



A panel data analysis on the costs of Turkish electricity distribution companies



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ABSTRACT

Turkey initiated electricity market reforms in 2001, and privatization of distribution companies was one of the main pillars of the electricity market reform. However, many problems have been encountered during the reform process, and both the regulator and the regulated parties are still struggling with major issues such as high loss ratio, financial soundness of the companies, and service quality problems. Moreover, there are concerns about the financial sustainability of these companies due to the recent depreciation of the Turkish Lira. In this respect, this article aims to contribute to the discussions by using panel data analysis to understand the factors affecting the costs of the distribution companies between 2011 and 2014.

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1. Introduction

Turkey initiated electricity market reforms in early 2000s with an aim to attract investment, promote efficiency and increase service quality in the power sector. In addition to introducing competition and establishing a power exchange, privatization of distribution companies was a major pillar of the Turkish electricity market reform. In this respect, former state-owned distribution company (TEDAS) was separated into regional distribution companies and they were privatized over time. Currently, 21 distribution companies are operating in Turkey, and their tariffs are regulated by the Energy Market Regulatory Authority (EMRA).

Despite the privatization process resulted in significant privatization revenues for the government; there are concerns about the increasing costs of these companies due to the risks taken by the investors and deteriorating business environment. Notably, the Turkish economy has been vulnerable to exchange rate risks and commodity price shocks, and inflation and other macroeconomic variables have been adversely affected recently. Given its high capital intensity and import dependency, Turkish electric power industry is not immune to the negative effects of these shocks. Even though generation companies have the chance to reflect the effects of these shocks in their prices to some extent, the same may not be

true for the transmission and distribution companies. Negative shocks can substantially affect capital expenditures, financing and operating costs, it may take time to remedy these effects due to regulatory processes. In recent years, Turkish national currency (Turkish Lira-TL) has depreciated against major currencies (notably USD) in nominal terms significantly, and some distribution companies have appealed to the regulatory authority to review tariffs given the depreciation of the TL.

Even though this issue is important, to the best knowledge of the author, no study has been conducted in Turkey to assess the factors affecting utility costs after restructuring and privatization. Therefore, this article aims to evaluate the drivers of utility costs by using panel data analysis for Turkish distribution companies between 2011 and 2014 and discuss its implications for companies and the regulatory authority. The article is structured as follows: Section 2 presents an overview of Turkish electricity distribution sector, followed by the methodology in Section 3. Section 4 discusses the results, and Section 5 concludes the article.

2. An overview of the Turkish electricity sector

Turkey is an upper-middle income country with a GDP of \$800 billion in 2015 [1]. With the help of market reforms and political stability, Turkey managed to triple its gross national income within the last fifteen years. However, its economy is still dependent on intermediate and final goods and vast energy imports (Turkey has to import almost 70% of its primary energy), whereas it still produces and exports low or middle-tech products [2].

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Prior to 2001, electric power industry was heavily controlled by the state, whereas there were some power plants operating under Built-operate-transfer (BOTs), Built-own-operate (BOOs) and Transfer-of-operating rights (ToORs) contracts. Turkish Electricity Institution (TEK) was founded in 1970 as a vertically integrated company responsible for generation and transmission. Distribution activities were conducted by municipalities, and they were transferred to TEK in 1982. KCETAS, CEAS and KEPEZ,² had concessionary agreements to conduct distribution activities in three regions. After the financial turmoil in the early 1980s, Turkish government tried to attract investments to the power sector, notably to the generation, and Law No.3096 was enacted to set the legal framework for BOT and ToOR contracts in 1984. TEK was unbundled into two companies: TEAS responsible for generation and transmission and TEDAS for distribution in 1994. Furthermore, BOO contract was also included in the legal framework in 1996.

Even though there were some attempts to restructure the power sector to attract private investments, these efforts were not successful due to inconsistent political preferences and failure to take institutional factors into consideration [3]. Following the economic crises in 2000 and 2001, Turkey initiated New Economic Stability Program (Güçlü Ekonomiye Geçiş Programı). One of the major pillars of this program was the liberalization of the energy sector. In line with the international experience (mostly following the United Kingdom's experience), Law No. 4628 Electricity Market Law (EML) was enacted in 2001. This can be considered as turning over a new leaf for the power sector, because unlike the former attempts, this law envisaged restructuring of the power sector with an aim to develop a competitive, transparent and financially sound electricity market to deliver sufficient, good quality, low cost and environment-friendly electricity to consumers and ensure the autonomous regulation and supervision [3]. The market model in EML was based on bilateral contracts, power exchange, and regulated third-party access scheme [4]. State-owned TEAS was unbundled into three companies: EUAS is responsible for generation, TEIAS owns and operates transmission, and TETAS is responsible for wholesale activities and financial liabilities of BOO and BOT contracts. The other state owned company TEDAS continued to perform distribution and retail sale activities in the regions where operating rights were not transferred to private parties. Energy Market Regulatory Authority (EMRA) was established as an independent regulatory body to regulate and supervise activities in the market. Private companies are allowed to invest in generation and other activities, except for the transmission, by getting a license from the regulatory authority. State-owned power plants (except for very large hydropower plants) and distribution companies have been privatized to attract investment to the industry.

