownership profile of utilities (*OWNER*), and extent of power reforms (*REFORM*) in the state. IPCPC gives us information about initial economic conditions in the areas under the control of the utilities. URBAN is the extent of the urbanized area served by the utility; Ownership indicates whether the utility is government-owned or privately-owned. REFORM is a measure to capture the progress of power sector reforms in the State, *s* to which the utility belongs. Thus, the final model used to see the impact of CG on utility performance is:

$$\textit{Utility Performance}_i = \alpha + \beta_1 CG_i + \beta_2 IPCPC_i + \beta_3 URBAN_i + \beta_4 OWNER_i + \beta_5 REFORM_s + \varepsilon_{ij} \quad (2)$$

It is to be noted that the analysis is a cross-section analysis with a lead-lag relationship between the utility's performance and CG index. The above model is estimated using a simple ordinary least squares (OLS) regression with correction for heteroskedasticity. The model builds on what Pargal and Mayer (2014) have used in their analysis. However, there are two basic differences: a) our measure of CG is much broader, and b) they have used data for 2010, for our analysis, we have used performance data for the year 2016-17.

4. Data and variables

To carry out the analysis, we have collected cross-section data from 48 utilities serving 19 major Indian states for the year 2016-17. These utilities cover over 85 percent of the area and 95 percent of the population of the country. Of these 48 utilities, ten are privately owned, which are spread in Delhi (3), Maharashtra (3), Orissa (3)[10] and West Bengal (1).

Regarding measuring utility performance, we have taken data for three different parameters: two representing financial performance and

[8] Clause 65 of the Indian Electricity Act allows that if the State Government requires the grant of any support to any consumer or class of consumers in the tariff determined by the state regulator, the State Government needs to pay in advance such subsidies to the DISCOM.

[9] The importance of AT&C losses can be gauged from the fact that while privatizing the utilities, the government of Delhi chose the reduction of this parameter as the sole criterion for successful bidding (Srivastava and Kathuria, 2014).

[10] It is to be noted that in late 2015 the Orissa Electricity Regulation Commission, OERC revoked license of three private DISCOMs and in 2017 the Supreme Court upheld the decision of the OERC. The Orissa government-owned GRIDCO company now owns these three DISCOMs. In the present analysis, they are considered as privately-owned DISCOMs only.

one representing technical-cum-commercial performance. For financial performance, we have collected data for the price cost margin (PCM) with and without subsidy,[11] and for technical-cum-commercial performance - AT&C losses. The data for these variables is for the year 2016-17 and is from different secondary sources such as Planning Commission's and Power Finance Corporation's (PFC) reports.

4.1. Measuring quality of corporate governance (CG)

Our approach to corporate behavior of utilities' is embedded in the stakeholder theory of the firm. To measure the quality of internal governance in the utility, we compute an index of CG. While deciding the parameters for the index, we have used the Institutional Shareholder Service (ISS) methodology perspective for quality of governance,[12] which is widely referred by the scholars (see for example, Chung et al., 2010; Brown and Caylor, 2006 among others). We have taken three categories of CG indicators as a measure of change towards the corporate style of functioning. These pertain to a) reporting commitments, b) service quality commitment, and c) alignment to commercial objective. The first two of these are utilities' response to external stakeholders, i.e., the investors and the customers, respectively, and the last one is a response to the internal stakeholder, i.e., the management. We have adapted these parameters to utilities' businesses in India. This is required as most of these utilities in India are still largely owned by the government, and they are still far from functioning as self-sustaining corporate entities.

4.1.1. Utilities' response to external stakeholders

4.1.1.1. The investors. To see how the utility is responding to investors, we select the following three parameters:

a. Regular filing of Annual reports by the utility and posting the same on its website. This is a measure of the seriousness of the company to its existing investors and also a signal to future investors.
b. An increase in the percentage of independent directors on utility Boards is associated with better financial performance (Pargal and Mayer, 2014). In the case of Indian utilities, we have adapted the indicator to see whether there is an independent director on the Board or not?
c. Information on Audit Committee: The declaration on Audit Committee is vital as this committee reviews the adequacy and effectiveness of internal auditing, accounting, financial controls and limits management's ability to expropriate firm value or misreport performance on financial and operational transparency (Chung et al., 2010; DeZoort and Salterio, 2001). In the case of Indian utilities, we have adapted the indicator to see whether there is information available on any Audit Committee on the utilities' website or not?

A utility that adheres to all these parameters would get a maximum score of three, and a utility which does not have any of the above parameters will get a score of zero.

