THREE ESSAYS ON THE CONNECTION BETWEEN THE RULE OF LAW AND REGULATORY GOVERNANCE IN ELECTRICITY MARKET

A THESIS SUBMITTED TO

THE INSTITUTE OF SOCIAL SCIENCES

OF

ANKARA YILDIRIM BEYAZIT UNIVERSITY

BY

GAMZE KARGIN AKKOÇ

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR

THE DEGREE OF DOCTOR OF PHILOSOPHY

IN

THE DEPARTMENT OF ECONOMICS

JULY 2019

Approval of the Institute of Social Sciences

Prof. Dr.

Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

Prof. Dr.

Head of Department

This is to certify that I have read this thesis and that in my opinion it is fully adequate, in scpoe and quality, as a thesis fort he degree of Doctor of Philosophy.

Prof. Dr.

Fuat OĞUZ

Supervisor

Examining Committee Members

Prof. Dr. Murat Aslan (AYBU, Economics)

Prof. Dr. Fuat OĞUZ (AYBU, Economics)

Doç. Dr. Fatih Cemil ÖZBUĞDAY (AYBU, Economics)

Doç. Dr. Özgür AYDOĞMUŞ (ASBU, Economics)

Dr. Öğr. Üyesi Erkan GÜRPINAR (ASBU, Economics)

I hereby declare that all information in this thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referrenced all material and results that are not original to this work; otherwise I accept all legal responsibility.

Name, Last Name:

Signature:

ABSTRACT

THREE ESSAYS ON THE CONNECTION BETWEEN THE RULE OF LAW AND REGULATORY GOVERNANCE IN ELECTRICITY MARKET

Kargın Akkoç, Gamze

Ph.D., Depertment of Economics

Supervisor: Prof. Dr. Fuat Oğuz

July, 2019, 181 pages

The main aim of this dissertation is to investigate the role of institutions in the electricity market. We employ the new institutional economic approach of regulation to achieve this aim. First, we present the theoretical review of regulations for a better understanding of the new institutional approach. We examine the role of regulatory governance and the rule of law which come to the forefront in the infrastructure reform and regulation processes. The second essay investigates the relationship between tariff structure, electricity losses, and the rule of law for the Turkish electricity market. We also put some characteristics of the rule of law in regulated industries. The third essay of the dissertation examines electricity theft from an institutional perspective specific to the rule of law and regulatory quality. We test the causal linkages between the rule of law, regulatory quality, and transmission and distribution losses representing illegal electricity usage between 1996 and 2014 for 64 countries.

Keywords: Rule of Law, Regulatory Governance, Electricity Market, Illegal Electricity Usage, New Institutional Economics.

ÖZET

ELEKTRİK PİYASASINDA DÜZENLEYİCİ YÖNETİŞİM VE HUKUKUN ÜSTÜNLÜĞÜ ÜZERİNE ÜÇ MAKALE

Kargın Akkoç, Gamze
Doktora., İktisat Bölümü
Tez Yöneticisi: Prof. Dr. Fuat Oğuz

Temmuz, 2019, 181 sayfa

Bu tez çalışmasının temel amacı, kurumların elektrik piyasasındaki rolünü incelemektir. Bu amaca ulaşmak için yeni kurumsal iktisat yaklaşımını kullanmaktayız. Bu bağlamda, ilk makale, yeni kurumsalcı yaklaşımın daha iyi anlaşılabilmesi için regülasyon teorilerini ve yeni kurumsal iktisat yaklaşımını sunmaktadır. Ardından, altyapı reformları ve regülasyon süreçlerinde düzenleyici yönetişim ve hukukun üstünlüğü ile ilgili alanlar incelenmektedir. İkinci makale Türkiye elektrik piyasası için tarife yapısı, elektrik kayıpları ve hukukun üstünlüğü arasındaki ilişkiyi incelemektedir. Ayrıca regüle edilen endüstrilerde hukukun üstünlüğünü gözlemleyebilmek için bazı karakteristikler sunulmaktadır. Üçüncü makale, kaçak elektrik kullanımı, hukukun üstünlüğü ve düzenleyici nitelik arasındaki nedensellik ilişkisini kurumsal bir bakış açısıyla incelemektedir. 1996 ve 2014 yılları arasında 64 ülke için hukukun üstünlüğü, düzenleyici nitelik ile kaçak elektrik kullanımını temsil eden iletim ve dağıtım kayıpları arasındaki nedensellik ilişkileri test edilmiştir.

Anahtar Kelimeler: Hukukun Üstünlüğü, Düzenleyici Yönetişim, Elektrik Piyasası, Kaçak Elektrik, Yeni Kurumsal İktisat.

ACKNOWLEDGMENTS

First and foremost I would like to express my deepest gratitude and thanks to my supervisor Prof. Dr. Fuat Oğuz. His contributions to both my academic career and my life are invaluable and irreplaceable. He has supported and guided me from the very beginning of the programme. He has also supported me throughout my thesis with his patience and knowledge whilst allowing me space to work in my own way.

I also sincerely thank the members of the examining committee, Prof. Dr. Murat Aslan, Assoc. Prof. Dr. Fatih Cemil Özbuğday, Assoc. Prof. Dr. Özgür Aydoğmuş and Asst. Prof. Dr. Erkan Gürpınar for their time, suggestions, comments, and criticisms.

I am thankful to TÜBİTAK (The Scientific and Technological Research Council of Turkey) for financially supporting me by 2211-A Grant Programme during my graduate studies.

I am grateful to Faculty Members of Political Sciences, Ankara Yıldırım Beyazıt University, especially to research assistants who are my dear colleagues. I am also greatly thankful to Koray Göksal, Önder Özgür, and Muhammed Şehid Görüş for their encouragements, friendships and their technical and scientific help at all times.

I can not thank enough to the best workfellows ever, Başak Akar, Melike Güngör, Songül Kahya, and Özge Öz Döm for their endless and supportive friendship and laughters. My supportive friends reminded me that this dissertation is a product of teamwork at any step. My very special thanks goes to Öz and Döm family and my dear friends Özge and Alper for being there for me when I needed. My life and Ankara are much more meaningful with them. I feel their love and support every moment of my life.

I am greatly thankful to Aslı for being the definition of sincere and dearest friend and appreciate every single thing and every glimpse of time we share together. Also, I send my love to my niece, Defne, who joined to Uğur Family in recently. Aslı, Feyyaz and

Defne made our life more meaningful with their cheer and friendship even though we are far away.

I extend my special thanks to my dear friend Buket for her cheer, fun, craziness, and most importantly for her friendship. I also send my love to her son and my nephew Ali Aslan. The friendship of Buket, Saygın and Ali Aslan is very valuable to me.

Life is better and more beautiful when shared with friends. Thanks to my friends Emir and Özlem, and their lovely daughter Gökçe Beren. Also, thanks to my cheerful friends Selçuk and Pelin. I would like to thank my dear friend and colleague, Asst. Prof. Dr. Dilek Durusu Çiftçi, for contributing to my personal and academic life with her talks, joy, and support.

I would like to thank my childhood friends, İpek, Nur, Can, and İlhan for their contribution to who I am while we grow together. I appreciate every single thing and every glimpse of time we share together.

I cannot express enough how I am thankful and grateful to my parents Emine and İsmail and my brother, Uğur. I thank them to support the every single decision I took in my life. I feel their love and support every single moment of my life. Their contribution to my life inexplicable. Also, I am grateful to my sister-in-law Servet and my niece Şaya who joined to our extended family and made our family more cheerful and lively. I would also like to thank my family-in-law, Akkoç family, for their deepest support and love. I greatly thank my aunt Sumru Noyan and my uncle Süha Noyan for their encouragement and love. They always support me for my academic career and life.

Last but not the least, I am deeply and ultimately grateful to my better half and best friend, Uğur. His touch to my academic and personel life are invaluable. In every step that I took, I know that you will be with me and that strengths me in so many ways. Without his unconditional love and friendship, and thoughtfulness I could not have overcome all the hard times during the Ph.D. I appreciate for all these and much to the moon and back.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATONS

BAU:	Business As Usual
CPI:	Consumer Price Index
EMRA:	Energy Market Regulatory Authority
EU:	European Union
GDP:	Gross Domestic Product
IMF:	International Monetary Fund
IRA:	Independent Regulatory Agency
NIE:	New Institutional Economics
OECD:	Organisation for Economic Co-operation and Development
RL:	Rule of Law
ROR:	Rate of Return
RPI-X:	Retail Price Inflation Minus X
RQ:	Regulatory Quality
T&D:	Transmission and Distribution
TDLOSS:	Transmission and Distribution Losses
UK:	United Kingdom
WGI:	World Governance Indicators

CHAPTER 1

INTRODUCTION

The main aim of this dissertation is to investigate the role of institutions in the electricity market. We employ the new institutional economic approach of regulation to achieve this aim. The new institutional economics states that economic performance cannot be understood neglecting the role of institutions. Institutions are "rules of the game" (North, 1990a) and direct economic, social, and political interactions. The NIE abandoned the assumptions of neoclassical economics, such as perfect information, unbounded rationality, and zero transaction costs (Menard and Shirley, 2005). Because these assumptions remained incapable of explaining economic performance differences. Instead of these assumptions, the NIE assumes imperfect information, bounded rationality, and positive transaction costs.

Regulated industries have economic, social, and political aspects (Spiller and Tommasi, 2008). The new institutional economic approach combines institutional environment and governance (Williamson, 2000). Levy and Spiller (1994) use this combination for infrastructure industries. They state that regulatory effectiveness is shaped by regulatory incentives (purposes and tools of regulation) and regulatory governance. The regulatory governance is the mechanism which constrains regulatory discretion (Levy and Spiller, 1994). The NIE emphasizes that the regulated industries have some specific characteristics which raise the necessity of governmental interventions. However, governmental interventions may cause rent-seeking and political opportunism.

Following part of the dissertation presents the theoretical review of regulations for a better understanding of the new institutional approach. The new institutional approach

mainly stresses transaction costs and regulatory commitment. Transaction costs exist as a result of incomplete contract features of regulations. So, these costs create regulatory commitment issues. We also examine the role of regulatory governance and the rule of law which come to the forefront in the infrastructure reform and regulation processes. Our focal point is investigating these issues for electricity reform and regulation. Electricity reforms have been implementing from the early 1980s in developed and developing countries. Many studies and international financial institutions show that the enhancing effects of regulatory governance cannot be neglected. At this point, we also put forward the rule of law in regulatory process and present a wider perspective. Accordingly, we examine into incentive-based price regulation and transmission and distribution losses because we assume that poor regulatory governance and the weak rule of law make it difficult to implement price cap regulations and decreasing losses.

The third chapter investigates the relationship between tariff structure, electricity losses, and the rule of law for the Turkish electricity market. We also put some characteristics of the rule of law in the regulated industries. The link between the rule of law and regulatory policy is usually overlooked in electricity markets. The discrepancy between legal and actual independence provides some light on the rule of law in regulated industries. We investigate the existence of the rule of law in regulated industries and offer an assessment of the Turkish electricity regulation. We find that tinkering with regulatory tariff structure and high level of electricity theft reflect the problems of institutionalizing the rule of law in the Turkish electricity markets.

The fourth part of the dissertation examines electricity theft from an institutional perspective specific to the rule of law and regulatory quality. When the rule of law is not well established, the regulatory process is disposed to poor governance, and the social and economic cost of electricity theft becomes larger. There has been a growing interest in the link between the rule of law and economic performance, far too little

studies on the linkages of the rule of law and regulated industries performance. We investigate the causal linkages between the rule of law, regulatory quality, and transmission and distribution losses representing illegal electricity usage.

Electricity theft is not only a technical problem that can be solved with smart meters and other technical devices. It is a political, social, and economic problem for countries in different manners. The empirical results are differentiated with high, middle, and low-income countries according to the rule of law, regulatory quality, and institutional endowments. Revealing the combination of social and economic characteristics can provide efficient outcomes for countries or industries, especially on non-technical problems that cannot be solved by only implementing rules or regulations.

CHAPTER 2

NEW INSTITUTIONAL ECONOMIC APPROACH TO REGULATION AND GOVERNANCE IN ELECTRICITY SECTOR

2.1. Introduction

The role of government in infrastructure industries changes over time. By the early 1990s, the notion of regulatory state replaced the interventionist government. This regulatory notion has brought along *better regulation* and *good governance* (Zhang, 2010). Since the infrastructure regulations are motivated by some specific features that make them vulnerable to interventions, these features are as follow: huge economies of scale and scope, high sunk costs, a wide range of consumer. The infrastructure assets are highly capital intensive that investors are exposed to regulatory risks. Economies of scale and scope limit the competitiveness of the industry. Also, utilities (energy, water, transportation, telecommunication, etc.) have been consumed by huge numbers of consumer and producer. These three specific features necessitate governmental regulation due to contractual problems and politicization of utilities pricing (Stern and Holder, 1999; Holburn and Spiller, 2002; Spiller and Tommasi, 2008).

Many developed and developing countries have undertaken the infrastructure reforms in the last three decades. The political changes that support the liberalization movement and poor performance of public-ownership triggered privatization. Also, international financial institutions assisted the infrastructure reforms and regulations, especially for developing and less-developed countries. The main reasons were poor governance, poor sectoral performance, political and social interferences,

macroeconomic conditions, and economic crisis. Governance or regulatory governance more specifically has been regarded as a critical factor for the efficiency of regulatory reforms (Kirkpatrick, 2006). Since developed countries relatively performed well, better institutional quality and good governance have been strongly promoted by international financial institutions for developing countries to increase the efficiency of infrastructure reform and regulation. The infrastructure industries are crucial for economic growth, development, and welfare. However, it is challenging to improve utilities performance that have some special characteristics under institutional weaknesses and poor governance (World Bank, 1994).

Many studies investigate the long-run growth effects of political, social, economic, and legal institutions that are supposed to shape the behavior and incentives of economic actors (e.g., North, 1989; Rodrik, 2000; Acemoglu and Robinson, 2005). Also, wide range of studies put a special interest on testing enhancing effects of institutions for different areas of economy such as foreign direct investments (Busse and Hefeker, 2007; Benassy-Quere et al., 2007); infrastructure investments (Henisz, 2002); entrepreneurship (Acs et al., 2008); trade (Dollar and Kraay, 2003). There is an improving literature that stresses the enhancing effect of institutions in performance in regulated industries. Many studies emphasize that the regulatory governance has a significant impact on regulatory reforms. According to Levy and Spiller (1994) while finding out the causes of different outcomes across countries, regulation should be considered as a design problem which has twofold: regulatory governance and regulatory incentives. While they identify regulatory governance as a system that constrains regulatory discretion and resolves conflicts, the regulatory incentives include pricing, subsidies, entry, etc. Also, the regulatory process necessitates an institutional design. Douglas North (1991) states that economies can achieve efficient and competitive markets when economic constrates are enforced by political and economic institutions. Regulatory governance should enforce the incentives to improve industries performance. Cooter (1996) and Weingast (1997) identify this enforcement mechanism as the rule of law. Further, both theoretical and conceptual

studies state that the rule of law is a better measure or indicator of institutional quality and governance (Knack and Keefer, 1995; Butkiewicz and Yanikkaya, 2006; Haggard and Tiede, 2011).

Electricity sector reform widely spread from the beginning of the 1980s driven by ideological and economic reasons. The traditional regulation forms of utilities resulted in inefficiencies, and the paradigm shift occurred in electricity by introducing private ownership, competition, unbundling, incentive-based price regulation, and independent regulatory agencies (Newberry, 2002). While the drivers of reform vary across developed and developing countries, the main elements of reforms are similar. The driving forces in developed countries were increasing technical and financial efficiency. But, Jamasb et al. (2005) presents the more comprehensive drivers named as "push" and "pull" factors for developing countries. Push factors are more related to specific features of utilities: poor performance of the state-owned industry, high costs, high and increasing demand, lack of investment, high losses, and failure of technological developments. The success of reforms in developed and Latin American countries and the aid of The World Bank and IMF for institutional restructuring can be summarized as a pull factor for developing and less-developed countries. However, developing countries have struggled to increase performance due to poor institutional factors. This result raised the importance of good governance and institutional quality of countries for regulated industries.

There are two main aims of this essay. First, we describe the development of regulation theories for a better understanding of the new institutional approach. Second, we provide an overview of the role of regulatory governance and the rule of law during the electricity sector reform experiences. This paper is based on the perception that high-quality institutions have an enhancing impact on economic performance. In this context, regulatory governance and the rule of law increase the efficiency of electricity sector reforms. Our purpose is to contribute this literature by exploring the institutional

factors of regulation and reform processes from the perspective of new institutional economics.

The following section presents the development of regulation theories with more emphasis on transaction costs, regulatory commitment, regulatory governance, and the rule of law. The third section reviews the main elements, experiences, driving forces of electricity sector reforms in developing and developed countries since the early 1980s. Section 4 presents the price cap regulation and transmission and distribution losses that are affecting the outcome of electricity sector reforms in developing countries related to governance concept. The last section contains a conclusion and a brief discussion.

2.2. Theories of Regulation

In this part, we review the theories of regulation for a better understanding of the new institutional economic approach on regulation. Theory of economic regulation has been taking place from the 1970s. First of all, instead of the public interest, the opinion on how interest groups will affect regulations and political decision-making processes became dominant. Also, it is demonstrated by some concepts that governmental failure is possible besides market failure. In this part, these concepts will be presented and go forward with new institutional economic approach on regulation by examining specific notions and assumptions.

2.2.1 Review of the Theoretical Literature

While normative regulation theories seek answers to what needs to be done to address market failures the positive theory is concerned with the regulation processes. Accordingly, positive theories of regulation examine the performance of the regulator,

as well as the effects of both economic, political, and bureaucratic processes (Joskow and Rose, 1989). Theories of regulation have begun with the normative approach and used the theory of public interest to solve market failures. Public interest theory of regulation is mainly concerned with market failures and focuses on the intervention causes (Viscusi et al., 2005). It has two main aspects. First, the market tends to become fragile and inefficient without regulations or interventions. Second, state regulation is almost costless (Posner, 1974). Also, public interest theory[1] emphasizes that the economic reasons of the regulation are market failures, more specifically asymmetric information, natural monopolies, externalities, and public goods, and under this assumption, it adopts the standpoint that the regulator determines the optimal policy (Joskow and Rose, 1989). In fact, in this case, the theory of public interest has generated a positive theory from a normative approach, and this leads to the problem that Demsetz (1968) describes as the *nirvana fallacy* (Oğuz, 2011). In this case, the public interest theory could not give an answer that what should be done in an imperfect world, as Joskow and Rose (1989) emphasize.

By the 1970s, public interest theory is criticized in three ways; inconsistency between theory and practice, the existence of non-price purposes, and transaction and information costs are excluded. It is difficult to reach perfect information on the market, and the transaction costs are high. It will be contrary to the dynamic nature of the market to consider only the demand side of the regulatory process. While public interest theory claims that regulations can be implemented at almost zero cost, Peltzman (2000) showed that the social costs of the regulated monopolies were higher than expected. By the 1970s, the theory of economic regulation states that public interest theory remained incapable of explaining the motivations of regulation. So, Stigler (1971) focused on the theories of interest groups and regulatory capture, which pointed out the regulatory capture by interest groups or regulated industries. Regulations tend to maximize the interest group benefits rather than the public interest. It is stated that under the consideration of the public interest as demanders in the

[1] For detailed studies on public interest theory, see Hertog (2000) and Hantke-Domas (2003).

implementation of the regulations, the problem of mismanagement arises from the fact that of a demand side is a particular group and the supply is directed by these groups. So, the regulations are primarily concerned with the interests of the regulated industry.

According to Peltzman (1976), regulations are political goods that are formed by political processes on the supply side and are formed by citizens that are carrying the right to vote on the demand side. Also, Becker (1983) stressed that regulations, taxes, transfers, etc. are the equilibrium of interest groups competition, in addition to arguments of Stigler (1971) and Peltzman (1976). The theories of economic regulation supported by the empirical studies[2] showing that the public interest could not achieve the desired results. Regulatory processes were quite fragile against political and bureaucratic interventions as the main reason why normative assumptions were not realized. The main contribution of the economic theory of regulation is modeling political behaviors as the components of economic analysis. In this context, interest groups also aim to maximize their welfare as all agents.

Public choice theory, which emphasizes that the regulations are not only captured by a particular group but also costly to implement, implies that the total cost of lobbying in the regulatory process is high and may raise the rent-seeking activities. Thus, rent-seeking reduces the effective use of resources (Tullock, 1967; Krueger, 1974)[3]. According to public choice theory, interest groups want to maximize their benefit like the other economic agents in the regulatory process. In the presence of these conditions, besides the market failures, government failure is also possible. According to Buchanan (1980), rent-seeking is individual behaviors that maximize social waste rather than a social surplus. Tullock (1993) stresses that rent-seeking activities arise from special privileges, and this harms people more than beneficiary gains. So, while

[2] For a detail literature review of empirical studies, see Joskow and Rose (1989).