By the end of 2014, 55% of power plants were owned by the private sector, while the rest is existing public-private partnership contracts (13.5%) and state-owned power plants (31.5%) [5]. On the demand side, large consumers – consumers with annual consumption more than 9000 MWh/year - became eligible consumers in 2003, and the threshold to become eligible consumer has decreased gradually to 4 MWh/year in 2015-which resulted in a market openness of 85% by the beginning of 2015 [6]. In the wholesale market, Turkish market is based on bilateral contracts, complemented by a centralized day-ahead market, intra-day market and balancing power market operated by Energy Exchange Istanbul (EPIAS). In distribution and retailing, state-owned distribution companies were privatized and account unbundling was

implemented between 2001 and 2013. Starting from 2013, distribution companies are required to establish a separate company for retail sale activities, and distribution companies cannot engage in any activity other than distribution or become a direct shareholder of a legal entity engaged in any other market activity [7]. Nonetheless, shareholders of the distribution utilities continue to own the shares of the newly established retail sales companies.

2.1. Distribution sector

With the enactment of EML, twenty-one distribution regions (20 TEDAS affiliates and KCETAS) were established as shown in Fig. 1, and there were a number of attempts to privatize distribution companies; however, they had to be postponed due to huge investment needs, legal problems and pricing issues. Following a new pricing mechanism introduced in 2007, the Privatization Authority privatized eighteen companies³ between 2009 and 2013 within the scope of Law no. 4046. Privatization started with Baskent, Sakarya and Meram regions, which were sold in 2009 for \$2.3 billion, followed by Uludag, Yesilirmak, Osmangazi, Coruh, Camlibel and Firat in 2010 for \$3 billion. Trakya was sold in 2011 for \$575 million, and Bogazici, Gediz, Akdeniz, Vangolu, Dicle, Aras, Toroslar and AYEDAS were sold for \$7.32 billion in 2013, raising total revenue from privatization to \$13 billion. Turkey used a ToOR-backed share-sale model, in which investor is the only owner of the share of the company, whereas distribution assets are owned by TEDAS [6].

In the initial version of the EML, distribution companies were allowed to conduct both distribution and retail sale activities. With the amendments in 2008 to unbundle distribution and retail sale, distribution utilities were required to establish a separate company for retail sale activities and obtain the retail sale license from EMRA until the end of 2012, and they had to separate operational facilities and infrastructure until the end of 2015.

2.2. Tariff methodology

Distribution companies are responsible for supplying power to consumers within specified technical requirements. In this context, and with the help of market reforms, they are expected to increase cost efficiency, promote service quality and sustain network investments. However, recent technological developments have added new responsibilities such as encouraging energy efficiency, promoting innovation and new technologies and improving system flexibility [8]. In this context, pricing schemes and tariffs play an important role to achieve targets, and regulators should consider system sustainability (fiscal soundness of the regulated parties with sufficient and adequate financing), economic and allocative efficiency and protection of consumers in their tariff design [9]. Even though it seems plausible to achieve these principles on paper, there are many trade-offs due to different characteristics of distribution networks.

In general, distribution tariffs are designed by using different approaches, namely, cost-based regulation (cost-plus or rate-of-return), price-cap regulation, revenue-cap regulation and yardstick regulation (which are also named as incentive-based regulation). Regulators have widely used cost-based regulations in which the regulator either provides a pre-determined profit margin added to the costs of companies or regulated company gets a pre-defined rate of return on its regulatory asset base. However, experiences have shown that cost-based regulation fails to create incentives to minimize costs and increase service quality [10]. Therefore,

² CEAS and KEPEZ were transferred to public ownership after it was found that they were abusing their monopolistic rights and did not comply with the concessionary agreements.

³ KCETAS is a concessionary company, AKEDAS and AYDEM were privatized according to Law No. 3096.

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