4.1.1.2. The customers. Utilities are essentially into the service business. Therefore an improvement in the quality of service being rendered to the customers should be a natural priority for them. Improved customer service is reported to be positively affecting shareholder returns (Ogden and Watson, 1999; Fornell et al., 2006). We have selected the following four parameters to capture the utilities' progress on this front:

a. Are the utilities' hosting their service commitment to their customers prominently on their websites?
b. Is the service commitment backed up by the financial penalty to be paid by the utilities if the commitment is not met?
c. Are customers able to register their complaints online with a traceable token number?
d. Is customers' complaint data maintained and published by the utilities on their website?

Similar to the previous set, a utility that adheres to all these four parameters would get a maximum score of four and a minimum score of zero.

4.1.2. Utilities' response to internal stakeholders

4.1.2.1. The management. During the transition to a corporate entity from a government-owned entity, we expect the Utilities to bring the internal management focus on customer service (Waldman et al., 2001). We have taken the following four indicators to capture progress on this front.

a. Declaration of its vision and mission[13]: Each visionary company has a distinctive core ideology, which combines its core purpose, values, and objectives and issues them as a guide from the beginning (Collins and Porras, 1999). We check whether the vision and mission of utility are given on its website or not.
b. Reward to and recognition of the performance of employees/groups who contribute to utility's objectives. This captures the company's focus on creating an objective-oriented and performance-oriented work culture. This is measured by - if there is any reporting/mention employee's performance on its website?
c. Is leadership sending regular communication to its management to engage them with the change that it wants to drive? In the case of utilities, where the leadership is not very visible on their websites, we have modified it to see whether leadership has any communication on the website regarding its objectives or not?

Thus, in all, we have used 11 key indicators to see adoption and adherence to CG norms by a utility. Table 1 summarizes these indicators.

It is to be noted that for some of the parameters for some of the utilities, only sporadic information is available on their websites. For such cases, we have assigned a value of half. To give an example, in the case of Madhya Pradesh utilities, there is no annual report on the website. Still, the relevant information is available in regulatory filings as given on the website.

Using these 11 CG parameters, we then construct an equally weighted cumulative CG index. To compute the CG index, we first normalized each of the indicators using the min-max criterion. These normalized indicators are then aggregated and normalized again using the same criterion. Min-max method is based on the distance approach from the ideal. The index calculated based on distance approach tend to fare better in comparison to others (Kathuria et al., 2015) and has been used by several studies (see for example, Kathuria et al., 2015; Panse and Kathuria, 2016 among others).

$$C_{ji} = \frac{P_{jiactual} - P_{jimin}}{P_{jimax} - P_{jimin}}$$

Where $P_{jiactual}$ is the Actual value of CG parameter, P_{jiMax} and P_{jiMin} are the maximum and minimum values of the CG parameter.

[11] Though we have calculated PCM with and without subsidy, we need to keep this in mind that as historically prices have been below cost levels for these utilities, some of them are still unable to recover the full power purchase cost itself. As a result, many of the utilities will have negative PCM.

[12] For details, refer: https://www.issgovernance.com last accessed on 15.01.2019.

[13] In the present study, we have taken vision and mission statements as separate indicators.

Table 1
Indicators to construct Corporate Governance Index.

S. No.	CG Sub –Index	Details	Metric
1	Response to Investors	Regular filing of annual reports (P1)	Yes/ No
2		Independent directors on utility's board (P2)	Yes/ No
3		Declaration of Audit committee (P3)	Yes/ No
4	Response to Customers	Declared customer service commitment (P4)	Yes/ No
5		Is service commitment backed by financial penalties? (P5)	Yes/ No
6		Are customers able to register complaints online? (P6)	Yes/ No
7		Is customer complaint data shared through the website? (P7)	Yes/ No
8	Response to Internal stakeholders	Declaration of its Vision (P8)	Yes/ No
9		Declaration of its Mission Statement (P9)	Yes/ No
10		Reward to and recognition of employee performance (P10)	Yes/ No
11		Leadership engagement to drive changes (P11)	Yes/ No

4.2. Control variables

4.2.1. Initial per capita power consumption (IPCPC)

Unlike per-capita income, which has been selected by many researchers (see for example, Sen and Jamasb, 2012: Steiner, 2000 among others), we have selected initial per capita power consumption (*IPCPC*) as a control variable. The advantage of picking *IPCPC* is that the data for per-capita income is available for a full state, but not at the level of the jurisdiction of a utility. We have thus calculated IPCPC for each of the utilities. Higher *IPCPC* of the utility shows a better economic environment for the utility to start with. The reverse is true for utilities having low *IPCPC*. The initial PCPC may also have an influence on the approach that the utilities take towards AT&C loss reduction trajectory. We have taken *IPCPC* of the year 2007, as it defines the initial condition prevailing for the utilities.