[3] Krueger (1974) investigates competitive rent-seeking and cost of rent-seeking in trade for India and Turkey.

rent-seeking activities cause wasting resources and unproductivity, profit-seeking activities create value added to resources and productivity.

The theories of regulation are based on the market failures, and the assumption of zero transaction costs were abandoned as a result of the empirical works. As a result of this point of view, theories of incentive regulation developed under the assumption that incentives affect the behavior of the interest and third-party groups. As an example, in the regulation of a monopoly, an optimal regulation policy should be established, because the firm will always have more information about its costs even if the regulator has not any information about the firm's actual costs. Firms may have incentives to falsifying on total cost (Baron and Myerson, 1982). Laffont (1999) investigated the suitable incentive instruments to avoid political and bureaucratic capture of regulators by using the principal-agent model. In the presence of asymmetric information and transaction costs, the regulator who has more knowledge as a principle should design the incentive mechanisms for firms and interest groups to maximize social welfare. Although incentive regulation theories take into consideration of the high transaction costs and asymmetric information, focus on the demand side of regulation. However, institutional and new institutional regulation approaches emphasize that public interest theory has seen the supply side as a black box (Spiller and Tommasi, 2008). In addition to market failures, the fact that government failure is also possible has led to a search for an answer to why an effective mechanism in theory differs in practice.

Public interest theory emphasizes what needs to be done to eliminate market failures and increase competition. In this case, regulated markets prices come closer to competitive prices so that social welfare will be maximized. However, by the 1970s, empirical studies showed that prices did not always decrease as a result of regulations. Even the social costs of the regulation were higher than expected. The Public Choice literature stated the existence of governmental failure due to the rent-seeking and competition between interest groups as well as market failure. However, the traditional regulation theories focused on the demand side of the regulation. They excluded the

supply side and so the equilibrium of supply and demand sides of regulation. The institutional determinants of regulation processes increased in importance with the rising of emphasizes on new institutional economics literature. The following section presents the new institutional economic approach on regulation. This approach mostly investigates the regulatory governance which is influenced by regulatory commitment and transaction costs.

2.2.2. New Institutional Economic Approach on Regulation

While Chicago School (Stigler, 1971; Peltzman, 1976; Posner, 1971) focuses on rent-seeking and allocation problems; incentive regulation theories (Baron and Myserson, 1982; Laffont and Tirole, 1993) focus on efficient incentives. Further, the NIE pays regard to interactions between regulation institutions, regulatory governance, and sector performance as a whole. D. North (1990a) identifies institutions are "rules of the game." Institutions attribute importance to the relationship between economic and social interactions. They shape institutional enforcement and are directly related to economic processes. The NIE indicates that infrastructure regulatory process includes two main components. One is the purposes and objectives of regulations, and the second is the institutional framework that has more impact on the effectiveness of regulations (Stern and Holder, 1999; Levy and Spiller, 1994) because the quality of regulatory governance is determined by the enforcement ability of rules and regulations.

Williamson (1994) states that the micro analytic approach of new institutional economic approach emphasizes transaction costs, governance, and credible commitment. The NIE has progressed with the institutional environment and governance mechanisms.[4] Also, the governance approach focuses on the following

[4] Williamson (1994) clarifies the institutional environment as the set of political, social and legal rules. Also, he clarifies the governance as the mechanisms that effects of rules as the governance according to Davis and North (1971) approach.

three propositions in economic development and reform process (Williamson, 1994: 171);

> *1. Institutions are important, and they are susceptible to analysis.*
> *2. The action resides in the details.*
> *3. Positive analysis (with emphasis on private ordering and de facto organization) as against normative analysis (court ordering and de jure organization) is where the new institutional economics focuses attention.*

From this point of view, the new institutional economics examines regulations from the perspective of regulatory policies, institutions, and governance. In particular, the NIE investigates the reforms and regulations as complex systems within a broader extent as political, economic, and social processes. According to Spiller and Tommasi (2008), regulations are complex relationships between policymakers. These interactions determine the natüre of the relationship, while the behavior of individuals determines the rules of the game. These interactions have transaction costs by nature of regulatory contracts (Laffont, 2005), which are incomplete contracts (Hart and Moore, 1988). They create coordination problems and opportunism (Williamson, 1979).

More specifically, if rules of the game change over time in a certain country, this institutional weakness would create regulatory commitment problems and transaction costs in the regulatory process under the presence of incomplete contracts. Regulations can not achieve effectiveness only by formal organizations. There should also be social norms and informal institutions to enforce. Thus, the NIE focuses on regulatory governance, which is more concerned with the regulatory process and institutional structure. The following sub-sections aim to investigate the role of the regulatory commitment, transaction costs, the rule of law, and regulatory governance.

2.2.2.1. Regulatory Commitment

There are three fundamental political institutions of regulation as legislative, executive, and judiciary (McCubbins et al., 1987). The poor coordination and inconsistency between these institutions generally create the existence of poor regulatory commitment and high transaction costs. The institutional weaknesses often hinder the regulatory commitment and may cause a deviation of desired or expected outcomes of regulations in industries.

The effectiveness and credibility of regulations are strongly determined by political, economic, and social institutions of countries. Since the existence of mechanisms restricts arbitrary actions to provide efficient regulations. These mechanisms must have three basic features. First of all, the regulator should be bound by the conditions restrict judicial discretion. Also, the regulatory system must be flexible to both formal and informal constraints. Finally, there should be an enforcement mechanism that implements these restrictions.

The economic systems typically face credible commitment issues (North, 1993). Credible commitment decreases political costs. North (1993) and Cooter (1996) state that formal rules or institutions are not adequate to enhance economic performance. Informal rules and institutions should be compatible with them. In this context, the rule of law should not be considered as an ideological or political idea; it should be established as an equilibrium to provide functioning institutions. So, if the economic agents and citizens do not adopt the formal rules, the unproductive outcome will occur. The renouncement of credible commitment will be unavoidable in the presence of disharmony between rules, regulations, institution, and lack of the rule of law, especially in developing countries.

Regulatory commitment refers to credible commitment issues in regulatory process. Levy and Spiller (1993; 1994) emphasize that if the regulations do not fit with

countries' institutional endowments, the regulatory commitment would be damaged. The regulatory commitment is an essential driver for investment decisions of infrastructure industries because of high sunk costs. Furthermore, principal-agent models investigate how regulatory commitment arise in order to solve asymmetric information between parties in a regulatory process. Urbiztondo (1994) presents a game theoretic principal-agent model that without regulatory commitment. If the regulator cannot commit to not use the firm's information after investment decisions, investments will occur under the initial investment level.

Similarly, Stern and Holder (1999) investigate how regulatory contracts vary in terms of ensuring regulatory commitment. Regulatory contracts are vulnerable to political opportunism. So, it is important that in which institutional framework which contract type is enhancing efficiency. For instance, if the market is too large and growing, or the legal process is efficient and secure; concession contracts can be used as a substitute for regulatory agencies. Also, explicit contracts decrease political opportunism and strengthen credible commitment for both regulator and regulated agents.

The sharp acceleration of privatization movements during the 1980s, a regulatory process coordinated with changing market structure. Accordingly, the common view has taken the form of independent regulatory process and institutions that aimed to ensure credible and regulatory commitment (Newbery, 2004). Therefore, the NIE regulation approach indicates the positive relationship between independent regulatory agencies and the effectiveness of regulations.[5] The failure of government, increasing regulatory capture, rent-seeking activities, and increasing political interventions necessitate the independent regulatory agencies.

The independent regulatory agencies were established to promote sectoral investments by reducing government opportunism, to keep under control sectoral prices, quality of

[5] For a detail literature review see also Jamasb et al. (2005).

service, and protection of the consumer. Moreover, the legal institutions of regulations should provide the principle of separation of powers enhance credible commitment, as judiciary independence (Williamson, 1994). In this way, independent regulatory agencies can have a positive impact in terms of protecting the industry from regulatory risks.

However, formal independence cannot increase efficiency alone. The independence of the regulatory authority is meaningful if it is achieved both formally and informally (Gilardi, 2009; Maggetti, 2007). Above mention, studies state that the agencies often provide formal independence as given in their formation. Independence from sector and government, namely informal (de facto) independence is more important for the success of regulations. The more interference of regulatory parties as interest groups and political preferences causes less informal independence (Maggetti, 2007).

2.2.2.2. Transaction Costs

Transaction costs are the governance of interactions between regulatory parties (Williamson, 1979). Regulations are incomplete contracts by nature (Hart and Moore, 1988; Tirole, 1999; Laffont, 2005). According to the NIE, regulations should design proper governance structure to minimize the transaction costs that originated from interactions between institutions (Spiller, 2013).

The neoclassical theories of regulation assume that transaction costs are zero in the market. However, markets have positive transaction costs inherently. The literature on transaction costs begins with Ronald Coase (1960). He states that if transaction costs are zero, inefficiencies resulting from externalities can be brought to Pareto optimum by negotiations of parties. However, real market conditions do not hold the neoclassical assumptions that unbounded rationality and perfect information, and have distinct transaction costs as search, bargaining, and enforcement costs (Menard and Shirley, 2005). In this context, Tirole (1999) states that the imperfect contracts contain

the cost of writing down, observing consequences under uncertainty, and enforcement. If the firms do not foresee the positive signals from the industry, they will avoid investing. So, the existence of institutions or organizations decreases transaction costs (Coase, 1960; Williamson, 1979).

Williamson accepts the bounded rationality[6] and states that "*all complex contracts are unavoidably incomplete*" as an inevitable consequence and this complexity will create opportunism. But all economic agents and contracts will not create opportunism equally. Opportunistic behavior is an unflattering behavioral assumption that may always arise in economic organizations, but the governance structures and credible commitment can mitigate opportunistic behaviors (Williamson, 1993). Spiller (2013) specifies two main contractual opportunisms as governmental and third-party. Governmental opportunism changes the rules of the game by directing governmental power to take quasi-rent of utilities. If interest groups use the information only in their advantages, the third-party opportunism may arise. The scope of opportunism is shaped by institutions.

North (1991) emphasizes the critical role of institutions to minimize transaction costs in the regulatory process. Thus, transaction costs are a component of economic performance. The enforcement mechanisms determine the regulatory environment and effectiveness through transaction costs. Taken together, first Coase (1960), subsequently, Williamson (1979), North (1990b) and Spiller (2013) emphasize the importance of transaction costs in the regulatory process because transaction costs are the function of political and economic institutions and engage with contractual risks. The cost of minimizing the risks (e.g., third-party and governmental opportunism) associated with the existence of monopoly rents in the industry is related to the efficiency, governance, and performance of regulatory agencies.

[6] The NIE abandon the unbounded rationality assupmtion. So, people or organizations are bounded by limited their knowledge and computational capacity and these limits influence intendedly rational behavior (Simon, 1997).

Williamson (1998) emphasizes the consistency of ex-ante and ex-post costs. For example, if an ex-ante incentive imposes high monitoring costs for operating a rewards or punishment mechanism to control an inherent hazard, the ex-post situation will damage the regulatory governance. The bargaining power of the regulator will be lower in the ex-post than an ex-ante period of the contract, which increases the expected return of the regulated firm. Williamson's argument that transaction costs in regulatory processes increased as a result of the inconsistency of ex-ante and ex-post situations. Williams and Coase (1964) state that it is not adequate only to find out that the regulations are flawed, but also the costs of alternative models or quit the regulation should be taken into account.

Williamson (1976:75) reported which features should be considered when evaluating different forms of regulation that involve producer, investor, consumer, and political institutions. A common feature of all components is uncertainty. Spiller (2013) states that the regulation should be analyzed using both transaction costs and positive political theory because opportunistic behaviors that will emerge under the existence of bounded rationality make transaction costs critical (Williamson, 2000). It will also generate political costs in policy-making processes (Spiller and Tommasi, 2008). [7] Spiller (2013) rejects the assumption of optimal regulation. He emphasizes the importance of governance structure between public and private interactions to minimize the transaction costs caused by inherent hazards.

Cooter and Ulen (2016:91) classify factors that increase and decrease transaction costs. For example, while transaction costs are lower (higher) in the presence of clear and simple rights (uncertain and complex rights), standardized goods or services (unique good or service), instantaneous exchange (delayed exchange), and cheap punishment

[7] Political costs are also expressed by North (1990b) and Wallis and North (1986) as the costs that arise from governance structures.

(costly punishment). These are strongly related to the existence of the rule of law (Moller and Skaaning, 2012).

On the one hand, uncertainty and complex rights or rules increase transaction costs; on the other hand, these increase opportunistic behaviors that harm credible commitment. Moreover, Coase (1960) emphasizes that clear and simple legal rules minimize transaction costs and the role of organizations, firms, or other institutions are crucial within that period. Even so, the legal institution or contract is well-designed, there could appear rent-seeking activities or political or sectoral interventions in the regulatory process.

Neoclassical theory neglects that the institutional affecting is also arising from the interaction between the supply and demand side of regulation. Policy makers, bureaucrats, and political institutions exist within a competitive framework[8]. From the NIE perspective, if the regulations, legal rules, and institutions are compatible with each other, the transaction costs will be minimized, and the industry will achieve efficiency.

The rule of law has been attributed as the most predominant and high-quality institutions[9] for economic growth in recent years (e.g., Rodrik, 2004). The rule of law is an equilibrium of formal and informal institutions (Cooter, 1996; Hadfield and Weingast, 2014). This is also emphasized in regulatory processes. Therefore, countries' institutional capacities are associated with the existence or establishment of the rule of law, and the recent studies investigate the effects of the rule of law on economic performance[10]. Also, the studies present evidence on the enhancing effects

[8] North (1990b), in what is referred to as transaction cost politics, makes an analysis that takes into account the interaction between policymakers and citizens.

[9] Prevalently, perceptions of the rule of law is used to measure institutional quality (Rigobon and Rodrik, 2005). While high-quality institutions promote economic performance, institutional quality can also be promoted by economic prosperity and performance (Rodrik, 2000).

[10] See Haggard and Tiede (2011) for a detail literature review.

of institutional quality and governance during the restructure or reform for regulated industries. Also, independence of regulatory authority is required for ensuring good governance and the rule of law to increase investment and efficiency. In the following section, we briefly mention the definition of the rule of law and how do we track the rule of law in regulated industries will be discussed.

2.2.3. The Rule of Law and Regulatory Governance

It is a very arduous process to define the rule of law in a generally accepted manner. Besides the different experiences and systems of societies, historically different definitions and approaches have been adopted according to varying focal points. However, the rule of law is categorized within two fundamental distinctions. The first is the thin (Skaaning, 2010) or formal (Tamahana, 2004) which is dealt with mostly by the law and legal dimensions. The second definition based on the thick (Skaaning, 2010) or procedural (Tamahana, 2004) approaches that address the reflection of rules or law in society through its functioning or implementation. Thick definition also involves thin definition features.

Shklar (1987) underlines that this term might serve specific groups due to overutilization or ideological reflection so it may become almost meaningless. The NIE approach provides an objective perspective to understand the rule of law and reveal the prominence in the economy and society. Tamahana (2004) considers the rule of law as a global notion. He states multidimensional features instead of indecisive definitions. Also, a widely emphasized major characteristic is that all groups of the society should be "*bound by and abide by the law*." This approach takes a broader perspective.

Before moving on to the relationship between economic activities and the rule of law, we need to review the definition of how this relationship develops. Raz (1979) and Fuller (1969) treat the rule of law as formal legality and argue that law must be clear,

open, accessible, and stable. Thin definition, which deals with the basic features of legal rules, does not commonly use early institutional concepts such as human rights, democracy, justice, equality. In fact, it focuses on the principles of legal rules rather than dealing with the enforcement or consequences of the law. According to Moller and Skaaning (2012), the definition of the rule of law takes formal legality as the core; it covers and focuses on rule by law instead of the rule of good law. Hayek (1960) emphasizes that the rule of law, liberty, and democracy are strictly related notions. In fact, Hayek stresses that societies cannot be successful if they do not have legal or law experiences. To be successful, they must establish institutions that guarantee the rule of law. In sum, Table 2.1. presents a summary of alternative approaches and transition from thinner to thicker versions. Each step proceeds cumulatively to include the previous one.

Table 2.1 Summary of Alternative Rule of Law Definitions

	Thinner	**- - - > to - - ->**	**Thicker**
Formal Versions	**1. Rule by Law**	**2. Formal Legality**	**3. Democracy + Legality**
	law as an instrument of government action	general, prospective, clear, certain	consent determines the content of the law
Substantive Versions	**4. Individual Rights**	**5. Rights of Dignity and Justice**	**6. Social Welfare**
	property, contract, privacy, autonomy	helps individuals develop the capacity to become self-determining	Substantive equality, welfare, preservation of community

Source: Tamahana (2004).

Although the rule of law definitions progress with different perspectives, countries have often constituted a consensus on the quality of formal and informal institutions

and therefore, the importance of the rule of law. The World Bank emphasized the formal institutions as well as informal institutions in infrastructure industries of the countries, especially since the early 1990s. The World Bank (1997) states that *"efforts to restart development in countries with ineffective states must start with institutional arrangements that foster responsiveness, accountability, and the rule of law."* World Bank also emphasizes that building effective institutions and good governance will promote the investments and efficiency required for the infrastructure industries. According to the World Bank (2003), the rule of law is attained with the existence of the meaningful and enforceable laws, enforceable contracts, basic security, and access to justice. The state is allowed to regulate the economy by engaging in investments, business, etc. through these well-functioning elements.

The relationship between economic performance and institutions is a subject that has been frequently studied specifically to the rule of law in recent years. The rule of law is often considered as an inseparable part of good governance, regulatory commitment, and independence of regulatory agencies. Two important effects come to the fore related to the rule of law in the NIE approach: consistency of regulations and informal independence of regulatory authority. First of all, the establishment of formal institutions is not sufficient for economic efficiency. Informal institutions should follow the rules or law. Cooter (1996) emphasized the differences between the rule of state law and the rule of law state. Rules (or regulations) that are in line with social norms could enable economic agents to obey the rules. Otherwise, agents would not internalize due to the rules and obeyed out of fear of punishment motivation would be not sustainable and productive. Hadfield and Weingast (2014) identify the rule of law as the equilibrium of formal (e.g., law, legal order, regulations) and informal (e.g., beliefs, behaviors) institutions. Also, Weingast (2013) emphasizes the two aspects of the rule of law that classifies as impersonal and dynamic by NWW (North, Wallis, and Weingast, 2009) perspective. The impersonal aspect includes the *absence of arbitrary actions by the states against citizens*, *certainty or predictability of law*, the *ability of the state to treat all before the law*. The dynamic aspect considers that the state should

be able to maintain and honor the rule of law in the future. In this sense, the rule of law has many practical angles to investigate the efficiency and success of regulated industries.

The primary objective of regulations and regulatory bodies is to increase efficiency and private investment in the regulated industry. But in a broad sense, regulations are the complex systems for managing the ideological, social, economic, political, and legal environment together to achieve this aim. This system should be designed to operate effectively in countries with different drivers and experiences. Otherwise, the rule of law cannot promote the efficiency of regulated industries, especially in developing countries.

The rule of law and governance generally accompany each other (Skaaning, 2010) and regulatory framework and independence are directly related to each other. The formal and informal aspects of governance designate promoting the rule of law in infrastructure regulatory environment. Therefore, two main aspects should be used to design suitable infrastructure regulation for different countries: a) the objectives (e.g., purposes, functions) of regulation b) the countries' specific institutional framework (Levy and Spiller, 1994; Stern and Holder, 1999). Moreover, they use these two standpoints to describe regulatory governance, and practical design of regulations, and those are closely related to institutional endowments of countries. Levy and Spiller (1994) put into account Douglas North's (1990a; 1991) approach to define elements of the institutional endowment. They are legislative, executive, and judicial institutions as a formal mechanism. Administrative capabilities and broadly accepted norms shape the citizens' behaviors as an informal mechanism and the balance of all. Institutional endowments are crucial that shaping and specifying the regulatory commitment which arises from the regulatory contracts between government and firm or interest groups. Good governance efforts try to solve contract and commitment problems for regulated industries.