4.2.2. Urbanization of the territory served (URBAN)

It is well acknowledged that an area that is more urbanized ascribes several advantages to the utilities. First of all, the paying capacity or per-capita income is much higher in urban areas than in rural areas; second, due to the greater density of people, not only the marginal cost of providing power is much lower in urban areas, but also demand of such services would be higher. As a result, from utility's perspective also, smaller the size of the area served, better will be their focus on performance. For example, utilities in Delhi and Mumbai, not only serve smaller areas but also cater to an urbanized part of India, whereas utilities of Uttar Pradesh or Rajasthan serve significantly bigger geographical areas with the more rural population. To assess the performance, the extent of the urbanized area (URBAN) under utility needs to be controlled.

4.2.3. Utility ownership (OWNER)

Many of the CG norms are adhered to *de facto* by private companies. Since some of the states have already privatized their utilities, it is possible that these utilities may do better on different performance variables. Thus, as a control, we include a dummy with value one for those utilities which are privatized (OWNER), and zero otherwise.

4.2.4. Reform index (REFORM)

To account for the status of power reforms in the state, we compute a reform Index (REFORM). For the index, we have selected six reform indicators: a) share of private power in utilities' sales; b) number of years since the regulator's presence in the state; c) number of years since unbundling happened; d) timely settling of overdue expenses; e) Status of open access regulation in the state; and f) years since utilities' privatization in the state. These indicators are in line with the literature (see for example, Bacon (1995), Bacon and Besant-Jones (2002); Sen and Jamasb (2012); Ghosh and Kathuria (2016) among others). The index (*REFORM*) is the weighted average of all the above six indicators. We anticipate that reforms carried out by 2015 would have a meaningful influence on the utilities performance in the year 2016-17.

5. Results and discussion

Table A2 in Appendix lists outs the value of CG parameters for different utilities. As can be seen from the table, there is a huge variation in adhering to different CG parameters by Indian utilities. On one hand of the spectrum, utilities from Andhra Pradesh and Karnataka are adhering to most of the parameters (10 of the total 11), thus having a CG index value of 1. On the other hand, four utilities, two from Uttar Pradesh, one from Bihar, and one from Jharkhand, are adhering to only one component of the CG norms with CG index value of zero. Fig. 3 gives the distribution of CG parameters for all the utilities, and Fig. 4 compares adherence of parameters across ownership – government-owned vis-à-vis privately-owned utilities. As expected, privately-owned utilities are adhering to more CG norms than state-owned utilities.

Figs. 5 and 6 plot the relation between different utilities performance indicators and CG index. It is clear from the figures that a higher CG index is associated with better performance - whether it is measured in financial terms (PCM with or without subsidy) or technical terms (AT&C losses), though the relation is not monotonic for all the performance measures. In fact, beyond a value of CG index, the performance plateaus.

Table 2 gives the descriptive statistics of different variables used in the analysis. Columns 2 and 3 compare the values across government-owned and privately-owned utilities.

As expected, AT&C losses and PCM without subsidy are not only lower for private utilities, but also statistically significant. Similarly, PCPC for private utilities is not only much higher than government-owned utilities (row 4); they also started with higher initial PCPC (row 7). One possible reason is that of the ten private utilities, seven are in urban areas, which usually have higher consumption and density. This is also verified by a statistically significant higher urbanization value (row 6). Regarding CG index (row 5), though privately-owned utilities have a higher value, the difference is not statistically significant. In terms of reforms (row 8), privately owned utilities have undergone more reforms vis-à-vis government-owned utilities.

The results of OLS regression for equation (2) to see the impact of CG index on different components of performance are reported below in Table 3 (models M1, M3, and M5). One of our variables - initial per capita power consumption ($PCPC_{2007\text{-}08}$), being in level has been converted in log form to minimize the problem of heteroscedasticity. Figs. 5 to 6 indicate non-linearity in the relationship between CG index and performance parameters. Consequently, the CG index has been used in quadratic form also (models M2, M4, and M6). Our data being in cross-section consisting of 48 utilities with varying sizes, heteroscedasticity cannot be ruled out. The Brush-Pagan test (last row, Table 3) indicates heteroscedasticity is a problem for our cross-section analysis for models M3 to M6. Consequently, all the models are run with correction for heteroscedasticity. The correlation matrix (results not reported) though indicates that some of the variables are correlated (for example, *Urbanization* with *Own*ership), the VIF values are much below the threshold level. Thus, all the variables are included to run the regression.