World Bank (1997; 2002), which promotes the electricity sector reforms suggests that privatization could enhance governance. For this purpose, the regulatory mechanisms should be designed to encourage accountability, promote competition, and hinder the corruption. Moreover, the World Bank presented privatization movements and promoting competition as a solution of rent-seeking activities of bureaucracies. From this point of view, the electricity reforms and regulations became privatization centered for developed and developing countries. The reforms do not only aim to increase private investments but also aim to achieve industrial efficiency. According to some studies (e.g., Henisz, 2002; Benassy-Quere et al., 2007), the rule of law is one of the most crucial elements of institutional endowments that encourages investments. For the regulated industries, the quality of regulatory governance and the rule of law in regulated industries is strongly related to the efficiency of industries. Developing and transition economies should draw on accountability, independence, predictability, transparency, and clarity which support infrastructure reforms and efficiency (Kessides, 2004). The studies (Levy and Spiller, 1994; Stern and Holder, 1999; Stern and Cubbin, 2005) that investigated the regulatory governance put emphasize on similar key features of good governance. They all present some necessary criteria for good regulatory governance. These criteria closely indicate effective regulatory effectiveness and independent regulatory agencies. Stern and Holder (1999) summarizes these as following;

- *Clarity (does regulator's functions and duties are clear and formally set out?)*
- *Autonomy (the bound of the relationship between government and regulator would be specified clearly and avoid arbitrary behaviors)*
- *Participation (does regulatory decision making and process involve all participants?)*
- *Accountability (Is there formal and legal mechanisms to challenge decisions?)*
- *Transparency (Does the regulatory decisions are public or accessible for all parties?)*
- *Predictability (How the regulator encourages regulatory commitment?).*

All these aspects are strongly related to formal and informal independence of regulatory agencies. Also, Cochrane (2015) argues that the rule of law does not only about laws or written rules; it is shaped by how the institutions apply that law or rules. So, he suggests some similar criteria of regulatory governance to observe the rule of law in regulated industries. For examples, clear and specific rule-based regulations are the basis for the rule of law due to all parties may easily understand the main aim of regulations and internalize. The complex and unclear rules allow the regulator to arbitrary behaviors that cause damage to the rule of law.

Also, the existence of individuals' right to discovery the evidence, details, and objections of the decisions of the regulatory authorities is a necessity to ensure the rule of law. The lack of this facilitates the arbitrary actions of regulations. If the rule of law ensured the enforcement mechanism, the government might appoint all members of a regulatory agency. On the contrary, appointments may be independent of the government, but the regulatory agency may be under the control of certain political interest groups. The independence of the regulatory agency should be measured by the extent of factors such as efficiency and consumer's welfare.

IRAs have been considered as a typical route to provide effective regulatory design and governance from the beginning of introducing privatization and competition to infrastructure industries. Smith (1997) emphasizes the role of independence in the presence of regulatory challenges. First, infrastructure prices are mostly political, and increasing the prices can reveal the voter’s adverse behaviors. Second, this political pressure obstructs private investments because of weak credible commitments. Also, investors demand specific rules and rapid adjustments by governments because of the long-term contracts in infrastructure industries.

The regulatory governance of electricity reform is mostly influenced by the independence of the regulatory agency. The reform performance is strongly related to some governance criteria that reflect the main aspects of independence from

government, regulated industry, or pressure group. Informal independence occurs during the implementation of legal requirements in the regulatory process. In that case, Stern (1997) states that even if the formal independence or regulatory arrangements is necessary for effectiveness, the informal regulatory aspects are complementary to sustain a clear understanding of "rules of the game" for regulatory governance, accountability, and credibility. Because, when the regulatory governance is credible, the regulatory contracting problems which arise from government opportunism due to the high sunk costs will be solved (Spiller and Tommasi, 2008). So far, this paper presents the theoretical focal points of regulation and having defined regulatory governance and the rule of law emphasis on regulation. The following section presents the process and elements of electricity regulation reforms for a better understanding of the role of new institutional aspects.

2.3. Electricity Sector Reforms in Developed and Developing Countries

By the 1980s, the role of government in infrastructure industries has been reviewed because of low efficiency, underinvestment, increasing demand, poor service quality, regulatory capture, etc. The idea that the infrastructure industries work more efficiently than state-owned became prominent. So, liberalization and privatization movements have become more prevalent for restructuring and reform (Kessides, 2004).

Privatization, regulation, and competition in both developed and developing countries have become the subject of reforms as a whole with the rapid privatization processes from the beginning of the 1980s. The privatization and liberalization movements are the key elements of reform. They are also supported by international financial institutions and the dominant ideologies of countries. Different results have been arisen about how privatization and liberalization affect the performance of the electricity

industry. Besides, the NIE approaches have been investigating that the enhancing effect of high institutional quality for privatization and liberalization.

Countries have adopted some or combinations of main elements in reform and had different challenges. For example, Chile, which implemented the first radical reforms in 1982, privatized transmission systems without vertical and horizontal unbundling. As a result of this change, an implicit private monopoly was created, and it was not sustainable to provide market power and promote competition in the generation, transmission and distribution market (Nagayama, 2007). Chile has been considered successful in terms of infrastructure reforms and implemented key elements (Joskow, 2006). However, Chile, which performed well during the first years of the reform, faced a major energy crisis in 1998-1999. This crisis occurred due to both regulatory objectives and the weakness of regulatory governance. Following this crisis, the energy law was reformed to improve regulatory governance in the sector (Joskow, 2006; Fischer and Galetovic, 2003). In the simplest sense, this can be an example of the importance of institutions of regulation to ensure the success of reforms for even the best practices. Argentina followed Chile, and infrastructure reforms rapidly expanded into Latin American countries. Argentina implemented fully unbundling in its transmission and generation systems and again realized the key elements of the reform considerably. However, the reform, which was successful in the early stages, experienced the negative consequences of being very fragile both against macroeconomic conditions and political interventions as in many developing countries with the Argentine energy crisis in 2004 (Pollitt, 2008). Latin American countries examples are seen as important issues in the literature for the success and failure of the reforms in developing countries. Also, there are many countries with similar experiences during similar periods.

The privatization of publicly owned enterprises in the UK was closely related to the ideological preference of the Thatcher government, and so the market is fully liberalized (Newbery, 2002). UK has been considered as a best practice by

international financial institutions like the World Bank and the IMF. They recommended to other countries to imply the British Model for infrastructure industries. The British Model has performed market-oriented reforms that require horizontally and vertically unbundling. The state-owned structure was separated into transmission and generation companies, and all companies were privatized. Also, the regulatory framework was determined by the Electricity Act in 1989, and this act established the OFFER (Office of Electricity Regulation). The main contribution of this office is provided by the head of the office Stephen Littlechild presented the price-cap (RPI-X) regulation which rapidly spread across countries and other infrastructure industries (Vickers and Yarrow, 1991).

The EU Electricity Market Directives also followed the British Model. The key reform steps were identified as restructuring the market by unbundling, competition, privatization, and regulation via independent regulatory agencies. Also, incentive-based regulation is implemented to promote cost-saving and efficiency (Jamasb and Pollitt, 2005). The member states should be required to perform at least minimum element of reform. The directives aim to create a single electricity market in the EU. Turkey also has been motivated by the EU membership candidate to follow EU Electricity Market Directives and liberalization movements (Bagdadioglu and Odyakmaz, 2009). EU directives recommended allowing open access to the market in the first step of reforms to restrain privatization's political and economic effects adequately. Turkey has also followed this gradually reforms set. Turkish electricity market was dominated by a state-owned company which was named as TEK. TEK allowed private access into generation, transmission, and distribution in 1984. Liberalization policies strongly influenced the reform movement at the beginning of the 1980s. In 1993, TEK separated into two state-owned TEAS in generation and transmission, and TEDAS in distribution. In 2001, TEDAS split into three state-owned companies, which are EÜAŞ (in generation), TEİAŞ (in transmission), and TETAŞ (wholesale) (Başaran and Bagdadioglu, 2010). The independent regulatory agency that named as Energy Market Regulatory Board (EMRA) was established in 2001 to

protect competition and consumer and authorized in legislation in the market. TEDAŞ, which is the distribution network, was separated into 21 distribution companies, the privatization of companies is completed in 2011.

It is aimed that the necessary tools used in the transformation of the electricity market in developed and developing countries potentially contribute to the price-cost margins, economic development, investment, income distribution, the strategy and efficiency of new technologies (Joskow, 1998). Market-oriented reforms are financed by domestic or international financial institutions. Reforms have started to be implemented as infrastructure industries are significantly affected by internal factors such as poor governance, low efficiency, and financial insufficiency, especially in developing countries (Besant-Jones, 2006). High economic growth rates and increasing energy demand were the most important drivers to utilization generation capacity for developed countries. The privatization movements, an essential pillar of the reforms, have been the reflection of economic and political transformation in developed countries. Although the motivations differ, the desired results have not been achieved in every country as a natural consequence of the application of similar recipes. The most important constraint on this issue was the incompatibility of the complex reform and regulation sets of the institutional endowments of the countries. For example, in countries such as Norway and UK, which have a strong institutional background, reforms have seen relatively successful, while it has not been possible to mention about the success of reforms in institutionally weak African countries.

Until the 1980s, many developed and developing countries had public ownership, vertically integrated structures or private monopolies in industries. Economic factors such as inefficiencies in the infrastructure industries, economic crises, rising input, and output prices have brought about restructuring. The electricity sector reforms have started to be implemented intensively in Latin America, OECD, and European countries. By the 1990s, many developing countries and transition economies have also undertaken the market-oriented infrastructure reforms. These reforms led to a

significant paradigm shift from state-owned to private-ownership. The idea of liberalization that promoted by politicians in this period has an important role as well as the encouragement of international organizations such as the IMF and World Bank. At the core of these approaches are reasons such as poor performance of natural monopolies, public fiscal failure and increasing demand for electricity, and transmission of electricity to rural areas. Therefore, in infrastructure industries requiring a new structure, the idea of transition to incentive-based regulation models, independent regulatory agency (IRA) to implement these models and the separation from private and public monopolies have been dominant (Newbery, 2002).

This restructuring has been put into practice as multi-dimensional and complex structures that cover not only regulations but also many sectoral transformations. The standard model included privatization, unbundling, competition, and incentive-based regulation (e.g., Kessides, 2012; Newbery, 2002; Joskow; 2003). According to Besant-Jones (2006), countries have implemented similar aspects in the restructuring process, but there have been significant differences in the success of reforms between developing and developed countries.[11] In addition to key elements, the implementation of the regulatory environment included a regulatory agency to achieve the expected results. The impact of the reforms has been empirically investigated for many countries. Institutional capacity, the independent regulatory agencies, and sequence of key elements play a dominant role in the performance of countries such as economic growth, investment, and development, as well as in sectoral performances (e.g., Nagayama, 2007; Zhang et al., 2008).

Although the reasons for the drivers of reforms were mostly common, there were some differences between developed and developing countries. The rapid progress of technological developments in developed countries and the more efficient use of existing capacity have been the driving force. Economic and social reasons such as

[11] Besant-Jones (2006) defines these reform packages as “cookbook solutions. Also, Kessides (2004) states that every element in the reforms cannot be “panacea".

low productivity, generation, and quality, high losses and economic crises became unsustainable by pure publicly ownership for developing and transition economies (Jamasb et al., 2005; Joskow, 1998). In cases where public ownership cannot sustain the efficiency of infrastructure industries and investments, privatization processes mainly supported by international financial institutions have come to the fore. The establishment of regulatory agencies that would ensure the effectiveness of regulations and privatizations and manage the market was considered important, particularly in European and developing countries.

Although many of the developing countries have taken the first steps of electricity reforms, most of them have had difficulty in realizing all aspects of the reforms. According to Joskow (2002), in a transition from public ownership to private ownership, the transaction costs that will arise during the transformation. If these costs are less than benefit, then welfare can increase. Therefore, the effects of regulations, and reform sets on the initial conditions, institutional background, economic conditions, formal and informal institutions of regulations have led to different results with similar policy sets. For this reason, the main characteristics of the electricity market before the reforms are presented for developed and developing countries.

Studies in the early years of the reforms demonstrated that developed countries outperformed developing countries (e.g., Newberry, 2002; World Bank, 1994). The main reasons underlying these significant differences are the high subsidy in developing countries, the lack of investment, the weak institutional framework and endowments, the lack of a robust legal framework, poor governance, political instabilities and interventions, and high electricity losses. Though the internal drivers of the countries that started to implement electricity reforms were different. The external drivers were affected by common and global factors. Table 2.2. summarizes the main drivers of reforms in developed and developing countries.

Table 2.2 Drivers of Electricity Sector Reforms

Developing Countries	**Developed Countries**
Internal Drivers	**Internal Drivers**
The burden of energy subsidies	Excess capacity
Low service quality	Usage of costly generation Technologies
High energy losses	Economic inefficiencies
Low capacity	Increasing demand for energy
Low investments	
External Drivers	
Political and economic ideology, technological progress, global and national macroeconomic events, the structure of capital, policies of OECD, World Bank, IMF.	

Source: Nepal and Jamasb (2015)

These factors have caused severe problems in energy prices, investments and macroeconomic variables on a national and international scale, such as the post-soviet transition of Soviet countries (1989), the Latin American crisis (1980), and the Asian financial crisis (the late 1990s). These external and internal drives caused the transition from state-owned to private ownership, the establishment of an energy reform law, the establishment of independent regulatory agency, implementation of incentive-based price regulation for natural monopolies, the promotion of a competitive market, establishing clear rules on consumer protection and subsidy (Joskow, 1998; Newbery, 2002).

Early studies investigate the effects of privatization, unbundling, and competition on generation capacity. Besides, Pollitt (2002) emphasizes the importance of the joint action of the components of infrastructure reforms as a combination of four theories. The first is property rights theory. According to Alchian (1965), the formation of property rights in a market will create the most effective solutions in allocating resources. Secondly, according to Niskanen's (1968) bureaucracy theory, since the bureaucrats tend to maximize their interests, the emergence of regulations will be based on maximum welfare of the bureaucrats, but in the opposite case, efficiency in private ownership will increase. Thirdly, it is assumed that political interventions will be less under private-ownership then commitment will increase in this case. Finally, the regulations bring out different results under different ownership. Reforms will only yield effective results under the balance of all these theories. Therefore, in the following, the results of the empirical studies will focus on how the elements of reform work together and in particular, the institutional components. Subsequently, studies focus on the impact of regulatory governance indicators as accountability, transparency, independence, the rule of law, etc.

Empirical studies increased after the electricity reforms have spread into both developed and developing countries. The first systematic study on this topic was made by Steiner (2001). Steiner investigated the effectiveness of reforms for 19 OECD countries in the period 1986-1996, covering the first decade. The study focuses on ownership, privatization, competition, vertical integration, and unbundling, which are the main variables of reforms. They reported that are unbundling, and privatization increased electricity generation capacity when they are implemented together. The UK applied the most liberal policies, followed by Finland, New Zealand, Norway, and Sweden.[12] Although private ownership is not sufficient to increase competition in less liberalized economies. The most interesting finding of Steiner (2001) on prices is that the downward movement of prices is valid in industrial prices and that producer benefit

[12] The least liberal countries are Belgium, Canada, France, Greece, Ireland, Italy, Netherlands, Portugal, and Spain.

more than consumers from the reforms. Hattori and Tsutsui (2004) conducted an empirical study for similar sample and period. This study, which reached the same conclusion as Steiner (2001) on the producer and consumer prices, stated that unbundling and wholesale spot market did not decrease prices but caused an increasing. This result was interpreted as an indication that the end-user largely paid the transaction costs of the transformation in the market during the first years of the reform. These two leading studies for developed countries have not taken into account the impact of institutional and governance determinants.

Another study attempting to explain the reasons for the significant differences between industrial and household prices was made by Nagayama (2007). The study predicted the impact of reforms in prices for 83 developing countries from Latin America, former Soviet Union countries, and Eastern Europe for the years 1985-2002. He indicated that unbundling and wholesale pool market does not have an impact alone on decreasing prices. But, reducing in price occurs under the presence of independent regulatory agencies. Likewise, Joskow (2008) emphasized that market-oriented reforms do not create price-lowering effects as expected in all conditions. Polemis (2016), a more recent study investigating OECD countries, examined reform performances between 1975 and 2011. Similar to previous studies, while the elements of the reforms alone do not yield strong results to increase generation capacity and labor productivity, the combined implication and interaction of them produce strong results together. Effective competition and regulation have a higher impact than privatization, and robust independent regulatory agencies are crucial for effective results.

Moreover, developed countries such as EU and OECD members also attach importance to independent regulatory agencies. EU electricity market directives remain high competitive market, and incentive-based price regulations are implemented by independent regulatory agencies (Pollitt, 2009). Also, creating independent regulatory agencies, removing the regulatory function from government, and legally well-defined regulations are the common elements of OECD and non-

OECD countries electricity sector reforms (Williams and Ghanadan, 2006). Furthermore, OECD still gives policy recommendations to strengthen good governance, regulatory quality, accountability, transparency, and creating a culture of independence in infrastructure industries (OECD, 2015).

Although the developed countries performed relatively well, they faced some performance problems in the reform processes. These problems have arisen mostly in the application of incentive regulations and in creating the right incentives for investors. Distribution restructuring affects the choice of whether the tariff and price apply regional or national; or wrong incentives to companies for reducing market power have significantly affected the performance of developed countries (Joskow, 2003).

The better performance of developed countries in general and the poor performance of developing countries have directed the empirical studies to the developing countries. Studies for developing countries have addressed the key determinants of reform. They have mainly focused on the sequencing of reform elements. Bacon and Besant-Jones (2001) emphasized that for the long-term sustainability of reforms, firstly the legal and regulatory framework should be established to make radical changes and implemented market-oriented reforms to achieve the desired results of reforms. These are challenging for countries under the assumption that the implementation of tariffs and privatization would be affected by the election cycle and the timing of reforms. Similarly, Zhang et al. (2005; 2008) investigated whether the sequencing of the reform elements is important or not for developing and transition countries. They reported that it is important to increase market competition and establish an independent regulator before privatization for developing countries. Maintaining this sequencing in terms of reforms results in higher electricity capacity, generation, and capital utilization. Moreover, privatization, competition, and the existence of an independent regulator can have substantial results in terms of production and labor productivity if they only implemented simultaneously.

In addition to the sequencing of the reform elements, the critical research question of whether the institutional components are compatible with the reforms arise. Kessides (2012) and Jamasb et al. (2005) stated in their surveys for developing countries that ideological factors on especially privatization and liberalization played a major role in the economic activities based on the reform movements that started in the 1980s. Therefore, each country's implementation of similar packages within this global dynamism did not produce similar results. For example, Jamasb (2006) stated that developing countries have the potential to implement incentive regulations and even stated that they could be successful in the implementation of these regulations without privatization. However, the important issue is the governance skills of the institutional structures of the countries and the industry. Because even though developing countries provided high investments in the early stages, their successes were not sustainable because they could not provide political, economic, and sectoral stability that would ensure the sustainability of investments.

Studies also investigated the effects of interest groups and political risks on the reform process. Sustainable and efficient investments are crucial to the success of the electricity sector. Because investment decisions are highly influenced by interest groups and political and third-party interventions, as we have mentioned in regulatory theories. Henisz and Zelner (2002) and Holburn (2001) examined empirically how political risks and the behavior of interest groups affect investment in the electricity sector. The lack of arbitrary practices and policy changes increase investments in the market. Otherwise, political instability and openness to the industry to intervention constitute an essential obstacle for new firms to enter the market.

Some studies on regulatory performance also evaluate the relationship between institutions and governance. Gasmi et al. (2006) investigated the effects of political institutions and regulatory governance on the performances of the infrastructure industries in their study conducted between 1985 and 1999 for both developed and developing countries. They show that the impact of political accountability on sector

performance is stronger in developing countries. Therefore, developing countries should first promote regulatory governance for reforms to be successful. The fact that developed countries have already achieved regulatory governance and accountability ensures that the high regulatory quality.

The better performance of Latin American countries has made it important to examine the effects of regulatory governance, along with standard reform elements. Andres et al. (2008) showed that the presence of regulatory authority improves the performance of industry and reforms regardless of the ownership of infrastructure industries. The presence of regulatory agency alone is effective, as well as the autonomy, transparency, and accountability of the regulator, which significantly improves infrastructure performance. Another critical issue that developing countries struggle for in terms of reforms is electricity losses. The study also reported a significant reduction in losses since the introducing of reforms in Latin American countries under the ownership of private ownership and regulatory agency.

Cubbin and Stern (2006) examined the impact of regulatory governance for the period 1980-2001 for 28 developing countries. In addition to providing empirically significant and substantial impacts of regulatory governance. They have also provided possible reasons for the better performance of the regulatory agency. Accordingly, the regulatory agency with good governance has the possibility of making fewer mistakes, correcting errors faster, and not repeating mistakes. There is also a high likelihood of success in transferring reform sets or good practices for reforms to countries. Erdogdu (2013) similarly examined the reforms in both developed and developing countries by a new institutionalist approach. Also, the study examined the impact of the regulatory agency, democracy, and transaction costs on the success of reforms. He stated that when the implementation of the reforms in countries dominated by interest groups and corruption in the country, these situations limited the efficiency gains.

Due to the specific characteristics of utilities, IRAs are approved to manage regulatory governance as an institutional form in regulatory environments. Then, social, economic, and political structure shape the degree of independence of regulators and the efficiency of governance that affect industrial performance. The independent regulatory agencies played a crucial role to perform reforms. The presence of independent bodies made a difference in the effectiveness of industries, especially in privatization and competition processes. The electricity sector reforms require the establishment of independent regulators to ensure privatization, competition, and regulatory governance. The liberalization and privatization of sector significantly improved governance via independent regulatory agencies (Pollitt, 2012). The World Bank paid regard to the establishment of IRAs as one of the milestones of reforms (Bacon, 1999). Also, new regulatory frameworks should be driven by independent regulators instead of government directly (Spiller, 1996). The main aim is to oversee the industry, enforce electricity law or acts, and strengthening commitment. The results show that the presence of independence supports the positive effects of privatization and competition. Also, while competition effects the strongest, it only occurs in the existence of independent regulatory bodies. So, they claim that the independent regulatory agency reduces the regulatory and hold up risks, especially for developing countries.

Even the IRAs are necessary and have an important role in the regulatory framework and have strong relationships with other reform elements, the political and economic crisis showed that only the existence of formal independence is not enough to sustain sectoral performance (Bakovic et al., 2002). According to Gilardi (2009), independent regulatory agencies are primarily hierarchical organizations that contain independent experts from the bureaucracy in terms of their organizational structure. This organizational structure has two characteristics in terms of independence as formal and informal. The appearance and ensuring of formal independence is generally more clear due to fulfilling the necessary conditions such as appointment and dismissal procedures, formal obligations, source of budget, and rule-making. Informal

independence is created by the degree of political and sectoral interferences (Gilardi and Maggetti, 2011).

In recent years, studies examining the relationship between the success of reforms and regulation, governance, and institution have adopted a new institutionalist approach. A significant analysis of regulatory governance is presented by Levy and Spiller (1994). They specify countries according to institutional endowments that incentives in infrastructure industries cause different outcomes. The reforms have two main objectives: to encourage investments and to ensure efficiency in production. Incentive-based regulations can increase efficiency by achieving market-based pricing and competition, while the right incentives will increase investments. However, institutional and sectoral capacities need to be taken into account to implement incentive-based regulations such as RPI-X. Therefore, for example, in low-income and high-income countries, it may be necessary to differentiate incentive mechanisms, and sometimes even to compromise commitment, rather than implementing the same incentive-based regulations. In many developing countries, electricity reforms have evolved, and hybrid forms have begun to be implemented. The main driving force in these hybrid forms has been the implementation of reforms that are in line with the institutional capacities of the countries, the application of pure unbundling or privatization where necessary, and the establishment of independent regulatory agencies to minimize vulnerability to political interventions (Eberhard, 2006). However, the most challenging area among these hybrid forms was price regulations. Because of the high cross-subsidy and illegal use rates in developing countries caused many difficulties.

Although the main objectives of the electricity reforms implemented in many countries since the 1980s were the same, significant differences in developed and developing countries led to the failure of the reforms to achieve the desired results, particularly in developing countries. Jamasb et al. (2005) summarized the lessons that should be drawn from these differences as follows;

1. In developing countries, consumer prices are subsidized by industrial prices, whereas in developed countries, this is the opposite. High and compulsory subsidy between urban and rural makes it difficult to determine the impact of reforms on prices in developing countries.

2. The existence of high technical and non-technical losses in developing economies complicates the implementation of reforms. First of all, regulations should be accepted by everyone, and social legitimacy should be built to deal with technical and non-technical losses. This finding shows that all elements of the reforms should be presented to the socio-economic structures of the countries in a complementary way.

3. The existence of a regulatory agency is important for increasing the investments in the sector and realizing the privatization objectives. The current institutional endowments in developed countries have facilitated the internalization of regulations and compliance with the rules and succeeding in providing a commitment for investments. However, privatization, liberalization, incentive regulations, and competition in developing countries can be successful under the presence of regulatory authority. Nevertheless, not only the existence of regulatory authority is sufficient in itself, but also should ensure good regulatory governance, accountability, the rule of law, and independence. The following section presents the commonly used incentive-based price regulation model and review of transmission and distribution losses. These issues have been seen as more challenging issues for developing countries in the presence of a weak institutional environment.

2.4. Some Special Aspects of Reform Related to the Rule of Law and Regulatory Governance

This section reviews the price regulation shift from cost-based regulation to incentive-based regulation and electricity losses. The RPI-X price model presented in 1982 by Stephen Littlechild report. This report also dicsuesses advantages and disadvantages of RPI-X and necessary restructuring tools. Besides, developing countries have challenged to sustain decreases in electricity losses, especially caused by non-technical losses.

2.4.1. From Rate of Return to Incentive-Based Regulations

Inefficiencies created by cost-based regulations began to be discussed in all natural monopoly industries in the 1980s. This argument first resulted in introducing of incentive-based regulation into the telecommunications market in the UK. The main objective was to increase both profit and social welfare by offering incentives to increase the efficiency of firms. The UK, Latin America, EU states, New Zealand, North America have made efforts to quickly implement incentive-based regulation mechanisms, especially between the 1980s and 1990s.

Averch and Johson (1962) introduced the inefficiencies of cost-based regulation of natural monopolies. The only way to increase the profits of regulated firms on a cost-based basis is to raise capital stock. However, since each additional capital cost is added to the rate base, whether it is productive or not, the revenue requirement will increase, and the firm will get a higher profit level. This situation caused firms to move away from productivity and has motivated them into rent-seeking incentive instead of profit-seeking incentive.

Rate-of-return (ROR) was used prevalently until the 1980s. The price cap regulation first applied in telecommunication industries due to a rapid change in technology and

increasing competition. The cost-based regulation gave the industry false incentives about investment and distorted new innovative investments. Firms manipulated their investments to maximize profits; they did not prioritize efficiency and productivity. Price cap regulations, which replace rate-of-return regulations, are a contract between regulated and regulated in its simplest form, and in this contract, the regulated firms have more information about the costs.

In the 1980s, the transition from ROR to incentive-based regulations applied in revenue or price cap forms accelerated. With the impact of the oil crisis in the 1970s, developed countries started to implement electricity sector reforms which due to the low-performance of infrastructure industries and increased prices. These reforms aimed to implement incentive-based regulations to minimize cost and avoiding from disadvantages of cost-based regulations. First, the revenue cap model presented by Stephen Littlechild in the UK emerged in line with these developments and then spread to many developed and developing countries. The price cap regulation was mainly based on the retail price index minus X (efficiency parameter) model, Littlechild also proposed a more comprehensive reform and laid down the market conditions for the regulation to be successful.

According to the RPI-X model, RPI (also referred to as CPI in some countries) indicates the price index, and X is the parameter of firms' efficiency. The model also involves the capital investment requirements. It is important to determine the X that measures efficiency. Because X gives an incentive to firms to reduce costs, if firms realize the given incentives, they can add the reduced cost to their profit. However, in cases where X is too high or low, it may cause firms to make excessive profits or not to make reasonable profits. Littlechild and Beesley (1989: 456) indicate that RPI-X is less fragile to inefficiency and overcapitalization problems compared to cost-based regulation. Because firms know that they can make more profit as they work more efficiently. Moreover, firms are more flexible in setting prices, because economic conditions and prices are linked, and regulatory lags are avoided. Lastly, both the

regulator and firm are managed in a more transparent environment as they contain clear determinants which occur market conditions.

Littlechild (1983) and Beeseley and Littlechild (1989) explained the regulation and reform model. They presented privatization of monopolies in the UK and emphasized the differences of the model from ROR. The report points out the critical points that will ensure the efficiency, competition, and liberalization of the infrastructure industries such as telecommunications, gas, electricity, and water, besides price control. Although the RPI-X model, which is offered as price control, is theoretically different from ROR, they stress the risks of how to determine the X parameter. While this model has significant advantages in terms of X, it has regulatory risks in some aspects. First of all, the set and reset of X at regular intervals (4 or 5 years) is perceived as an indicator of regulatory commitment for investors. Also, unlike ROR, the risks are attributed to firms, making them more efficient. X is modifiable and includes forecasting under the sectoral or macroeconomic instability. X should be clear since uncertainties in rules and regulations will prevent strong incentives for firms to increase their investments. Also, transparency of the regulatory process will allow the control of pass-through from cost reductions to prices. Finally, an important risk associated with X is that firms may have less incentive to provide quality services (Vickers and Yarrow, 1991).

S. Littlechild emphasizes many essential characteristics of reforms besides price control. Stern (2003) summarizes these prominent characteristics as follow; (1) independence (2) forward-looking incentive regulations (3) focus on consumers and their welfare (4) the importance of competition (5) private ownership (6) strong legal processes and well-defined appeal rights (7) light-handed regulation. Accordingly, the conditions necessary for the success of incentive-based regulations are strongly related to regulatory governance. First of all, if there is a monopoly or dominant player in the market, the regulation will likely be captured. It is important to have a regulator that will ensure independence from both the government and industry. Accordingly, the

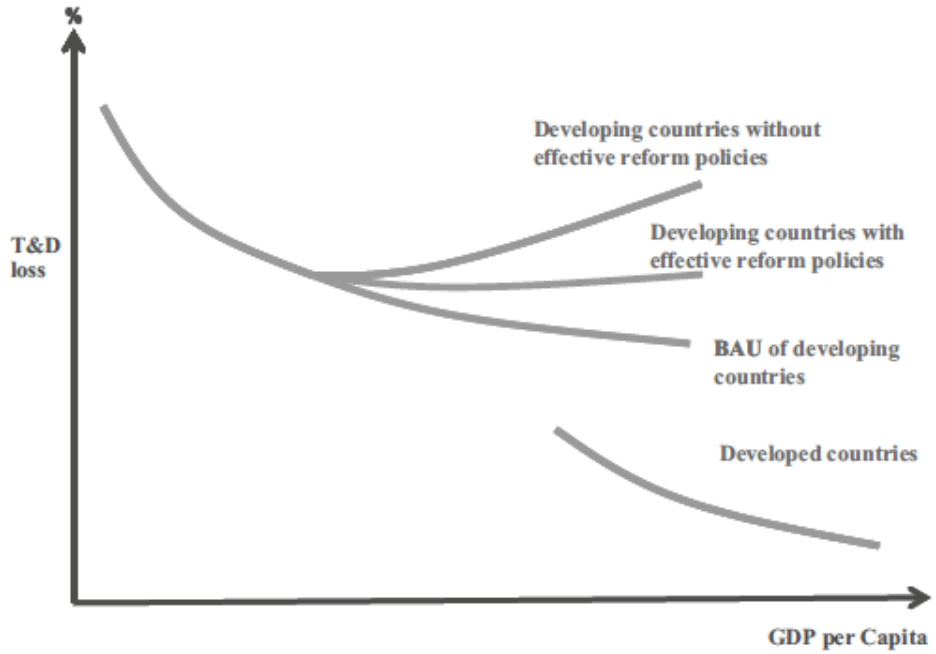
existence of private ownership will prevent investments from remaining limited by comparison to public ownership. The light-handed regulation process will also provide a competitive environment in the market and create conditions for deregulation. Finally, a well-defined legal process will promote competition, ensure regulatory commitment, and enable faster and more competitive decisions with specialized courts.

In this context, Kirkpatrick et al. (2005) report that the developing countries and transition economies have had difficulties to in impelementing price cap regulation. According to their survey results, price cap caused to underinvestment and price increases contrary to expectations. Moreover, price cap or other incentive-based regulations require more qualified staff rather than the high number of staff. Domah et al. (2002) show that countries such as India where has poor governance and high corruption has a low proportion of qualified staff, could not achieve efficiency from incentive regulations. Middle and low-income countries have been only partially successful in implementing the UK incentive-based regulation model. Gassner and Pushak (2014) explain that this result mainly stem from inability to restrain politicization of regulatory institutions. The main challenge of regulatory design has seen in substantive issues as tariff design. Because, there should be good regulatory governance to restrain the regulatory discretions (Levy and Spiller, 1994; Eberhard, 2006).

2.4.2. Transmission and Distribution Losses

Reducing transmission and distribution losses (T&D losses) was one of the main targets of the electricity reforms for developing countries. They are evaluated as one of the main indicators of reform performance (e.g. Cubbin and Stern, 2006; Erdogdu, 2011). The electricity losses have also included non-technical losses (e.g., theft, unpaid bills). While some studies use transmission and distribution losses as an indicator of performance, non-technical losses oriented studies dwell on electricity losses as an

indicator of regulatory governance. Losses, privatization, the establishment of independent regulatory agencies, and unbundling, which are the main elements of reform, are accepted to decrease losses (Joskow, 2002). Also, T&D losses are applicable for the indicator of operational problems of firms (Estache et al., 2009). Moreover, higher GDP per capita has negatively related to electricity losses since the high-income countries have performed better by employing advanced technologies (Nagayama, 2010; Erdogdu, 2011). Nagayama (2010) presents the following figure that is on the theoretical relationship of T&D losses and GDP per capita.



Source: Nagayama (2010). (BAU: Business as usual)

Figure 2.1. Theoretical Dynamics Between T&D Losses and GDP per capita in Developed and Developing Countries

T&D losses tend to decrease with higher GDP per capita. But, the relationship is varied with reforms in developing countries. If the countries have efficient reforms, losses

tend to decrease. But, if the reform is not well-designed and well-balanced, losses will be higher. Also, the increasing generation capacity with effective reform led to some increases in losses. So, the losses gap between BAU and effective reform depend on the performance of the regulator and quality of governance.

The main elements of electricity reform are expected to reduce losses. However, they do not have a significant impact on reducing losses in many developing countries. Erdogdu (2011) shows that the electricity reforms caused more losses, as a result of the increasing generation capacity. Increasing T&D losses due to increasing generation capacity are generally considered acceptable, and technical developments can manage technical losses in the long run. However, non-technical losses mostly arise from poor regulatory governance, weak institutions, weak rule of law, and political and social interferences.

For example, India has notably high electricity losses. These losses stem from non-technical losses or in other words, electricity theft. India introduced the electricity reform in 1991 by allowing independent producers. But it has not maintained the reform because of high losses and tried to implement different policies and reforms over the years (Joseph, 2010). Gaur and Gupta (2016) emphasize that the main factors of this ongoing problem are poor governance and weak rule of law. Similar to India, Sub-Saharan African countries have difficulty in reducing electricity theft. So, the electricity reform advocated vertical and horizontal unbundling, established independent regulatory agencies, and promoted competition to minimize losses. Even though these countries restructured the market, sectoral performances still suffer from theft and corruption in electricity (Imam et al., 2018).

Turkey also has high losses, especially in some regions. The current privatization and regulation structures provide incentives to firms to reduce theft or non-technical losses, but the high political and social pressures do not allow implementing regional tariff (Tasdoven et al., 2012). Regional tariff structure can be used to reduce electricity

losses. In this case, costumers who are living in high losses regions will be more charged proportionally. Yurtseven (2015) states that Turkey should focus on regional specific socio-economic characteristics such as social capital, social control and self-enforcement mechanisms.

Also, losses were notably high in Latin American countries where the reforms were initiated in 1980s. Introducing private sector to transmission and distribution networks and the establishment of an independent regulatory agency triggered a rapid reduction in transmission and distribution losses in Chile.[13] Chile is considered one of the best practices of electricity reforms and maintains the success of keeping losses low. Chile's initial institutional endowment, especially in terms of judicial institutions, is relatively higher than other Latin American Countries (Levy and Spiller, 1994). The second practitioner of reform in Latin America is Argentina. Argentina has also struggled high losses in electricity networks. Even if Argentina showed success in reducing losses this could not be permanent (Pollitt, 2008).[14] Argentina's initial institutional endowment was relatively not strong in terms of the judiciary. Jimenez et al. (2014) present the institutional and external drivers of technical and non-technical losses in Latin America Countries.[15] They indicate that Chile has better management due to a transparent and clear pricing system, which includes reward and penalty in over and underperformance.

Taken together, independent regulator and regulatory governance have reducing impact on losses. However, independent regulatory agencies have not performed well and caused regulatory weaknesses (Stern and Cubbin, 2005). Further, some studies

[13] The transmission and distribution losses were around 14 % early on reform, losses are around 6-8 % for the past decade.

[14] Argentina's initial loss values was similar to Chile, but it has been reached 20 % in the past decade.

[15] Bergman (2009) shows the tax evasion behaviors of Argentina and Chile citizens is related to social norms that supported by rule of law. The abrasion of state's enforcement capacity in Argentina indicate the weaknesses of the rule of law and citizens are more likely to cheat. But in Chile, enforcement sanctions and culture are strong enough to avoid tax evasion. In this context, the differences between reducing losses performance also could be a reflection of degree of rule of law in those countries.

(e.g., Smith, 2004) state the strong relationship between electricity losses, the rule of law, and regulatory governance.

2.5. Conclusion

The theories of regulation advanced considerable since the public interest theory of regulation. Public interest theory corroborates the government interventions under strong market failure assumptions. However, empirical studies and theoretical progress in natural monopoly weakened the notion of strong government intervention. Subsequently, economic theory of regulation (Stigler, Posner, Peltzman) presents the counter-argument that the maximizing pressure group's welfare causes monopoly power. This theory uses both political science and economic tools such as rent-seeking and regulatory capture. Additionally, Buchanan, Tullock, and Krueger emphasize rent-seeking activities cause inefficient and unproductive outcomes that bring government failure. Besides, Laffont, Tirole, Baron, and Myerson investigate the role of asymmetric information in regulatory contracts. Also, they present a theory of incentive regulation to examine how asymmetric information and incomplete contracts impact investment decisions. In light of these developments, the regulation of public utilities started to comprise competition and privatization policies.

Economic theory of regulation, public choice and incentive theories of regulation deal with some institutional economics tools to understand regulatory policy outcomes, the NIE approach takes a step further by emphasizing the institutional aspects of regulatory institutions and regulatory performance (Spiller and Tommasi, 2008). Williamson (1994) presents the governance approach in transaction cost economics. Levy and Spiller (1994) underlined the significance of regulatory governance rather than regulatory objectives. Because good regulatory governance indicates that well-established and stable rules and regulatory process enhance utility performance. Regulatory governance has become more of an issue during the electricity reforms for

developing and transition countries which have weak institutional environment. Besides, the rule of law has been considered more dominant, especially on the causes of differences in economic performance between developed and developing countries (Dam, 2007; Haggard et al., 2008).

The electricity sector reforms aim to increase utilization capacities, investments, efficiency and reduce electricity losses. Empirical studies (e.g., Cubbin and Stern, 2006; Zhang et al., 2005; 2008; Erdogdu, 2011) highlight the significant impact of better regulatory governance on the effectiveness of reforms. Also, privatization and competition increase the generation capacity in the presence of independent regulatory agencies and better regulatory governance. The key conclusions of studies which are investigating the impact of reform aspects show some strong evidence on institutional factors. First, the existence of an independent regulatory agency increases sectoral investment and efficiency. However, the sequence of the reform element is also crucial. On the one hand, pre-established independent agencies enhance efficiency, which is desired from privatization, unbundling, and competition. On the other hand, if the agency established after the restructuring of the market, the positive effect may not occur or be slow.

The electricity reforms are highly motivated by low generation capacity (due to lack of investment) and high transmission and distribution losses in developing countries. Accordingly, the empirical studies examine the impact of reform elements on generally generation capacity and transmission and distribution losses for efficiency measurement. The technical part of transmission and distribution losses have been decreased in the early stages of reforms. But, non-technical losses are still an important problem for developing countries. Because, non-technical losses or in other words, electricity theft is considered as both political, social, economic, and institutional issues.

Also, a significant number of countries have been adopting the UK regulatory model, which is presented first in the UK. This model has the main key characteristics that are focusing on competition and privatization and increasing investment and efficiency through incentive-based regulation. While the incentive regulations have different forms, most countries widely utilized price cap or revenue cap regulations alternative to cost-based regulation in the early stages of reform. The main aim is providing incentives to increase investment and efficiency, which can provide benefit to consumers (Jamasb and Pollitt, 2000). However, achieving efficiency gains from incentive-based regulations has also been challenging because of necessitating some regulatory and institutional aspects. Littlechild and Beesley (1989) emphasize that the regulatory effectiveness of RPI-X is based on some specific characteristics of the model.