As can be seen from the Table, the CG index (row 1) has a significant positive relationship with the performance of utilities. A high CG index results in better performance in terms of PCM without subsidy and reduction in AT&C losses. However, the impact of the CG index on PCM with subsidy vanishes once we introduce non-linearity in the CG index. Urbanization of the area served by the utilities has no bearing on their

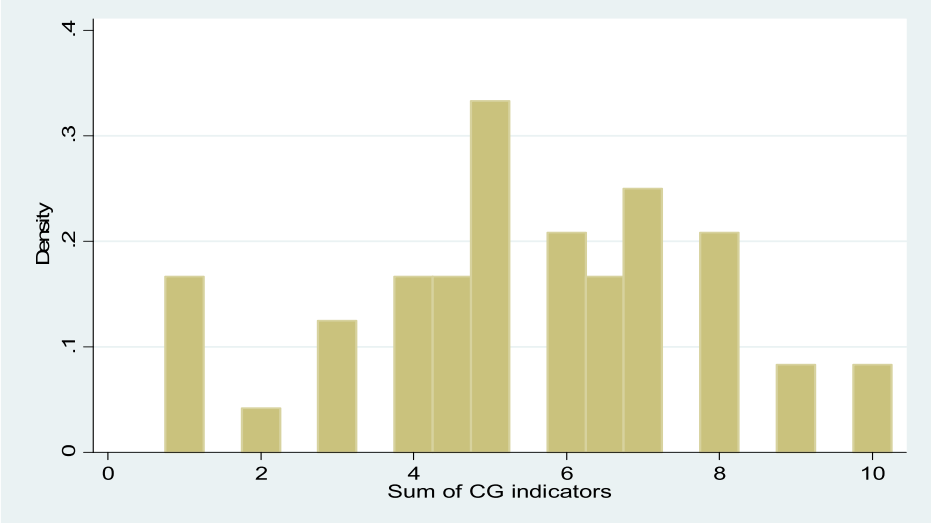

Fig. 3. Distribution of utilities pertaining to CG Indicators.

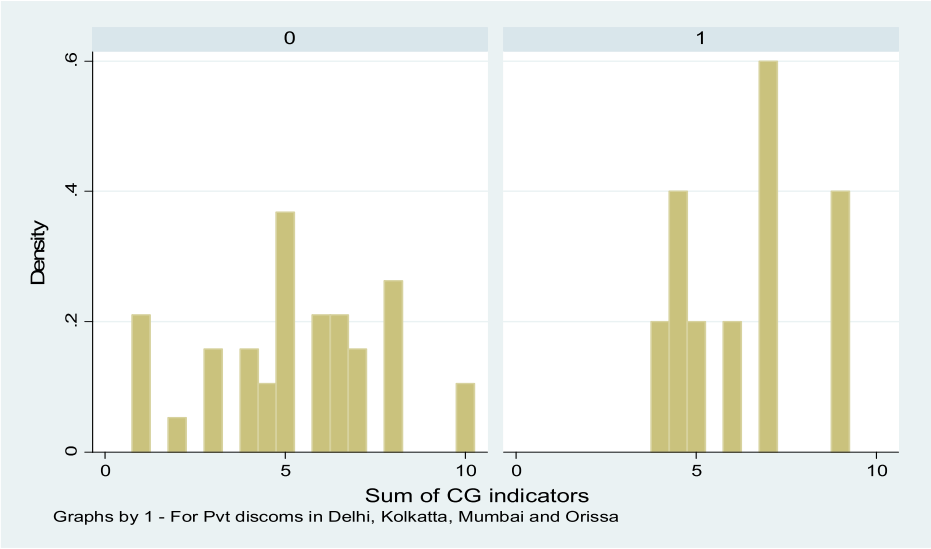

Fig. 4. Comparison of Govt.-owned vs. Private utilities - CG Indicators.

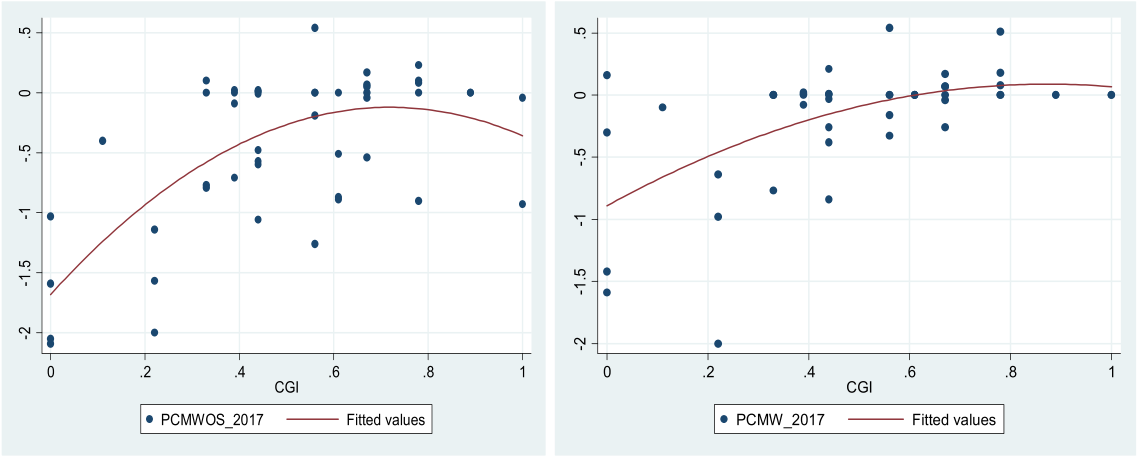

Fig. 5. Relation between Price-cost Margin (PCM) without and with subsidy and CG index.