While the strong relationship between institutional factors and regulatory governance has been reported, very little was discussed on the determinants of those. Levy and Spiller (1994), Stern and Holder (1999), and Spiller and Tommasi (2008) explore the determinants of regulatory governance from the institutional perspective. In this sense, North's argument of the institutional endowment has been used very often. So, institutional endowments of countries are characterized by legislative, executive and judicial institutions, norms, customs, or behaviors of citizens, social interest, and administrative capabilities. All these key attributes are related to accountability, transparency, legitimacy, predictability, and autonomous, which demonstrate regulatory governance in the regulatory process. Moreover, the most challenging aspect of reform is to implement reform elements under weak regulatory rule-making and governance. Furthermore, the reform experiences show that reducing transmission and distribution losses and achieving efficiency through incentive-based regulations are strongly subject to institutional endowments, regulatory governance and enforcement capabilities which are closely associated with the rule of law.

CHAPTER 3

THE RULE OF LAW AND THE REGULATION OF ELECTRICITY: A COMMENTARY ON THE TURKISH EXPERIENCE

3.1. Introduction

The rule of law has played a key role in regulatory reforms around the world for more than three decades. Regulatory reforms usually involved the liberalization of the infrastructure industries along with privatizations of state enterprises. Liberalization programs had common goals of increasing efficiency and competition by reducing government opportunism and increasing investments (Spiller and Tommasi, 2008; Berg and Desai, 2013).

Network industries have some characteristics that separate them from other industries. First, the requirement of large scale production and high sunk costs lead to high asset specificity and dependency on government for future profits. Also, these sunk costs and high capital intensity necessitate an effective institutional structure for sustainable efficiency and growth (Spiller and Tommasi, 2008; Cubbin and Stern, 2006). Second, scope economies and continuing transformation of market structure (e.g., vertically integration or/and reforms) are brought by the regulatory structure. This structure may encourage rent-seeking behaviors. Lastly, utilities are consumed by the whole society. Any disruption of the service may have different consequences on governments, interest groups, or individuals. The distinguishing features of electricity and other utilities from other industries, make these industries more vulnerable in the absence of the rule of law (Holburn and Spiller, 2002).

In recent years, the implementation of reforms has become more difficult in regulated industries. Increasing government involvement has become widespread around the world, particularly in developing countries (Robinson and Acemoglu, 2012; Weingast, 2013; Hadfield and Weingast, 2014). Deregulation started to lose its appeal, and many developing countries faced tradeoffs between economic efficiency and political expediency.

This paper investigates the connection between the rule of law and regulation with an emphasis on electricity markets. We aim to address institutional issues in regulated industries with a focus on the recent Turkish experience. We focus on descriptive issues as the rule of law remains relatively overlooked in the literature, and there is much controversy on how to define the rule of law in a regulatory framework.[16]

The absence of any theoretical work on the effects of the rule of law on electricity regulation motivates the paper. The literature on electricity regulation usually ignores the question of the rule of law. Even issues closely related to the rule of law, such as electricity theft are discussed from a more technical perspective. Above mentioned studies generally use the rule of law as a component of regulatory governance. Even if it is valid in measuring governance, studies show that the rule of law has more impact on different areas of the economy than other governance or institutional indicators. Nevertheless, enhancing the effects of good governance and institutional environment does not investigate specifically to the rule of law in regulated industries. We contribute to the literature by addressing the institutional dimension of electricity regulation in the Turkish electricity markets.

[16] In a related paper, we put forward an empirical analysis of the rule of law and regulatory quality for electricity regulation.

Turkish electricity markets suffered from the lack of a working market system until the late 1990s. Regulatory reforms aimed to remedy these problems.[17] The electricity reform aimed to establish an independent regulatory agency and privatize markets from generation to retail gradually. While the regulatory reform had a slow start, increasing the level of private investments and relative independence of the regulatory agency paved the way toward a more liberal market structure during the last decade (Atiyas, 2012).

The connection between the rule of law and an efficient market mechanism is usually taken for granted in empirical studies on electricity markets. The literature focuses mostly on the actions of market participants (including the regulatory institutions) rather than the institutional framework. A major reason for ignoring institutional factors is the inability to identify the causes and consequences of institutional change. We address this gap and offer a detailed discussion of a potential path for introducing institutional variables into economic studies on electricity regulation.

The next section starts with a brief description of the rule of law. In the third section, we look into how the rule of law policies have become relevant for developing countries. The fourth section connects the rule of law, independence of regulatory policy and puts together general principles of the rule of law in regulated industries. In the fifth section, we discuss the Turkish electricity markets to assess recent developments regarding the institutionalization of the rule of law.

3.2. On The Rule of Law

The emphasis on the rule of law plays a crucial role in protecting the regulatory institutions. By focusing on the problems of political interferences and independence

[17] This topic has been subject to many studies on Turkish electricity market reforms. See for a detailed analysis of this historical background; Atiyas et al. (2012), Bagdadioglu and Odyakmaz (2009), Erdogdu (2007).

of regulatory authorities as examples of deviations from the rule of law lead us to reveal problems more clearly and as part of the greater picture.

The relationship between regulated industries and the rule of law can take many forms. For example, in electricity markets, the regulatory authority exists to ensure that the rules of the game are applied properly, and monopolistic tendencies are kept under control. The rule of law becomes a proxy for curbing government opportunism and prevents detachment from economic and social efficiency. The dynamic sustainability of the rule of law is particularly important for regulated industries in developing countries where regulatory capture and opportunistic behavior may become a dominant factor in regulatory policy. Regulatory reforms, as they connect the rule of law, independence from political pressures and efficiency, usually lack a well-defined answer to this question.

The meaning of 'the rule of law' remains controversial. Some argue that it is ambiguous and intangible (Carothers, 2003). For example, Judith Shklar argued that the concept has become meaningless due to extreme and ideological usage and serves political interests (Shklar, 1987). In recent years, this view gradually lost its appeal, and a compromise over its definition has evolved. Along with formalization of the concept came empirical studies and indices to measure the level of the rule of law (Hadfield and Weingast, 2014).

While the history of the concept goes back to Aristotle's discussion whether it is better to be ruled by men or rules, the modern doctrine begins with the English jurist Albert Dicey (Bingham, 2011). According to him, the rule of law has three meanings: first, people should not be punished for charges that are not clearly defined and not accepted by common courts. The trial should be proven by the established law and courts. Courts should also be independent and impartial from government. These structure is the most important element of the rule of law principle. So, legal procedure should be applied to all citizens equally. The creation of that kind of courts reduce the power of

the rule of law principle. Second, no one can be above the common courts, and everyone should be tried in the same way. Everybody should be equal before the law. Third, the law must advance through case law. Since Dicey, substantive literature has developed on the concept. The practical issues surrounding the rule of law has taken a more prominent role in recent years. The rule of law has been transformed into an institutional framework for economic development provided the ground for free-market economics (Haggard and Tiede, 2011).

Even though the rule of law does not have a common definition, it is divided into two approaches are "thin" and "thick." The thin version is more related to formal rules or rules, the thick approach includes informal rules and institutions (Moller and Skaaning, 2012). More recently, the World Bank (2017) accepted the thick approach and emphasized that the implementation of known rules to government actors and citizens would strengthen the rule of law; it also stated that this would improve the economic performance of the countries.

In recent years, new institutional economics has been at the root of the relationship between the rule of law and economic performance within the thick approach. Douglas North defines institutions as rules of the game and views the rule of law as both a political and economic institution. Institutions do not only consist of formal rules. Informal rules are also considered an economic institution as they influence the decision-making processes and behavioral patterns (North, 1991).

The rule of law was often identified from a legal perspective in the beginning (Fuller, 1969; Raz, 1979). It was with Hayek that the economic consequences of legal rules came to be taken more analytically. Hayek (1973) emphasized the rule-based governance and the role of the rule of law as an institution to reduce uncertainty and restraint on government opportunism. The rule of law not only emphasizes or enacts the rules but also emphasizes the importance and consequences of following these rules. According to Cooter (1996) and Slapin (2015), the basis of this mechanism is

the cost of being caught or punished. If this cost is low, people may not be sensitive to follow the rules. However, in societies where the rule of law is established, there is a high tendency to follow the rules, even if the cost of being punished or caught is low. For example, if people do not throw trash on the ground in a place where there is no one, simply can be seen as a reflection of the rule of law. The fact that the agents in the economy observe with the existing rules is related to the rule of law degree and economic performance of the countries in the related literature. For example, a higher level of the rule of law promotes economic growth and foreign direct investments in developing countries (e.g., Dollar and Kraay, 2003; Butkiewicz and Yanikkaya, 2006).

3.3. The Rule of Law in Developing Countries

The rule of law has become part of the discussion on developing economies and regulated industries in recent decades.[18] During the 1970s and 80s, development policies were linked to the implementation of the correct fiscal, monetary, and distribution policies. Active public policy was deemed necessary and sufficient for growth. If a developing country kept its budget on balance, controlled foreign exchange rates and inflation, it was accepted to be on the right path. State ownership of utilities remained as part of government policies.

However, economic policies were not enough to sustain economic development (Rodrik, 2007; Weingast, 1995). In the wake of the Asian crisis in the late 1990s, institutional change beyond correct economic policies for a successful development gained prominence in policy circles. The belief that development passes through the rule of law began to be accepted as a condition for economic growth (Dam, 2007). Many organizations, especially the U.S. Bar Association and the World Bank, began to apply "the rule of law programs" in developing countries.[19] Many developing

[18] For a detailed review of the literature, see Haggard et al. (2008), Xu (2011).

[19] See, for example, Krever (2011) and Haggard and Tiede (2011).

countries, including Turkey, accepted the significance of the rule of law in development and pushed policies for its improvement (Schick, 1998).

Following the initiatives of the World Bank and the IMF, the rule of law was introduced as a condition for economic growth. Both organizations connected the rule of law to regulatory reforms. A considerable literature on the role of the rule law in supporting economic growth emerged (Haggard and Tiede, 2011). The rule of law started to be seen as a 'cluster of institutions' that keeps other elements of economic growth. A 'thick' definition of the rule of law dominated the literature. For example, Rigobon and Rodrik (2005), in their study on the relationship between economic institutions, democracy, openness, and income, connect economic institutions with the rule of law.

3. 4. The Rule of Law and Independent Regulatory Agencies

How does the rule of law is connected to regulated industries? The rule of law is not just a set of written rules. It is also about how institutions work to implement these rules. In sum, the rule of law is an equilibrium of the law and institutions (Hadfield and Weingast, 2014). The rule of law in regulated industries is directly related to how far an independent regulatory agency (IRA) perceives to be in the equilibrium when applying written rules or law.

Regulatory reforms around the world usually include privatization of state enterprises, liberalization of relevant markets, and the establishment of a watchdog to oversee the markets. IRAs typically undertake the crucial role of making sure that the rules of the game are well defined and enforced. Since IRAs are hierarchical organizations that employ tenured experts, they accumulate expertise over the industry and reduce uncertainty for market participants They are designed to weaken expediency and political interference and strengthen the rule law in the industry.

Independence allows governments to delegate issues in those industries to IRAs to reduce political costs. Independent regulatory authorities are expected to have a more transparent structure than ministerial bureaucracy. These characteristics support generality, equality, and sustainability of observable rules. The literature on the independence of regulatory agencies usually includes the rule of law as a variable in governance indicators that are mostly used as a proxy of institutional quality. For example, Kaufmann et al. (2011) have considered the rule of law as one of the indicators of measuring governance. Accordingly, the creation of the rule of law ensures the effectiveness of governments and the regulatory environment. It also works as an indicator of how well agents honor the contracts and rules. By contrast, ignoring the rule of law makes effective regulatory policy more difficult.

The rule of law, in this thick description, refers to the institutional environment. In this sense, the disparity between written rules and their implementation provides key signals on the existence of the rule of law. Gilardi (2009) and Maggetti (2007; 2009) examine legal and actual independence separately and then set variables for actual independence. According to them, there are three main objectives to be expected from the establishment of independent regulatory agencies (Maggetti, 2009). First, they aim to protect investors from political interferences. The reduction in government opportunism contributes to the rule of law in regulated industries. Second, the control of natural/legal monopolies in these sectors is targeted. Third, regulatory agencies put more emphasis on economic efficiency in comparison to direct government control, where political preferences tend to play a more dominant role. As technical competencies of these institutions increase, and as they move away from politics, they are expected to put more weight on efficiency and public interest. As a result, IRAs become tools for institutionalizing the rule of law in these industries.

The experience of developing countries shows that the independence of regulatory authorities is more widespread under coalition governments (Spiller and Urbiztondo, 1994). Strong governments, where the executive controls the legislature, the control

over the bureaucratic structure increases. In these systems, duties of regulatory authorities tend to narrow down to technical aspects of regulation. Multi-party governments push participating parties to delegate their regulatory powers to independent regulatory authorities, as opposed to strong single-party governments (Spiller, 1990; Levy and Spiller, 1994).

3.4.1. Characteristics of the Rule of Law in Regulated Industries

How do we know the existence of the rule of law in regulatory processes? Even though there is an expanding literature on the connection between the rule of law and economic development, its relation to regulatory policy is a neglected area. The absence of any explicit work on the connection between the rule of law and independence of regulatory agencies in regulated industries creates methodological problems in terms of applying general principles and indicators to specific issues in regulated industries.

Basic principles of the rule of law are widely accepted and discussed above. In addition to being clear and general, the rules must be known and stable (Hayek, 1973). These principles, when considered for regulated industries, form the basis of the rule of law, in which the rules of regulation should be clear and comprehensible and signal the credible commitment of the regulatory agency. Equality before the law should be established concerning regulatory rules and decisions by IRAs and courts. Finally, the rule of law supports the effective application of policies by governments to ensure social and economic efficiency (Hadfield and Weingast, 2014). A few criteria can be put forward for a more substantial evaluation of the rule of in regulated industries:

To begin with, the choice between discretion and rules reflects the agency's commitment to the rule of law. If it ties its hands and lowers uncertainty about the opportunistic behavior, transactions costs of doing business in the industry are reduced in the industry. An indicator of this preference is making rules simple and clear. Stern

and Holder (1999), and Cubbin and Stern (2006) state this criterion as a requirement for good governance of regulatory policy. Complex and contradictory regulations make it easier for regulatory authorities to choose discretionary behavior. Simple and clear regulations can be followed by society more easily and strengthen the rule of law. According to Gilardi and Maggetti (2011), the quality and effectiveness of regulations are directly related to the decision-making process and credible commitment of the regulatory authority. For example, one way to keep regulatory discretion under control is to establish a well-defined licensing procedure rather than defining general rules.

Second, regulatory agencies should apply the rules indiscriminately. Regulations that are applied in discriminatory ways encourage rent-seeking activities. Market participants should have the right to see the details of regulatory decisions. Regulatory authorities may tend not to make public the reasoning of their decisions, as it increases accountability and necessitates the regulator to justify public interest in its decisions.

The right to judicial review and appeal shed lights on the boundaries of the rule of law in the industry. The regulator may prefer not to be impartial to all market participants, and this may increase rent-seeking activities. An active judicial review restrains the regulator. If the regulatory authority could easily influence the judiciary, the regulatory review loses its significance.

The regulatory process should include all major stakeholders. Accountability, one of the six dimensions of governance, measures whether or not all stakeholders participate in the decision-making and policy-making process (Kaufmann et al., 2011). Openness to participation in the regulatory process reinforces the rule of law. If the regulatory body does not encourage the participation or makes it difficult, regulations end up being incompatible with social needs.

These criteria provide a bridge between the independence of the regulatory agencies and the rule of law in regulated industries. Offering a substantive evaluation method,

they provide a set of variables to see the place of the rule of law in regulated industries. The rule of law, in this way, goes beyond being merely procedural and takes a substantial role in the evolution of regulated markets. The rule of law in regulated industries is more complicated than other industries, as they have different characteristics that create analytical difficulties. Three features make utilities more vulnerable to opportunistic government interventions and bring politics to the forefront (Holburn and Spiller, 2002). Let us look at these issues more closely as they are also related to the rule of law.

To begin with, the requirement of large scale production and substantial sunk costs lead to asset specificity and dependency on government for future profits. Since the sunk costs in the electricity are not included in the operating costs, power companies continue production even if they cannot cover their fixed costs. This invites continuous government involvement in the industry. Companies in the industry also desire political involvement as long as it reduces opportunistic behavior on the government side. Secondly, scope economies play an important role. In most countries, distribution companies operate in generation and retail markets as well. Thus, vertical integration continues at the firm, or group of firms, level, even though the regulatory structure requires vertical separation. Lastly, mass consumption makes electricity open to political intervention, as any disruption in the service can have political consequences. Thus, governments, interest groups, and individuals in the community tend to be more sensitive to changes electricity tariffs in comparison to prices in non-regulated markets. The combination of these elements separates electricity and other utilities from unregulated industries. Markets where these characteristics exist together tend to be more vulnerable to the absence of the rule of law.

So far, we focused on the concept of the rule of law and its connection to the independence of regulation. In the next section, we discuss the recent experience of the Turkish electricity market in terms of the place of the rule of law.

3. 5. Major Issues in the Turkish Electricity Markets and their Relation to The Rule of Law

The Turkish electricity markets have undergone a significant transformation since the 1980s with the final aim of liberalizing the industry. This has been influenced by political developments on the one hand and advances in incentive regulation models on the other hand. The developments in the world, as well as the internal economic and political factors, were influential in the liberalization process.

The reform in the Turkish electricity markets started in the 1990s. A new market design was introduced along with a program for privatizations from generation to retail in 2001. The Electricity Market Law of 2001 introduced unbundling of distribution, transmission, and generation assets along the lines of the U.K. model. The key to the reform was the privatizations in the distribution market. All the 21 distribution regions were privatized by 2013. Currently, private companies own all regional monopolies in distribution, a large part of generation and retail. The transmission network is left under state ownership. Retail has been in the process of liberalization along with generation. The Energy Market Regulatory Authority (EMRA) was established in 2001 as an independent regulatory agency. It was designed to have major legal protections of a typical IRA. Its decision-making body is the Energy Market Regulatory Board, and its members are appointed for six-year terms. The formal independence of the EMRA and its Board were stronger in the beginning. It started to deteriorate in recent years as a result of strong one-party governments limiting the power and jurisdictional authority of the EMRA, as expected in the literature (Spiller and Urbiztondo, 1994).

An important legal change regarding the rule of law came with the 2013 amendment to the Electricity Market Law. The new Law weakened the EMRA’s authority further by shifting some of its supervisory powers to the Ministry, especially on distribution companies. It also transferred some of EMRA's decision-making powers to the

Ministry, such as licensing issues (Tiryaki, 2013). The new law, thus, reflects a change of path on regulatory reform by consolidating the authority of the Ministry over the industry. In a sense, there is a rollback of the regulatory reform that started in 2001. Besides the Ministry, legal ambiguity sometimes arises with the Competition Authority. The recent wave of investigations and fines on electricity distribution companies reflects the differences of opinion between the sector-specific regulation and the Competition Authority. The EMRA and the Competition Authority define the concept of 'competitive market' differently, worsening the rule of law in the industry.[20]

Even though the EMRA has the legal basis for independence, the existence of a strong one-party government created an environment where it could not establish its technical expertise to overcome political pressures, and the industry remained open to political opportunism (Durakoglu, 2011). Inconsistencies between government priorities and requirements of a market-based system created incentive problems and discouraged private investments in the industry. While some of the problems were eliminated in recent years, the tension between rule-based regulation and discretionary policy of the government could not be resolved. For instance, there is a widespread perception that the government is in charge of energy prices and other fundamental policy issues, even though the EMRA has the legal authority (World Bank, 2015: 50). While the problems with the regulatory framework and implementation are widely discussed in the literature, the emphasis rarely goes beyond technical issues (e.g., ill-designed market mechanisms)[21], lack of expertise (e.g., mismanagement of the privatization processes)[22], or regulatory capture (e.g., delays in liberalization). The lack of the rule of law principles does not take a pivotal role. For example, the World Bank report on

[20] For a detailed analysis, see Cetin and Oguz (2007) and Ozbugday et al. (2016).

[21] For a detailed analysis of the scope of ill-designed mechanisms, see Ozbugday et al., (2016); Kirmanoglu and Kahveci (2016).

[22] Atiyas and Dutz (2005) and Atiyas (2012) present a comprehensive analysis of the scope of privatization, liberalization, and regulation processes in the Turkish Electricity Market.

the industry (World Bank, 2015) does not mention the rule of law and only briefly refers to governance issues.

A similar attitude is taken in academic literature as well. Institutional issues do not take a prominent place. In other words, the problems tend to be seen about the players rather than the rules of the game. It is reduced to the level of incentives. In this perspective, it is implicitly assumed that if the incentives could be corrected, the regulatory model would work efficiently. This approach neglects the more fundamental issue of the rule of law in the industry. The principles described above give us a clearer picture of why regulatory reform could not improve the problems of the old system.

In the rest of this section, we investigate two major issues in the industry that reflect the tension between political involvement in regulation and the establishment of the rule of law. They reflect the tendency toward more political opportunism.

3.5.1. Tariff Structure and Regulatory Commitment

In Turkey, the regulatory framework of the distribution tariffs is based on the incentive regulation approach. Like many European countries, Turkey uses the revenue cap model. The goal is to encourage distribution companies to improve efficiency during the implementation period. In the revenue cap model, the distribution company's profit depends on its ability to improve its efficiency. This is measured with an efficiency coefficient, widely referred to as X. The model assumes that regulation would be transitory. The goal of the regulation is to pave the way toward a more competitive market environment. In this sense, the incentive regulation model can be aligned with the rule of law. A major tension in this sense stems from implementing a revenue-cap model where the independence of the IRA is weakened. The difference between theoretical assumptions and the real market creates rent opportunities for market participants and the government.

The revenue-cap model encourages distribution companies to benefit from improving efficiency. Inefficient firms are punished indirectly. Regulation, thus, is assumed to be a middle point in the transition from state ownership to a competitive market system. This theory assumes that problems in the process tend to be solved as markets become more efficient.

In Turkey, the EMRA monitors distribution companies closely to minimize rent-extracting in the industry. Heavy-handed regulation increases transaction costs of regulation. It also encourages the regulator to intervene in the tariffs during the implementation period when it sees fit, especially in cases of windfall profits. In recent years, the EMRA intervened in this way to the tariffs a number of times. As a rule, it publishes official tariffs at the beginning of the implementation period. Its methodology on distribution tariffs is not explained formally. The reasoning and details of models are not made public (Oğuz and Göksal, 2017). Thus, the industry tries to guess the methodology of the regulator. The absence of transparency puts a barrier before the institutionalization of the rule of law in the industry, as it tilts the judicial appeal process toward the regulator.

According to the tariff methodology, inefficient distribution companies that cannot reach predetermined productivity parameters (X factor) are punished with a reduction in allowed revenues. The model is based on the effective working of the revenue-cap model. The EMRA decided not to punish inefficient firms by allowing them to keep their inefficient levels of costs in the previous implementation periods. This policy choice naturally creates adverse incentives in the industry (Ozbugday et al., 2016). As a result, distribution companies do not feel the pressure to improve their productivity. This preference gives the wrong signals to market participants and allows them to keep

their inefficient operations intact. This makes the ratchet effect[23] stronger and reduces the reliability of the EMRA's tariff targets.

The EMRA tends to ignore some aspects of the rule of law principles in other ways as well. Toward the end of each implementation period, all distribution companies submit their revenue requirement estimations to the EMRA. The regulator evaluates these proposals. It approves or revises them based on its own calculations. This process takes a little more than two months. Distribution companies usually cannot appeal to EMRA's official tariffs published in the first month of the implementation period. The ambiguity over the EMRA's method, the inability of distribution companies and other stakeholders to be involved in the process and the difficulty of the appellation in the judiciary encourage expediency and discretion. This behavioral pattern encourages firms not to improve productivity (Oğuz and Göksal, 2017). It also weakens the rule of law and opens the door to government opportunism.

3.5.2. Illegal Use of Electricity and the Rule of Law

Another example of weakening the rule of law is the way illegal electricity usage[24] is treated by the EMRA. The rule of law and the independence of the regulator require more emphasis on efficiency and equality across consumers in electricity markets. The government has not shown the willpower to reduce the illegal use and create wrong signals for the efficiency of the distribution market. The political attitude toward illegal use is also accepted by the EMRA. The illegal use of electricity is a very contentious

[23] Ratchet effect refers to the situation where regulated firms do not reduce their observable costs with the anticipation that the regulator would ask for tougher cost-reduction targets in the next period. As a result of backward induction, inefficiency dominates all periods of incentive regulation, making the incentive regulation the reason for inefficiency.

[24]. The government and the regulator do not use the concept of "electricity theft." They preferred "illegal use" in the past. Recently, they started to avoid this term altogether and began to use the concept of "lost electricity." The concept of "loss" refers to both technical and non-technical losses and usually include both transmission and distribution losses. In our discussion, we ignore technical losses, as there is not much controversy over it.

issue in Turkey. The public is sensitive to the issue and creates many legal and political hurdles as it becomes difficult to resolve the issue with regulatory tools. Judiciary also could not solve the issue decisively (Benli and Benli, 2017).

The illegal use of electricity in developing countries can have widespread economic and political consequences. Turkey is one of the countries facing this problem. While illegal electricity usage in Turkey was around one billion dollars in 2011, its cost was used to be shown in the end-user bills, under the title of 'illegal usage share.'[25] Recently, this item was removed from the bills, so the public has no way of knowing the exact size of electricity theft.[26] The cost of electricity theft is distributed at the national level, making it another example of the public choice problem. The cross-subsidization of illegal use disrupts social justice on the one hand and adversely affects the investment decisions on the other side (Yurtseven, 2015). More generally, it undermines the rule of law in the industry. From a public choice perspective, the sustainability of electricity theft in the long-run is related to the small effect on individual customers.

The illegal use of electricity in Turkey is also informative in terms of reflecting the general problems of the sector. Table 3.1. shows the targets for illegal electricity use between 2011 and 2015. In some regions, the difference between the target levels and actual electricity theft rates has not diminished substantially, even though the tariff model explicitly aims to reduce illegal use. The steady persistence of the disparities shows that economic incentive mechanisms introduced by the tariff model do not operate effectively. The pre-announced illegal usage rates for the 2011-2015 tariff period were revised in the second year of the period. The targets of the five distribution

[25] Until recently, consumer bills in Turkey included illegal use share explicitly. However, the government took the name out of the bill, along with a few other items and added a general item on distribution. This is widely thought to be a political move to hide the costs of illegal use on society.

[26] It can be calculated from regional electricity consumption levels. Yet, these numbers are not made public in detail to allow economic analysis.

areas with the highest illegal usage rates have almost doubled. As a result of this revision, the difference between the targeted and actual rates has fallen.

Tablo 3.1 Illegal Usage Share of Electricity Distribution in Turkey: Target and Actual

Distribution company	2011		2012		2013		2014		2015	
	Target (%)	Actual (%)	Target (%)	Actual (%)	Target (%)	Actual (%)	Target (%)	Actual (%)	Target (%)	Actual (%)
Dicle	60.96	71.07	50.63	70.70	42.06	75.41	59.03	74.15	49.03	72.12
Van Gölü	46.15	52.10	38.33	53.29	31.84	65.84	43.27	61.02	35.94	59.70
Aras	22.92	25.70	19.04	27.67	17.62	27.58	21.35	26.21	17.73	26.6
Çoruh	10.90	10.60	10.39	10.00	10.15	9.42	10.15	9.05	10.15	9.28
Fırat	12.59	10.39	11.65	10.98	11.11	9.49	10.59	9.51	10.09	10.44
Çamlıbel	7.72	9.20	7.36	8.32	7.02	7.58	6.92	7.73	6.92	7.06
Toroslar	9.38	11.80	8.94	13.28	8.52	15.24	11.25	13.20	10.72	12.50
Meram	8.59	9.55	8.28	9.77	8.28	7.14	8.28	7.33	8.28	7.30
Başkent	8.46	9.17	8.07	8.67	7.88	7.90	7.88	7.68	7.88	7.00
Akdeniz	8.86	8.47	8.45	9.78	8.05	11.32	8.02	8.50	8.02	7.02
Gediz	8.48	8.10	8.08	7.97	7.70	9.73	7.34	8.38	7.00	7.36
Uludağ	6.96	9.46	6.90	8.03	6.90	7.03	6.90	6.86	6.90	6.94
Trakya	7.70	7.76	7.70	5.87	7.70	6.14	7.70	6.33	7.70	7.39
AYEDAŞ	7.12	6.91	6.79	6.88	6.61	7.59	6.61	7.20	6.61	7.00
SEDAŞ	7.66	7.52	7.31	7.31	6.96	6.64	6.64	6.76	6.33	6.68
Osmangazi	7.21	7.14	7.21	7.15	7.21	7.86	7.21	7.81	7.21	7.62
Boğaziçi	9.12	10.76	8.69	10.59	8.28	9.89	10.26	9.16	7.57	9.44
Kayseri	10.01	7.20	10.01	7.01	10.01	6.85	10.01	6.92	9.78	5.25
AYDEM	9.80	8.41	9.34	8.00	8.90	7.61	8.49	7.92	8.09	7.03
Yeşilırmak	10.35	7.81	9.87	7.26	9.41	11.47	8.97	8.27	8.78	7.90
Sakarya	7.66	7.52	7.31	7.31	6.96	6.64	6.64	6.76	6.33	6.68
Average	13.86	14.60	12.53	14.55	11.54	15.45	13.19	14.61	11.94	14.22

Source: Assembled from the EMRA decisions by authors.

There are high economic costs of detecting, pricing, and collecting revenues from illegal electricity usage. However, the decrease in illegal use is below expectations. Apart from the transaction costs of avoiding illegal electricity use, political factors can also be decisive (Depuru et al.. 2011). Illegal use continues to be seen as state aid to these regions (Cetin and Oguz, 2007; Erdogdu, 2011). The tolerance of illegal use is also observed through productivity parameters of distribution companies. Productivity parameters remain zero for regions where electricity theft is substantial. This allows distribution companies to be relatively lenient on illegal users.

The problem of illegal use of electricity has two dimensions in terms of the rule of law: the state's impartiality and the transaction cost of non-economic pricing. Allowing some residents and companies to use electricity illegally increases the cost of electricity for the whole society (Smith. 2004). The inability of the EMRA and the government to address the issue boldly stems from the ability to deflect the costs to the rest of the society. Illegal use of electricity is an element that cannot be eliminated completely due to the costs of monitoring and implementing administrative sanctions. However, distribution companies can take precautions to reduce the transaction cost of illegal use. Success in this process is a prerequisite for ensuring the rule of law in electricity markets and reducing political opportunism.

The distribution tariffs in Turkey include allowances for illegal use (Cetin. 2014). In this way, the model does not provide strong incentives for distribution companies for its reduction. This political preference creates other inefficiencies in terms of distribution tariffs. As other distribution companies where illegal use is at very low rates are punished for their efficiency. A kind of ratchet effect that encourages inefficient behavior dominates the tariff mechanism and encourages firms not to invest in increasing efficiency.

The persistence of illegal use reflects political opportunism. The rule of law requires the EMRA to follow its targets in terms of illegal use and determine tariffs based on

these targets. As illegal use continues to be high in some regions, distribution companies do not do much to improve efficiency in other areas of their business as well. Distribution companies in other regions also begin to be reluctant to improve their productivity. In a sense. the ratchet effect dominates the distribution market.

3.6. Conclusion

This paper began with a discussion of the meaning of the rule of law for regulated industries. We outlined the criteria following the literature to assess the level of the rule of law in regulated industries and discuss a number of issues in the Turkish electricity markets. We aimed to articulate the implications of the rule of law for regulatory policy in a developing country, using the recent Turkish experience.

The weak ties between the rule of law and regulation encourage government opportunism. The increasing government involvement in regulated industries creates a path toward public ownership. As firms turn to the government for rents, they forsake efficiency-enhancing strategies. Political opportunism encourages a move from profit-seeking to rent-seeking (Buchanan, 1980). This creates a slippery slope toward inefficient state ownership as the cost of political opportunism falls. The economic and political incentives in electricity markets move in opposite directions (Oğuz et al., 2014). In this process, the level of investments starts to fall and the government intervenes more to encourage investments in the industry. The government tries to ensure the continuity of investments by providing alternate sources of income to the companies in order to maintain the quality of service. As a result, it moves away from liberalization and public administration again becomes the dominant player in the market.

The emphasis on the rule of law thus plays a crucial role in protecting the regulatory institutions from rent-seeking activities. By focusing on the problems of political interferences as examples of deviations from the rule of law help us to see problems

more clearly and as part of the greater picture. A recent example reflects the tension between the rule of law and political opportunism in electricity markets in Turkey. An amendment to the Electricity Market Law in 2013 increased the government's role in the distribution market (Tiryaki, 2013). The supervisory power over distribution companies was transferred from the EMRA to the Ministry with the change in the Law. EMRA lost its authority to audit distribution companies. The result is a return to the heavy hand of government.

In sum, a major step to improve the rule of law in the electricity industry would be to reduce institutional uncertainties in the regulatory policy. The EMRA should aim to increase consistency in its decisions and be more transparent in tariff procedures. It should also implement policies to reduce electricity theft. Marginal cost-based pricing (for example, a distribution region-based electricity tariff) would reduce theft and encourage distribution companies to focus on theft. It would also make the revenue-cap model more effective. More importantly, it would improve accountability and reduced the political burden on the regulator.

In the end the rule of law is closely related to the independence of the regulatory process. The cases we discussed show that political interference weakens the rule of law and independence of the regulatory agency. In terms of the criteria presented in this section, the EMRA should stay away from vague rule-making in tariffs. It also has to stick to its tariffs until the end of the implementation period. It should not change the rules unilaterally. The administrative courts should take a more impartial position in cases involving the EMRA. The result would be the improvements regarding efficiency and the institutional structure of the rule of law in the industry.

CHAPTER 4

REGULATORY QUALITY, THE RULE OF LAW AND ELECTRICITY THEFT: AN EMPIRICAL ASSESSMENT

4.1. Introduction

Modern economies strongly have energy dependency. The literature that investigates the causality relationship between economic growth and electricity consumption provide strong evidence over the past decades (Ozturk, 2010; Payne, 2010; Omri, 2014; Tiba and Omri, 2017). The importance of energy efficiency and institutional characteristics are underlying factors for growth-electricity nexus and these studies widely consider the electricity losses is one of the important factors that harm energy efficiency, distort competition and increase social and economic cost of end-users or distribution companies.

The difference between generated and delivered electricity is regarded as losses and take two basic forms as technical and non-technical. Technical losses generally occur on the transmission process due to characteristics of network such as geography, transportation, length, and quality of lines. Even it is the main component of energy efficiency, decreasing the losses to zero is all but impossible. Therefore, developed economies agree the reasonable losses level in transmission and distribution (Jimenez, 2014); generally, this level fluctuates approximately between 6 % to 8 % in developed

countries,[27] and the exceeding part of this minimum level is considered as non-technical losses or pilferage[28].

Moreover, the economic cost of electricity theft reaches high levels in both developing and developed countries. Even if illegal usage is limited in developed countries, the size of total consumption makes it an important social problem when compared to the costs of other illegal activities. Developed countries face the problem of electricity theft, albeit on a smaller scale. In the United Kingdom, Ofgem estimates that the cost of electricity theft in the UK is around £ 250 million in a year[29]. In Canada, illegal drug producers use large amounts of illegal electricity and reach impressively high percentages of total production.[30]

In developing countries, illegal usage of electricity rates is much higher. The countries such as India, Pakistan, Bangladesh, and Latin American countries do particularly have very high electricity theft ratios. For example, the cost of electricity theft is estimated at 16.2 billion dollars in India[31]. Likewise, Brazil and Russia are countries that suffer from illegal usage. Also, half of Latin America and the Caribbean countries' losses approximately 20 % and it costs almost 15 billion dollars.[32] More importantly, the annual worldwide economic cost of non-technical electricity losses is approximately 100 billion dollars (Glauner et al., 2018). However, illegal electricity usage in these

[27] Glauner et al. (2018) focus on the non-technical losses, specifically. They indicate the non-technical losses fluctuates between 1-2 % in Western Europe and in less efficient systems, it fluctuates between 9-12 %.

[28] On following sections, we have used transmission and distribution losses as a proxy of electricity theft in our estimations from World Bank Database that covers illegal usages using the term as "pilferage."

[29] (Ofgem, 2014).

[30] http://dtechsepm.com/power-theft/

[31] https://asian-power.com/ipp/in-focus/indian-power-sector-loses-162b-theft-every-year

[32] Jimenez et al. (2014).

countries is not considered as a major criminal issue (Min and Golden, 2014; Joseph, 2010). In the same way, electricity theft in Turkey is accepted as a social issue rather than a strictly criminal one (Yurtseven, 2015). For instance, governments in Turkey tend to use the term illegal use of electricity rather than calling it as a theft. In many developing countries, illegal use is usually tolerated by governments, and society usually overlooks the issue. Generally, it is not accepted as a crime but seen as a social problem (Smith, 2004; Depuru, 2011).

Electricity theft has both economic and social effects for countries. On the one hand, unbilled consumption decreases the revenues (Arango et al., 2017), effects energy efficiency (Cubbin and Stern, 2006; Jamil, 2013; Yurtseven, 2015), hinder investments (Jamil and Ahmed, 2010; Lewis, 2015), etc. On the other hand, electricity theft has social consequences that governments may use subsidy mechanism for political opportunism during electoral cycles[33], increases carbon emissions and causes environmental degradation[34], or promotes other illegal activities[35]. The use of regulatory policy for social policy goals reduces the belief in the rule of law in society. Social issues should be dealt with social policies. Using indirect methods to subsidize some groups in society creates the problem of identification of the correct groups and waste resources (Cooter and Ulen, 2016).

As mentioned above, illegal electricity usage has many dimensions that are motivated by political, social, and economic behaviors. In this sense, this study has emerged from the approach that institutional endowments of economies have a significant impact on energy efficiency and so, on electricity theft. The institutions are the structure that links

[33] Min and Golden (2014) revealed the electricity theft ratios increased 3 % in political periods.

[34] Wijayatunga et al. (2004) and Andrews (2008) emphasize the additive effect of transmission and distribution losses on carbon or greenhouse gas emissions.

[35] Marangoz (2013) found the terrorist activities are also high in areas with high losses. Also, electricity theft is strictly accepted as drug-related crime, especially in Latin America. https://digitalrepository.unm.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1032&context=la_energy_dialog.

political, social, and economic interactions, and these components are formed by formal and informal rules. While formal rules include law, property rights, etc., informal rules are about norms, sanctions taboos, customs, etc. (North, 1991: 97). From the beginning of institutional economics literature, numerous studies (e.g., Knack and Keefer, 1995; Rodrik, 2000; Dollar and Kraay, 2003; Gleaser et al., 2004) stress the importance of institutional quality on economic performance. They commonly referred to better institutional quality leads to economic growth. In this context, this paper aims to investigate whether we can trace the similar effect of institutions, more specifically the rule of law, in utility industries. We seek to explain causal linkages of institutional and regulatory endowment with electricity theft, which is mostly occurred by poor governance, lack of institutions and the rule of law, regulatory capture, etc., that harms the efficiency of regulatory process and electricity industry.

The rule of law expression is coined by Albert Dicey, since that time, it is used to describe for many different fields, processes, and features (Bingham, 2011). Initially, the legal perspective was dominant for expressions and deep understanding of the term. Subsequent to new institutional economics theories, the term brought different angles such as legal, social, economic, even interaction of them that institutions. The recent approaches arise from the statement that political and economic behaviors trace conventional rules and norms (Hadfield and Weingast, 2014:24). Also, according to Hadfield and Weingast (2014), the rule of law stands out the concept of equilibrium stems from the interactions of legal and informal aspects of institutions in society and economy. The link between the rule of law and economic performance became a growing field as institutional economics and the rule of law literature progress. The empirical literature produced a considerable amount of evidence on the role of the rule law in supporting economic performance (Dollar and Kraay, 2003; Butkiewicz and Yanıkkaya, 2006; Haggard and Tiede, 2011). The recent works reflect the importance of the rule of law for economic growth.[36] There are several channels that the rule of

[36] For a comprehensive literature review, see also; (Haggard and Tiede, 2011).

law influences economic performance through time. Following Haggard and Tiede (2011), we can categorize them as the security of person, protection of property rights and contracts, checks on governments, and lowering corruption.

The starting point of this paper to clarify how should the rule of law be defined concerning regulated industries. If an institutional capability has an effective role in the development of a country, can a similar impact also emerge in industries? Despite, there has been a growing interest in the link between the rule of law and economic performance, far too little studies on the linkages of the rule of law and regulated industries performance. Even though the earlier and recent studies investigate the causal relationship between institutions and macroeconomic indicators, the relations between the rule of law and regulated industries performances are not examined empirically. This study aims to provide a brief and explicit theoretical framework on the rule of law in regulated industries and delve into empirical outcomes to understand the causal effects of the rule of law and regulatory quality on electricity theft. Revealing the combination of social and economic characteristics can provide efficient outcomes for countries or industries, especially on non-technical problems that cannot be solved by only implementing rules or regulations.