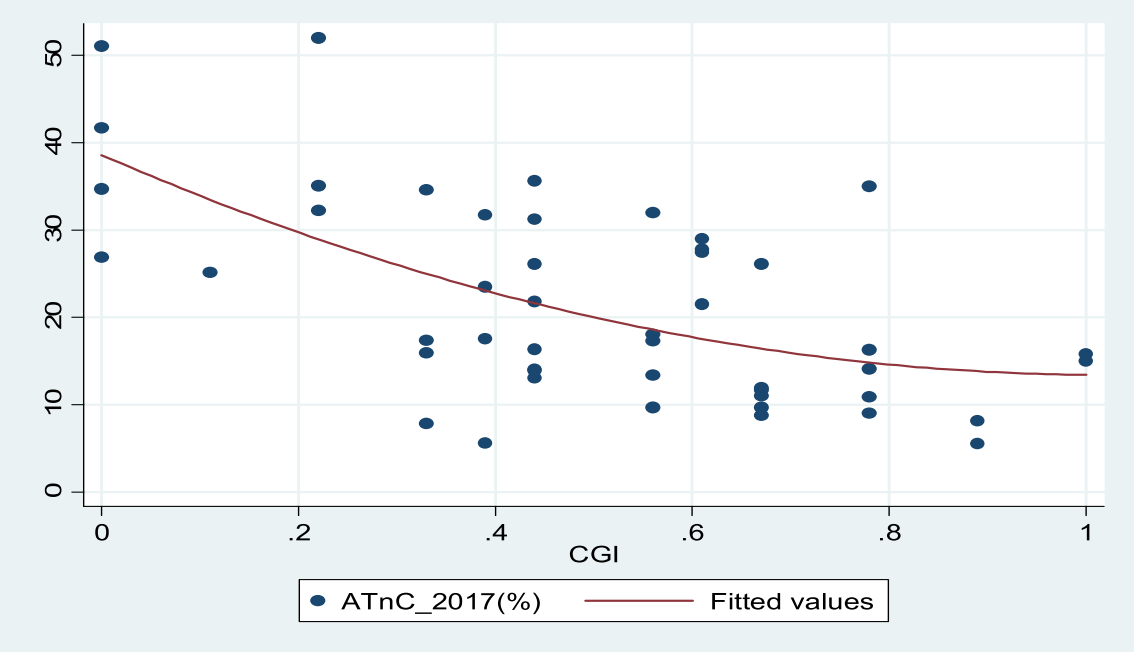

Fig. 6. Relation between AT&C Losses and CG index.

Table 2
Comparison of Govt.-owned and private utilities.

		All utilities	Govt.-owned utilities	Private Owned utilities
1	**PCM Without Subsidy**	−0.45 (0.65)	−0.58 (0.68)	0.023* (0.06)
2	**PCM With Subsidy**	−0.17 (0.48)	−0.22 (0.53)	0.023 (0.06)
3	**AT&C**	21.45 (11.47)	23.16 (11.17)	14.96* (10.75)
4	**PCPC**	798.94 (410.34)	781.13 (424.73)	866.61* (362.19)
5	**CGI**	0.46 (0.22)	0.48 (0.26)	0.59 (0.2)
6	**Urbanization**	0.38 (0.28)	0.34 (0.16)	0.73* (0.39)
7	**IPCPC$_{2007}$**	516.50 (287.11)	469.36 (260.72)	695.64* (325.75)
8	**REFORM$_{2014\text{-}15}$**	0.43 (0.18)	0.40 (0.16)	0.54* 0.22
	N	48	38	10

Notes: Figures in parenthesis are standard deviation; * indicates significance at a minimum 5% level.

financial performance but has a significant bearing on the technical performance.