The connection between the rule of law and economic growth emphasizes the importance of the rule of law for the effectiveness of complex structures such as social, economic, and regulatory effects (Dam, 2007). In this context, the effectiveness of regulations and institutions are directly related. Specifically, the rule of law ensures the existence of effective regulations (Berg and Desai, 2013). Rigobon and Rodrik (2005) examine the relationship between economic institutions, democracy, openness, and income. They link political institutions with democracy and connect economic institutions to the rule of law. In this sense, the connection between separate institutions plays a more significant role than individual parts of a rule of law system (Acemoglu and Johnson, 2005), especially in developing countries. More importantly, the rule of law began to be seen as a "cluster of institutions". Previous empirical studies

support the assumption that the rule of law, as an equilibrium or cluster of institutions, has significantly promoting effect on the economy in developed countries where the rule of law is pre-established. In other words, economic performance is mainly driven by the rule of law (e.g., Law et al., 2013).

Having defined the term “the rule of law” and its role in economies and societies, prominent argument that the term tends to be used to refer to institutions and governance. This allows for a deeper approach to the economy through infrastructure industries. Briefly stated, the infrastructure industries include a wide range of users, and the pricing and provision mechanisms are vulnerable to political and economic interventions. Thus far, some studies linked the rule of law as a high quality institution and regulatory independence, governance or reforms for different infrastructure industries (Stern and Holder, 1999) especially on electricity (e.g. Cubbin and Stern, 2006; Erdogdu, 2014) and telecommunication (e.g. Levy and Spiller, 1994; Gual and Trillas, 2006).

Our hypothesis is higher rule of law and regulatory quality lead to lower electricity theft. Accordingly, the purpose of this study is to determine whether the use of illegal electricity, which is one of the most essential problems of the electricity market, is a cause of the individuals' compliance with the rules, the institutional capacities of the countries and the regulatory quality, rather than technical reasons. We focus on the causality relationship between the rule of law, regulatory quality, and illegal electricity usage. We argue that electricity theft is closely related to the deterioration of the regulatory quality and the rule of law. We begin with a brief discussion of the meaning of the rule of law and the connection with regulation and electricity theft. Then we apply panel Granger causality to present the empirical evidence on the rule of law on regulatory quality and electricity theft in section three. The fourth section presents the empirical findings. We give a detailed discussion in section five and conclude the paper.

4.2. Background: The Rule of law, Regulation and Electricity Theft

In this section, we first discuss the rule of law and regulation relationship for a better understanding of the role of rule of law in regulated industries. Then, we review the rule of law and electricity theft connection by outstanding empirical studies.

4.2.1. The Rule of Law and Regulation

While the concept of the rule of law goes back to Aristotle, its modern evolution started with Albert Dicey and culminated with Friedrich A. Hayek's work (Bingham, 2011). The rule of law requires everybody in society, including those who wield government powers to be bound by the same set of rules. These rules should be made publicly, accessible to everybody, and predictable.

Some authors add a dynamic dimension to the concept. The sustainability of the rule of law in the long-run is accepted as an element of the rule of law system (Hadfield and Weingast, 2014). In the transition to regulation, the sustainability of the rule of law plays a central role. The existence of the rule of law reduces government opportunism and regulatory capture in regulated industries. The independence of the regulatory authorities can be seen as an indicator of the rule of law in regulated industries. Cubbin and Stern (2006) state criteria of the rule of law as a formal requirement to establish the good governance of regulatory systems. In countries where the rule of law has been established, it is the rule that the judiciary is independent and that everyone is treated equally. This assumption exists in the same way as the regulatory authority and other parties (Hanretty and Koop, 2013).

According to Rodrik et al. (2004), the effects of correct institutions are presented into the market with the regulation, stabilization, and legitimization in depth. Moreover, Levy and Spiller (1994) stress the importance of countries different characteristics which are associated with the institutional endowment that content to ease the tension

between the regulatory process and other conditions. In this sense, they categorized the countries into three types according to abilities to solve the tension with the institutional endowment. Where the institutional endowment is high, the regulatory system would be well-organized and restrict arbitrary behaviors. In other words, rules and regulations take for granted the rule of law. Besides, such countries would manage the tension to provide some flexibilities which could damage credible commitment within the process. Finally, the exact opposite situation may arise in low-income countries where do not have any domestic institutions maintaining credible commitment.

The empirical literature on the independence of regulatory agencies usually includes the rule of law as a variable among governance indicators. Studies using The Worldwide Governance indicators have found a significant positive correlation between the rule of law and the governance of the regulation. Accordingly, a better the rule of law enhances the greater impact of the regulators (Cubbin and Stern, 2006; Gual and Trillas, 2006). The creation of the rule of law ensures the effective regulatory environment directly. These two indicators show how well agents honor the contracts and rules. Moreover, ignoring the rule of law obstructs the effectiveness of regulations (Levy and Spiller, 1994).

Theoretical channels found their way into policy circles through the work of the World Bank and OECD. Following the initiatives of the World Bank and the OECD, the rule of law was put forward as the ground for economic growth and development in the last three decades. Both organizations connected the rule of law and regulatory reform. There has been a considerable amount of work on the implementation of regulatory reforms in developing countries[37]. For the last few decades, the rule of law has been hailed as the ground for the regulatory reforms around the world. Liberalization efforts

[37] See OECD (2015) Regulatory Policy Outlook. https://www.oecd-ilibrary.org/governance/oecd-regulatory-policy-outlook-2015_9789264238770-en

in developing countries aimed at improving the rule of law by reducing government opportunism and introducing competition (Spiller and Tommasi, 2008).

The World Bank follows the standard definition but emphasizes the role of governments and how they use their power in establishing the rule of law. The rule of law indicator shows the quality of contract enforcement, property rights, the courts for the basic institutions. Regulatory quality captures the ability to formulate and implement regulations to keep monopolistic tendencies under control (Kaufmann et al., 2011). Also, The Worldwide Governance Indicators are classified into three fundamental areas, dissociating in a total of six dimensions of governance; about governments' selection and governance; implementing efficient policies; economic and social interaction between citizens and institutions.

The connection between the rule of law and regulation is usually granted and overlooked for the same reason that it is assumed that regulatory reforms improve the rule of law coincidentally. The empirical literature usually demonstrates the correlation between the rule of law and improving the regulatory environment. The more effective governments can perform more effective regulations, or the rule of law brings along more effective governments and regulations. So, a positive correlation between the rule of law and regulatory quality is inevitable (Kauffman et al., 2011).

4.2.2. The Rule of Law and Electricity Theft

How do we define electricity theft? There are some methods of theft in the power system. To begin with, customers may try to deceive the distribution company deliberately. Tampering with the meter is a widely used method to reduce electricity bills. A second method is to steal electricity from the grid. The third way of theft is not paying bills. Customers may accumulate their debts to utilities. Both households and businesses may defer their payments and create costs for the distribution companies, so these methods support each other. Non-paying users may start to tamper with meters

or stealing directly from the grid. These behaviors are closely related to the level of the rule of law and the regulatory process in countries.

The problem of illegal use of electricity has two dimensions regarding the rule of law on economic efficiency: the state's impartiality and the transaction cost of non-economic pricing. Allowing regions to use electricity illegally increases the cost of electricity for the whole society (e.g., Smith, 2004; Lewis, 2015). The connection between the rule of law and electricity theft took some attention in the literature. Basically, there are two approaches to losses as technical and non-technical reasons. In recent years the non-technical reasons are mostly associated with theft became the focal point. For example, Smith (2004) addresses the relationship between the quality of governance and electricity theft and follows the World Bank's governance indicators, which include the rule of law as a variable. Using the WGI data set, he finds that transmission and distribution losses are highly correlated with governance. In his words (Smith, 2004: 2072):

> '*Power theft thrives (and is a part of) systems of mal-governance. The reverse can also be said to be true, that in well-governed systems, one finds much less power theft. The relationship of power theft to graft and corruption is not unexpected as examples of high power theft systems show evidence of corrupt practices within power sector organizations.*'

The empirical studies generally focus on the determinants of electricity theft that countries have high electricity theft ratios. Gaur and Gupta (2016) and Yurtseven (2015) examine the determinants of electricity theft in India and Turkey, respectively. They both find socio-economic factors such as education, income, rural population affect the loss ratios for these countries. Also, some studies (Jamil, 2013; Lewis, 2015) examine the cost of theft on electricity efficiency, tariff, and outages.

Electricity theft is a crucial issue, both for developed and developing countries. But, while it has been regarded as criminal activity in developed countries, developing countries are tackling it as a social issue. In that, it is assumed that the problem occurs because of the lack of institutions, regulatory failures, political opportunism, lack of regulatory reforms, and socio-economic factors in countries where the losses are high. Many recent studies stress that on the presence of inefficient regulatory reforms lead to higher theft and losses for developing countries (Tasdöven et al., 2012; Winther, 2012; Kessides, 2012). Nepal and Jamasb (2015) examine Nepal and Belarus case and indicates the delay of independent regulatory agencies causes regulatory failure in the sense of electricity thefts. According to Winther (2012) in order to solve or decrease the losses, it is necessary to imply effective regulations and end-users need to comply with the rules set. This approach is closely related to the presence of the rule of law as an important factor in the reduction of theft.

The greater part of the studies emphasizes the poor governance results in higher electricity thefts besides the socio-economic factors (Smith, 2004; Min and Golden, 2012; Steadman, 2011). Moreover, there is a relationship between governance and illegal electricity usage. Golden and Min (2012) and Baskaran et al. (2015) examine the relation between electoral cycles and electricity theft in India. Fighting with electricity theft has political costs for governments. This creates a public choice problem. The government may spread the cost to the society, as the cost per person in the society stays low, but the benefits for illegal users remain high enough to encourage them to continue theft (Bazilian et al., 2014), and they see illegal use as a victimless crime. In this sense, the rule of law and the role of institutions become significant. Never (2015) indicates that electricity theft is not a technical problem; it is closely associated with social norms, trust, and awareness. Similarly, Ullah et al. (2017) dwell on the institutional determinants of energy governance. Consequently, formal and informal laws, regulations, social norms, and institutions, in brief, the rule of law is closely related to electricity theft.

4.3. Data and Methodology

The annual data of the study covers the period 1996 to 2014 for 64 countries from the different parts and income levels of the world. The period and selected countries were limited by the availability of data. We examine the relationship between regulatory and electricity theft by using three indicators. To measure the rule of law and regulatory quality, we have used the data of The Worldwide Governance Indicators from the World Bank that referring to the indicators. We use the percentile rank that shows each countries' position compared to others ranging between 0-100. While 0 indicates the lowest rank, 100 indicates the highest rank among countries (Kaufmann et al., 2011). The characteristics of the data as follow:

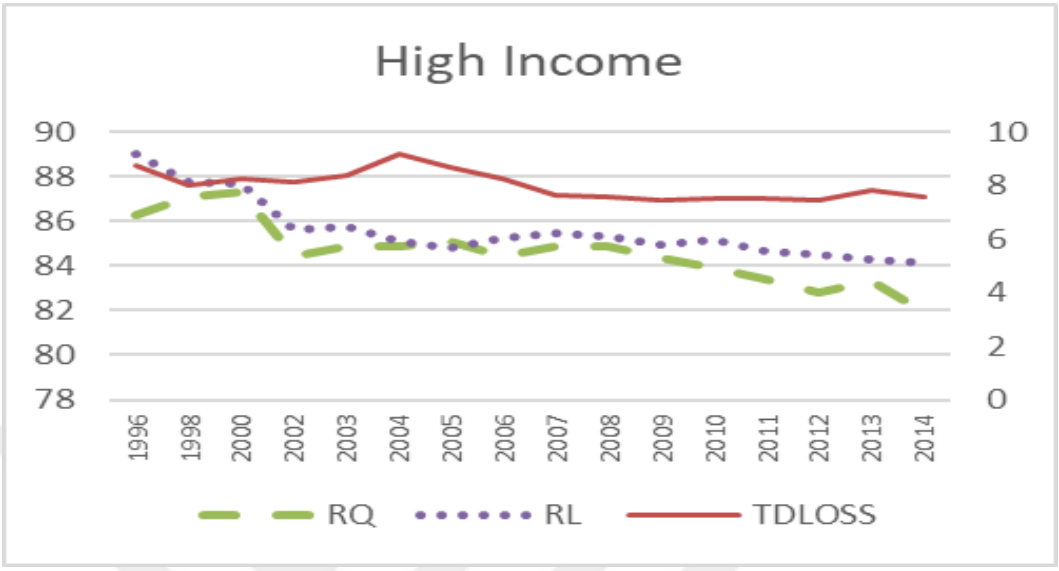
> *"Regulatory Quality (RQ) – captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development."*
>
> *"The rule of law (RL) – captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence."*
>
> *"Transmission and Distribution Losses (TDLOSS)- Electric power transmission and distribution losses include losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage."*

To quantify the electricity theft, we have used the common approach in the literature, which is mentioned in the previous section. This approach suggests using the transmission and distribution losses (% of output) from the World Bank database, which includes our focal point pilferage, in our words "theft."

Table 4.1 Group Averages of the Variables

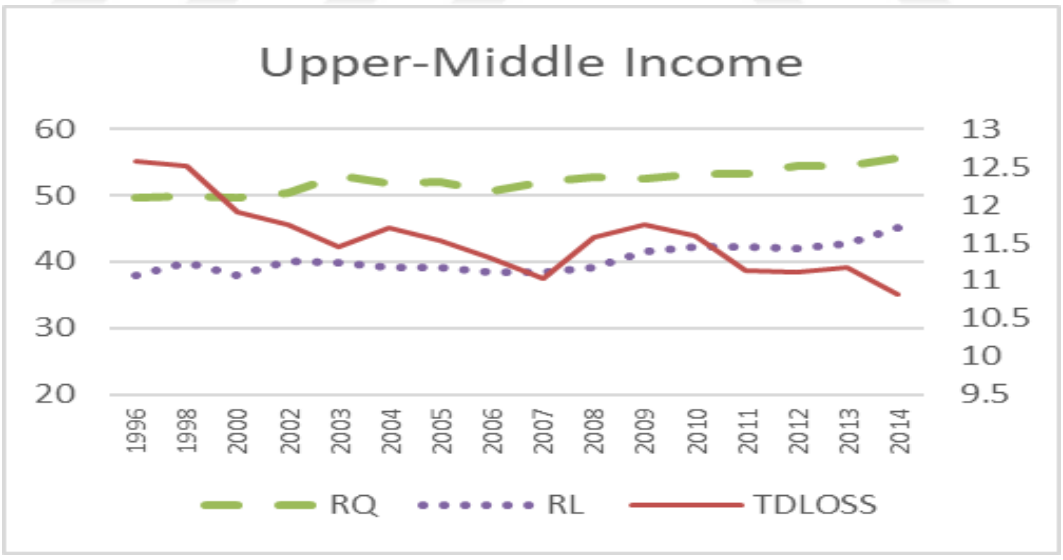
	T&D loss		RQ		RL	
	1996	**2014**	**1996**	**2014**	**1996**	**2014**
High-income economies	8.74	7.56	86.28	81.90	88.97	84.16
Upper-middle-income economies	12.57	10.82	49.77	55.71	37.83	45.10
Lower-middle-income economies	18.24	14.09	35.96	35.60	31.98	34.67
Low-income economies	21.86	26.01	23.32	18.67	24.58	19.19

As a sum, we examine the causality relationship between the transmission and distribution losses (TDLOSS), the regulatory quality (RQ) and the rule of law (RL) in four different groups of countries. Accordingly, we use the panel data framework for each group of income levels named as high-income countries, upper-middle-income countries, lower-middle-income countries, low-income countries. All groups consist of seventeen economies; only low-income groups have thirteen economies. List of the country groups can be found in Appendix A. Table 4.1. shows the group averages of the variables in the start and end of the period. It is clearly seen that while RQ and RL are higher in higher income groups, and TDLOSS decreases as income rises.



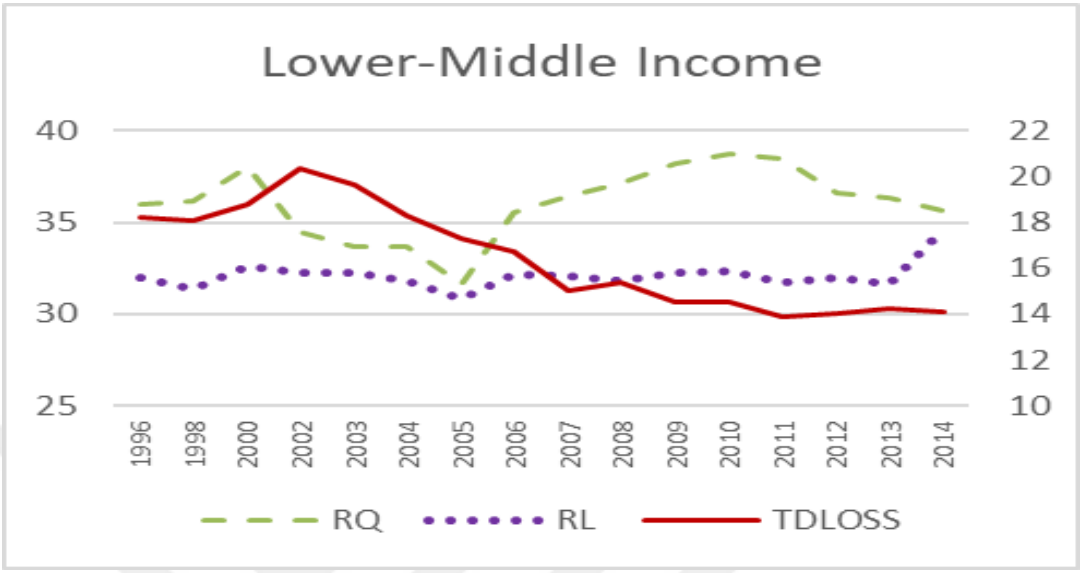
Notes: Red lines that represent the TDLOSS correspond to the second axes.

Figure 4.1. The Trend of Variables for High Income Countries



Notes: Red lines that represent the TDLOSS correspond to the second axes.

Figure 4.2. The Trend of Variables for Upper-Middle Income Countries



Notes: Red lines that represent the TDLOSS correspond to the second axes.

Figure 4.3. The Trend of Variables for Lower-Middle Income Countries

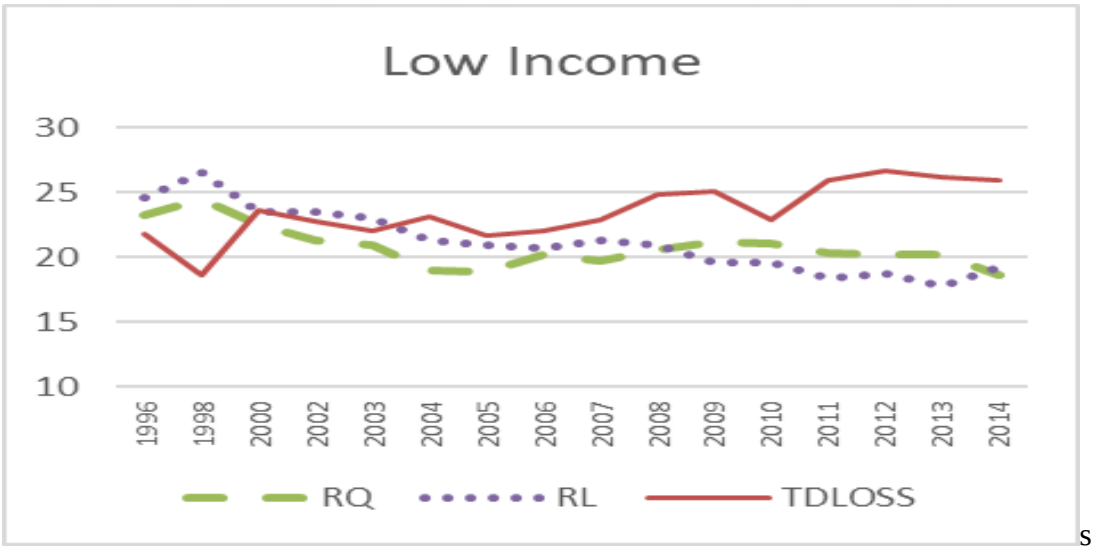


Figure 4.4. The Trend of Variables for Low Income Countries

Also, above figures reveal that TDLOSS have decreasing trends in middle-income countries, but low-income countries have experienced rising losses. RQ and RL have noticeable decreases in the two tails of the groups, which are low- and high-income groups. Hereunder, we use the empirical framework, which has three steps. In the first step, cross-sectional dependency will be tested. Secondly, the stationary properties of variables are investigated by panel unit root tests. Third and finally, the causality relationships and directions of causality will be examined by Dumitrescu and Hurlin (2012) panel non-causality test.