a. The PCM without subsidy (PCMWoS) has improved for the utilities, which have a higher value of the CG index (M1). It is a natural expectation with improved internal management. This is in line with what Pargal and Mayer (2014) have found in their analysis. The effect, however, gets plateaued with an increase in the CG index (M2). From the coefficient values, we find that for a 10 percent increase in CG index score from its mean value, the PCMWoS increases by 4.5 percent.
b. The PCM with subsidy (PCMWS), where the role of the State governments is more pronounced, is not affected by the CG Index when we account for non-linearity (M4). This also validates the points highlighted in the literature that, at times, the State government, as the sole owner, may not encourage financial discipline like a commercial entity run by shareholders.
c. The AT&C losses, too, are lower in the utilities, which have a better CG index score (M5). A more commercially driven entity will try to minimize all possible wastage. However, beyond a CG index score, the effect gets mellowed down (M6). From the coefficient values, we find that for a 10 percent increase in CG index score from its mean value, the AT&C losses decline by 1.55 percent.
d. Regarding control variables, initial PCPC has a direct bearing on the performance of utilities – be its financial performance (PCM with or without subsidy) or technical performance (AT&C losses). Not to our surprise, privatization has no impact on AT&C losses, rather it is urbanization that affects AT&C losses. One possible reason is that barring for Orissa, all the privatized DISCOMs are in urbanized areas e.g., Delhi, Mumbai, and Kolkatta. This implies that urbanization may be accounting for the effect of privatization also.
f. A somewhat surprising result is that the regulatory index (REFORM) of states does not significantly impact the performance variables – be it PCM or AT&C. The possible explanation for REFORM not impacting performance could be the period of the study, as, by the year 2014-15, most of the states have already implemented the basic regulatory changes as mandated in the EA, 2003. On this threshold groundwork, the utilities which have implemented the next level of CG discipline are showing better results.
g. Another surprising result of our analysis is that urbanization alone may not lead to PCM or financial performance improvement, whereas it leads to technical-cum-commercial performance improvement (the AT&C losses reduction). This result, when seen in conjunction with the PCPC control variable, brings another insight that in an area for power reforms to succeed improvement in overall economic conditions rather than urban or rural settings play a crucial role.

6. Conclusions and policy implications

Power sector reforms have been at the core of wider economic reforms in India, similar to many developing countries. Among many changes, the reforms encouraged setting up of independent regulators, unbundling of the integrated sector into generation, transmission and distribution companies, unbiased access of networks, even competition at the retail end. The reforms thus set an improved outward environment to operate for the utilities with an aim to bring financial discipline to them. However, even more than a decade after the reforms, the results at

Table 3
Estimating impact of Corporate Governance norms on Utilities' performance.

Variables	Dependent variable = PCM without subsidy		Dependent variable = PCM with subsidy		Dependent variable = AT&C Loss	
	M1	M2	M3	M4	M5	M6
CG $Index_{2015\text{-}16}$	0.97*** (2.69)	3.42*** (3.44)	0.55** (2.14)	1.07 (0.97)	−11.05** (2.42)	−22.58* (1.67)
CG $Index^2_{2015\text{-}16}$		−2.46*** (2.78)		−0.53 (0.58)		11.6 (0.97)
Ln($PCPC_{2007\text{-}08}$)	0.326** (2.37)	0.182 (1.11)	0.36** (2.49)	0.33** (2.04)	−6.61*** (3.15)	−5.94*** (2.62)
Urbanization	−0.15 (0.34)	0.101 (0.26)	−0.2 (0.63)	−0.15 (0.47)	−12.42*** (2.71)	−13.6*** (2.70)
Ownership	0.46** (2.15)	0.35* (1.84)	0.14 (0.81)	0.11 (0.67)	0.25 (0.10)	0.79 (0.30)
$REFORM_{2014\text{-}15}$	−0.36 (0.92)	−0.17 (0.5)	−0.19 (−0.64)	−0.15 (−0.49)	2.25 (0.43)	1.35 (0.26)
Constant	−2.79*** (3.88)	−2.54*** (3.22)	−2.48*** (2.93)	−2.42*** (2.79)	71.18*** (6.32)	69.98*** (6.14)
Observations	48	48	48	48	48	48
R-squared	0.48	0.56	0.46	0.46	0.62	0.63
F-value	19.34	11.39	3.42	3.00	16.62	14.32
Breusch-Pagan Test for Heteroskedasticity (χ^2 values)	0.97 (0.32)	0.97 (0.32)	21.58 (0.00)	25.23 (0.00)	3.49 (0.062)	2.99 (0.084)

Notes: Figures in parenthesis are 't' values; *,**,*** - indicates significance at minimum 10, 5 and 1% level; Based on the regression results, the following observations can be made.

the distribution end, the critical most segment of the power sector, are mixed. Some utilities are reporting improved results, but many have not shown improvement. The 'external causes' unleashed from the reform process should, at least ideally, be working as a catalyst to bring significant internal changes in the utilities. We have used corporate governance (CG) index to quantify these changes. Using cross-section data on the performance of 48 power utilities from 19 Indian states of the year 2016-17, we have studied the effect of CG index on their performance.

To calculate the CG index, three sub-components, pertaining to reporting commitments, service quality commitment, and alignment to the commercial objective are used. We test a) whether utilities with better CG index perform better in financial terms also?; and b) whether utilities with better adherence to CG norms perform better as regards to operational (technical-cum-commercial) parameters? Initial per capita power consumption and extent of urbanization of the utilities are used as control variables to capture the environment in which utilities started operating.

Present Indian law, the Companies Act 2013, exempts the government-owned enterprises from certain mandatory CG norms such as chapter XI, section 164(2) disqualification for not filing financial statements or as per section 149(6)(a) independent director selection is by the ministry (not by the company board). Our study gives empirical evidence that despite these exemptions, if some state utilities (such as Karnataka) have pro-actively improved internal governance by adhering to different CG norms, it has resulted in improvement in the DISCOMs performance. This also substantiates the general recommendation of many expert groups.[14] Similar to the findings by Pargal and Mayer (2014), our results also indicate that the utilities that have developed information-driven processes and have made their accounts and audits publicly available (resulting in higher CG index) tend to show better financial performance with high operational efficiency.

The study has important policy implications for all those utilities in other developing countries, which are in the process of deregulation. Adhering to different CG norms with governmental discipline on payment of subsidies will lead to a direct improvement in financial parameters of these utilities, besides helping them to reduce AT&C losses. Another implication of the present study is identifying CG parameters, which can easily be improved. Several of utilities Boards in India, despite unbundling, are still state-dominated, lack sufficient decision-making authority, and their performances are hardly evaluated (Pargal and Mayer, 2014). This may be true for utilities in other developing countries too. Having more independent directors (P2) and declaration of audit committees (P3) would not only be in line with international and country-specific CG guidelines but also would improve the performance. At present, nearly half of the utilities in India do not have independent directors, and more than half do not have audit committees (Table A1). Another CG parameter that requires immediate improvement is customer orientation. Though half of the utilities in India have declared commitment to customer (P4) and almost all the utilities provide interface for launching online complaint (P6), only 12.5 percent are sharing this information with the public (P7) and less than one-fifth (P5) are backing it with any financial penalty in case if complaint is not met (Table A1). Adhering to these simple parameters can go a long way in improving the performance.

The Indian Electricity Act, 2003, has been proposed to be revised, and a draft has been approved by the Select Committee of the Indian Parliament in 2018. The draft focuses on the distribution sector in detail. It brings separation of ownership of assets and services. Though this is a welcome change, still the linkage to the CG mechanism of distribution companies, which can deliver the targeted results, is missing.

The present study thus demonstrates that improvement in CG is worth pursuing even in utilities where the arm's length between government and the utility is not possible, as the government is the owner of these utilities. The study gives the general direction of the movement of the selected performance variable with an improved CG index. However, progression towards higher CG index no way judges the corporate design or the adequacy of the improvements achieved. Further studies need to be carried out to find out how the reduction in AT&C losses has helped the utilities in bridging their PCM gaps. As a further step, we can look into which of the dimension of CG can lead to the most drastic

[14] For example SEBI's 2017 Kodak Committee report of corporate governance recommends to bring the PSUs under the full ambit of Companies Act requirements (https://www.sebi.gov.in/reports/reports/oct-2017/report-of-the-committee-on-corporate-governance_36177.html) last accessed on 19.12.2019.

improvement in AT&C losses and PCM. Another extension of the present work would be computing a weighted index instead of putting equal weights to all the indicators.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Govind Srivastava: Conceptualization, Methodology, Investigation, Data curation, Writing - original draft. **Vinish Kathuria:** Formal analysis, Writing - review & editing, Visualization, Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.enpol.2020.111414.

Appendix

Table A1
Institutional differences between the Electricity Act, 2003 and previous Acts

	Function	Before EA, 2003	After EA, 2003	Remarks
1	Generation	State-owned, Private	Increasingly Private	Liberal licensing and captive power generation policy
2	Transmission	State-owned	State and Private-owned corporations	Open Access in Transmission permitted
3	Distribution	State-owned and Private	Corporations – increasingly private (especially in Urban Areas), Multiple Licenses, Standalone systems in Rural	Franchisee model also permitted, open access to be introduced in phases
4	Regulation	State, Regulatory Commissions (RCs)	State, Regulatory Commissions, Appellate Tribunal for Electricity (ATE)	ATE a new addition - to appeal against decisions of any RC
5	Trading	Mostly bilateral, Power Trading Corporation – the only player	Market Based, many licenses	Power trading recognized as a distinct identity with trading margins fixed by RCs

Source: Prayas (2005); Singh (2006).

Table A2
Corporate governance parameters of utilities

S.No.	State	Utility	Response to Investors			Response to Customers				Response to Internal Stakeholders			
			P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
1	Andhra Pradesh	APCPDCL	1	0	0	1	1	1	0	0	0	0	0
2		APEPDCL	1	0	0	1	0	1	0	1	0	0	0
3		APNPDCL	1	0	1	1	1	1	1	1	1	0	0
4		APSPDCL	1	1	1	1	1	1	1	1	1	1	0
5	Delhi	BRPL	1	1	1	1	0	1	0	1	1	0	0
6		BYPL	1	1	1	1	0	1	0	1	1	0	0
7		NDPL	1	1	1	0	0	1	0	1	1	0	1
8	Gujarat	DGVCL	1	0	1	1	0	1	0	1	1	0	1
9		MGVCL	1	1	1	1	0	1	0	1	1	1	0
10		PGVCL	1	1	1	0	0	1	0	0	1	0	0
11		UGVCL	1	1	1	1	0	1	1	1	1	0	0
12	Orissa	CESCO	1	1	1	1	1	1	0	1	1	0	0
13		NESCO	0	0	0	1	0	1	0	1	1	0	0
14		SESCO	0	0	0	1	0	1	0	1	1	0	0
15		WESCO	1	0	0	1	0	1	0	1	1	0	0
16	Uttar Pradesh	DVVN	0	0	0	0	0	1	0	1	1	0	0
17		KESCO	1	0	0	0	0	1	0	1	1	1	1
18		MVVN	0	0	0	0	0	1	0	1	1	0	0
19		PaVVN	0	0	0	0	0	1	0	0	0	0	0
20		PoVVN	0	0	0	0	0	1	0	0	0	0	0
21	Rajasthan	AVVNL	1	0	0	0	0	1	0	0	0	0	0
22		JDVVNL	1	0	1	0.5^	0.5^	1	0	0	0	1	0
23		JVVNL	1	0	1	1	1	1	0	0	0	0	0
24	Madhya Pradesh	MKVVCL	0.5*	1	0	1	0	0	0	1	1	1	1
25		PaKVVCL	0.5*	1	0	0	0	1	0	1	1	1	1
26		PuVVCL	0.5*	1	0	0	0	1	0	1	1	1	1
27	Maharashtra	MSEDCL	1	1	0	1	0	1	0	0	0	0	0
28		BEST	0.5*	0	0	1	0	1	1	0	0	1	0
29		RELIANCE	1	1	1	1	0	1	0	1	1	1	1
30		TATA	1	1	1	1	1	1	0	1	1	1	0
31	Bihar	NBPDCL	0	0	0	0	0	1	0	1	1	0	0
32		SBPDCL	0	0	0	0	0	1	0	0	0	0	0
33	Jharkhand	JSEB	0	0	0	0	0	1	0	0	0	0	0
34	WB	WBSEDCL	1	1	1	0	0	1	0	1	1	0	0

(continued on next page)

Table A2 (*continued*)

S.No.	State	Utility	Response to Investors			Response to Customers				Response to Internal Stakeholders			
			P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
35		CESC	1	1	1	0	0	1	0	1	1	0	0
36	Haryana	DHVBNL	1	1	1	0.5^	0.5^	1	0	1	1	0	0
37		UHVBNL	0	1	1	0.5^	0.5^	1	0	1	1	0	0
38	HP	HPSEB	1	0	1	0.5^	0.5^	1	0	1	1	0	0
39	Punjab	PSPCL	1	0	1	0.5^	0	1	0	0	0	0	1
40	Uttrakhand	UtPCL	1	0	1	1	0	1	0	1	1	1	1
41	Karnataka	BESCOM	1	1	1	0.5^	0.5^	1	1	1	1	1	1
42		CHESCOM	1	1	0	0	0	1	0	1	1	0	0
43		GESCOM	1	1	0	0	0	1	0	1	1	0	0
44		HESCOM	1	1	0	1	0	1	0	1	1	0	0
45		MESCOM	1	1	0	0	0	1	1	1	1	0	1
46	Kerala	KESB	1	1	0	1	1	1	0	1	1	0	0
47	Tamil Nadu	TANGEDCo	1	1	0	1	0	1	0	1	1	0	0
48	Chattisgarh	CSPDCL	1	1	0	0.5^	0	1	0	1	1	0	0
	Total Adherence		36	26	22	26	9	47	6	36	36	12	11
	% Adhering		75	54	45	54.2	18.8	97	12.5	75	75	25	22.9

Source: Own compilation from the Websites of utilities collected during July–August 2016

Notes: For definition of P1-P11 refer Table 1; *-limited reports submitted to respective regulatory commissions are published on website – hence 0.5 score is given; ^ - SERC guidelines are published on website. In our indexing, if customer complaint data is available through website, full weight is given. A reference is given half the weight, as this being a significant step towards transparency in meeting customer complaints.

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