4.3.1. Preliminary Data Analysis: Cross-Section Dependence and Panel Unit Root Tests

This section presents the preliminary tests for panel data analysis. These are cross-section dependency and panel unit root tests. It is important to find out cross-section dependency to decide which unit root tests will be implemented. Also, unit root test results will assist the panel causality application.

4.3.1.1. Cross-Section Dependency Test

While examining the causality within the panel data framework, first, we need to control the cross-sectional dependency across the countries. Because the cross-sectional dependency alters the generation of stationary tests. In advance to analyzing stationary properties of TDLOSS, RQ, and RL, we first followed the Pesaran (2004) CD-test to find out the cross-section dependencies of variables. Standard LM test have size distortions for large N, and small T. Pesaran (2004) allows controlling dependency consistently in which case length of the time period is lower than the number of cross-section units:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}\right) \quad (1)$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pairwise correlation of the residuals. CD test statistics derived from Equation 1 is distributed normally and tested against cross-section dependency hypothesis.

4.3.1.2. Panel Unit Root Tests

Before going one step further in the analysis, determining the stationarity of variables with unit root tests provides protection from spurious results. For this purpose, the panel unit tests developed by Levin et al. (2002, henceforth LLC) and Im et al. (2003, henceforth IPS) are widely exploited in panel data analysis. The LLC (2002) which based on the identical parameters (p_i) across cross-sections considers the following Augmented Dickey-Fuller (ADF) specification:

$$\Delta y_{i,t} = \rho_i y_{it,-1} + \sum_{j=1}^{p_i} \delta_{i,j} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad (2)$$

Where sub-index of i indicates the cross-section units. This tests the null hypothesis $p_i=0$ for all individual i against the alternative hypothesis that $p<0$ for all i. The rejection of the null hypothesis indicates a possible panel stationary process.

Unlike the LLC (2002), the IPS (2003) test does not require the homogeneity of p throughout all cross-section units. In other words, the IPS allows for heterogeneity. Similar to the LLC, it is based on the ADF process, and the null hypothesis is $p_i = 0$, while the alternative hypothesis is $p_i <0$ (for at least one i) and considers the following model specification:

$$\Delta y_{i,t} = \alpha_i + \beta_i t + \rho_i y_{i,t-1} + \sum_{j=1}^{k} \emptyset_k \Delta y_{i,t-j} + u_{i,t} \quad (3)$$

4.3.2. Dumitrescu-Hurlin Non-Causality Test

After controlling the stationary of the variables, the causal relations tested. The standard Granger (1969) causality analysis investigates whether variables other than itself have explanatory or useful information when estimating a variable. Dumitrescu-Hurlin (2012) adapted to provide deeper insight into the Granger Causality approach for panel data analysis and testing non-causality relationship through cross-sections. The recent advances of this test are twofold: using the heterogeneity of causality relationships and having a significant power testing for samples that consist very small T and N. Also, this method is particularly useful in both T>N and N>T samples.
In the follow-up, it is introduced the heterogonous model specification of Dumitrescu-Hurlin non-causality test:

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (4)$$

where a_i and B are assumed to be fixed across time and e_{it} is the error term. Y_{it} and x_{it} represent stationary variables for N individuals in T periods. Also, this test examines the existence of no causal relationship for at least one of the cross-sections. So, the null hypothesis is no causal relationship for any of the cross-section units, and the rejection of the null hypothesis indicates the causality relationship for at least one cross-section. The null and alternative hypothesis present as follows:

$$H_0 = \beta_i = 0 \text{ for } \forall_i = 1, \ldots, N$$
$$H_1 = \begin{cases} \beta_i = 0 \text{ for } \forall i = 1, \ldots, N_1 \\ \beta_i \neq 0 \text{ for } \forall i = N_1 + 1, \ldots, N \end{cases} \quad (5)$$

4.5. Empirical Results

In this study, we have employed the panel data techniques to introduce causal relationships between the rule of law, regulatory quality, and electricity theft. First, we have investigated the cross-section dependency to implement appropriate unit root and causality tests. Because there is no cross-sectional dependency, then IPS and LLC unit root tests are implemented to reveal stationarity of variables. Finally, we examined the causal effects between variables for all sub-income groups via Dimitrescu-Hurlin (hereafter DH) Non-Causality test. We also employed the interactions of regulatory quality and the rule of law variables which may be considered to be an indicator of institutional quality and checked the interaction effects of observance of rules of the game.

4.5.1. Cross-Section Dependency and Panel Unit Root Tests

Pesaran (2004) test results are presented in Table 4.2. Dependency searched for only intercept and trend and intercept specifications with all four versions of the LM test. p-values which are lower than significance levels infer non-dependency. Since we have not rejected the null hypothesis, so we can say that there is no cross-sectional dependency across countries for allof the income groups for all variables. It is an expected observation due to the characteristics of our data set, which mostly depend on individual characteristics of countries institutional structure.

Table 4.2. Cross-section Dependency Tests Results

Variables	Country Group	CD Test	Intercept	p-value	Trend and intercept	p-value
TDLOSS	HI	Breusch-Pagan (1980) CD_{LM}	199.518	0.000	223.024	0.000
	UP-MI		186.285	0.003	270.029	0.000
	LR-MI		193.391	0.001	202.753	0.000
	LI		113.167	0.006	152.500	0.000
	HI	CD_{LM} Pesaran (2004)	3.851	0.000	5.277	0.000
	UP-MI		3.049	0.001	8.127	0.000
	LR-MI		3.480	0.000	4.047	0.000
	LI		2.816	0.002	5.965	0.000
	HI	CD Pesaran (2004)	1.167	0.122	1.353	0.088
	UP-MI		0.957	0.169	1.409	0.079
	LR-MI		0.471	0.319	1.121	0.131
	LI		1.835	0.033	1.811	0.035
	HI	Bias-adjusted CD Pesaran et al. (2008)	1.204	0.886	0.600	0.726
	UP-MI		1.306	0.904	0.687	0.754
	LR-MI		0.744	0.772	1.104	0.865
	LI		2.250	0.988	2.322	0.990
RL	HI	Breusch-Pagan (1980) CD_{LM}	221.057	0.000	250.549	0.000
	UP-MI		243.356	0.000	274.945	0.000
	LR-MI		286.398	0.000	336.022	0.000
	LI		118.800	0.002	112.324	0.007
	HI	CD_{LM} Pesaran (2004)	5.157	0.000	6.946	0.000
	UP-MI		6.509	0.000	8.425	0.000
	LR-MI		9.119	0.000	12.128	0.000
	LI		3.267	0.001	2.748	0.003
	HI	CD Pesaran (2004)	0.967	0.167	1.485	0.069
	UP-MI		2.205	0.014	2.303	0.011
	LR-MI		2.143	0.016	2.141	0.016
	LI		0.668	0.252	0.734	0.231
	HI	Bias-adjusted CD Pesaran et al. (2008)	2.816	0.998	2.519	0.994
	UP-MI		1.618	0.947	1.063	0.856
	LR-MI		2.038	0.979	2.015	0.978
	LI		1.165	0.878	0.818	0.793
RQ	HI	Breusch-Pagan (1980) CD_{LM}	255.078	0.000	254.477	0.000
	UP-MI		194.584	0.001	235.628	0.000
	LR-MI		270.956	0.000	286.965	0.000
	LI		104.239	0.025	128.834	0.000
	HI	CD_{LM} Pesaran (2004)	7.220	0.000	7.184	0.000
	UP-MI		3.552	0.000	6.041	0.000
	LR-MI		8.183	0.000	9.154	0.000
	LI		2.101	0.018	4.070	0.000
	HI	CD Pesaran (2004)	1.652	0.049	1.112	0.133
	UP-MI		2.038	0.021	1.860	0.031
	LR-MI		1.371	0.085	0.995	0.160
	LI		1.562	0.059	2.186	0.014
	HI	Bias-adjusted CD Pesaran et al. (2008)	2.256	0.988	1.749	0.960
	UP-MI		1.380	0.916	1.081	0.860
	LR-MI		1.503	0.934	1.180	0.881
	LI		1.835	0.967	1.950	0.974

After applying the CD test, we have proceeded with the first-generation panel unit root tests which are IPS and LLC. Table 4.3. highlights the results of unit root tests in the two specifications. Values in the parentheses are p-values of the test statistics. According to Table 4.3, IPS and LLC tests prove that all variables are stationary in the level. There is no need to transform variables to stationary.

Table 4.3 Unit Root Tests Results

	Variables	**LLC**		**IPS**	
		Intercept	**Trend and intercept**	**Intercept**	**Trend and intercept**
High-income	TDLOSS	-5.08 (0.000)**	-8.16 (0.000)**	-2.92 (0.001)**	-2.89 (0.001)**
	RQ	-2.96 (0.001)**	-14.34 (0.000)**	-0.300 (0.381)	-5.24 (0.000)**
	RL	-5.01 (0.000)**	-6.16 (0.000)**	-3.50 (0.000)**	-2.54 (0.005)**
Upper-middle-income	TDLOSS	-3.42 (0.000)**	-6.68 (0.000)**	-1.22 (0.110)	-4.02 (0.000)**
	RQ	-4.91 (0.000)**	-7.85 (0.000)**	-2.52 (0.005)**	-3.00 (0.001)**
	RL	-3.53 (0.000)**	-6.58 (0.000)**	-2.33 (0.009)**	-2.26 (0.011)**
Lower-middle-income	TDLOSS	-3.55 (0.000)**	-6.66 (0.000)**	-2.07 (0.018)**	-5.90 (0.000)**
	RQ	-3.43 (0.000)**	-6.34 (0.000)**	-2.48 (0.006)**	-2.96 (0.001)**
	RL	-1.02 (0.152)	-3.45 (0.000)**	1.15 (0.876)	-0.50 (0.306)
Low-income	TDLOSS	-22.55 (0.000)**	3.87 (0.000)**	-10.31 (0.000)**	-3.48 (0.000)**
	RQ	-8.36 (0.000)**	-21.26 (0.000)**	-4.96 (0.000)**	-7.62 (0.000)**
	RL	-1.33 (0.090)*	-4.42 (0.000)**	-1.26 (0.103)	-1.34 (0.089)*

Note: **, and * denote the 5 %, and 10 % significance level respectively.

4.5.2. Dumitrescu-Hurlin Panel Non-Causality Test Results

The results of Dimitrescu Hurlin (hereafter DH) non-causality test for the first lag of variables are presented in Table 4.4. We will mention empirical findings for each income groups briefly as following.

High-income panel

There is no bi-directional causality relationship between none of the three variables in the high-income group. The causality results indicate that a unidirectional causality exists from RQ and RL to TDLOSS. In other words, regularity quality and regulation quality variables cause electricity losses in the high-income group. Similarly, causal relationship from the interaction index of RQ and RL, to TDLOSS is significant. So, the significant causal effect that runs from RL to RQ is one of the most remarkable findings and is only valid for the high-income sample.

Upper-middle-income panel

Upper-middle-income panel results present a bi-directional between RQ, RL, and TDLOSS. There is one exception of this result that no causality is running from RL to RQ. Moreover, the interaction term and TDLOSS have uni-directional causality relation. Results of this group share some similarities with both of the high and lower-middle-income groups. While the unidirectional causality effects from RL and RQ to TDLOSS of upper-middle-income group are similar to the high-income group, similar bi-directional causality between RQ and RL can be observed in the lower-middle-income group.

Lower-middle-income panel

Lower-middle-income panel results represent only bi-directional causal effects running from RL to TDLOSS. However, there is a uni-directional causality between RQ and TDLOSS. These results are contrary to upper-middle and low-income group

outcomes, which show bi-directional causality relationship between RQ and TDLOSS. Also, this result reflects the high-income sample observations that even RQ pass through TDLOSS. This relationship does not have any feedback effect.

Low-Income Panel

For low-income countries, bi-directional causality effects are identical to upper-middle countries. However, the causal relationship between the interaction term, which represents institutional quality, and TDLOSS is not significant.

Dumitrescu-Hurlin non-causality test results provide critical insights for comparison of causal effects of variables. Taken together, the most striking aspect to emerge that the identical findings of upper-middle and low low-income countries. Unidirectional causal relationship from TDLOSS to RQ is significant for only upper-these country groups. Furthermore, the results of the low-income countries provide divergent properties between individual and interaction indices. Whereas TDLOSS, RL, and RQ show bi-directional causality, the interaction of RL and RQ has no causal relationship with TDLOSS.

Table 4.4 Dumitrescu-Hurlin Panel Causality Test Results

Direction	**High-income**		**Upper-Middle-income**		**Lower-Middle-income**		**Low-income**	
	W-stat	p-value	W-stat	p-value	W-stat	p-value	W-stat	p-value
RQ→TDLOSS	2.979	0.000**	2.167	0.044**	4.043	0.000**	3.044	0.000**
TDLOSS→RQ	0.978	0.646	3.663	0.000**	1.494	0.541	2.321	0.042**
RL→RQ	2.159	0.046**	1.316	0.808	1.619	0.385	1.908	0.199
RQ→RL	1.838	0.185	3.483	0.000**	2.522	0.006**	3.638	0.000**
RL→TDLOSS	2.751	0.001**	2.053	0.076*	3.010	0.000**	2.948	0.001**
TDLOSS→RL	1.990	0.105	2.602	0.003**	3.394	0.000**	2.581	0.012**
RQRL→TDLOSS	2.420	0.011**	2.167	0.012**	2.733	0.001**	2.172	0.078*
TDLOSS→RQRL	1.397	0.682	3.919	0.000**	2.039	0.082*	2.170	0.078*

Note: RQRL is the interaction terms of RQ and RL.

Note: **, and * denote the 5 % and 10 % significance levels respectively.

4.6. Discussion

Previous studies stress the importance of institutions on economic performance. A limited number of empirical studies (e.g., Chong and Calderon, 2000; Butkiewicz and Yanıkkaya, 2006; Law and Bany-Ariffin, 2008; Aixala and Fabro, 2008; Law et al., 2013) have exposed the rule of law as a component of institutions. Nevertheless, few studies examined the regulatory governance impact on electricity reforms (e.g., Cubbin and Stern, 2006; Smith, 2004; Erdogdu, 2014). We investigate this nexus by causality for utilities industries for a specific case that electricity theft. We established an empirical framework for indicating causal relationships between institutional endowments and electricity losses to take the rule of law literature a step further. The electricity utilities are suffered from losses, especially from non-technical losses. Even newly technical mechanisms[38] struggle to overcome losses; social, economic, political, and regulatory structures are included in technical processes to maintain losses. The regulatory processes should be designed and implemented by considering country-specific institutional endowments to solve non-technical losses, more particularly, electricity theft. This study aims to trace the effects and directions of institutions in terms of the rule of law and regulatory quality on electricity thefts.

We have found that generally, the rule of law is a crucial element of sectoral efficiency, as is the case with economic development. This outcome strengthens the hypothesis that the rule of law and regulatory quality, that is, institutional quality, lead higher economic efficiency even in the subcomponent of the economy (e.g., Levy and Spiller, 1994; Stern and Holder, 1999; Jamasb et al., 2018). As in many empirical studies, it is crucial to understand how institutions matter for the economy and society in terms of different level of development by ascertaining the direction of causal linkages. Figure 4.5. presents that the causality pattern of high-income countries between the rule of law and regulatory quality is different from that of other panel groups. While the rule

[38] See Depuru et al. (2011).

of law leads to regulatory quality in high-income countries, there is no causality running from the rule of law to regulatory quality for other sub income groups. The consequence of significantly different feature of high- income countries confirms the argument that ignoring the rule of law blocks the effective regulations. Having good and well-established governance (e.g., the rule of law) matters for the positive impact of regulations (Cubbin and Stern, 2006; Maiorano and Stern, 2007) as in developed countries.

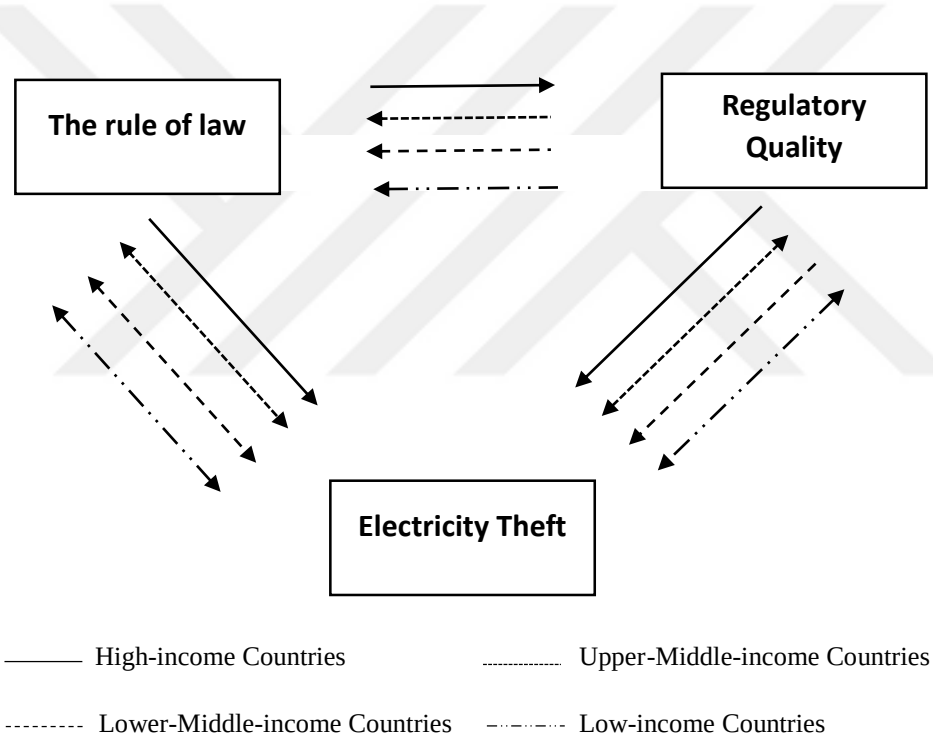


Figure 4.5. Summary of Causality Relationships

Thus far, it has been conclusively established that institutions are essential for economic performance, especially in developing countries. The significant difference in the causality between RL and RQ in high and low-income country groups leads us to examine the classification of Levy and Spiller (1994) according to the institutional endowments to shed light on existing relations. According to this classification,

countries with high institutional endowment are able to adapt their regulation systems to changing conditions but at the same time to prevent arbitrary actions. So, the existing institutional structure directly affects the quality of regulations from the outset in these countries. In such countries, well-designed institutional structure from scratch directly affects the quality of regulations. On the contrary, in some countries, especially in low-income countries, institutions that provide credibility may be inefficient or even not exist. However, between these two extremes, there may also be an arrangement structure that can stretch certain rules and sometimes have to sacrifice some practices in order to provide credible commitment. In this context, the fact that the relationship between the regulations and the rule of law in high-income countries only emerges from the rule of law to the quality of regulation supports the argument of Levy and Spiller (1994). Similarly, in other income group countries, this relationship from regulation quality to the rule of law shows that the regulatory structure in these countries is still influenced by the ongoing institutional capacity building. In addition, under the assumption that rules of regulation in these groups may be flex for some cases results scarifying regulatory governance may directly affect the rule of law. In line with these results, we have the opportunity to comment in the subgroups for the rule of law and regulatory quality, which are two of the governance indicators of the countries.

The enhancing impact of the rule of law on utility industries for high-income countries appears to be one step ahead of the results of the previous studies examining the effects of institutions on economic performance and stresses the role of the rule of law on rules and regulations. These findings reveal the importance of institutions that are often emphasized for developing countries. Further, previous studies (Law and Bany-Ariffin; Law et al., 2013; Aixala and Fabro, 2008) emphasize that the effect of institutional variables is significant only when the rule of law is used in high-income country analysis, and states that the essential institution that enhances the economic development for developed countries is the rule of law. At the same time, the fact that regulatory processes are still in progress in developing countries and the establishment

of credible commitment within the regulatory process can be considered as a dominant reason for the causality relationship for this country group from regulatory quality to the rule of law. Reflecting the cost of electricity theft to all end-users turns an economic problem into a political problem and encourage political rent-seeking. The result is increased tariffs for the whole society and legitimizing illegal use indirectly.

More specifically, the Granger causality results of the TDLOSS variable, which is an important indicator of the electricity theft and efficiency of electricity market, and indicating a social problem, confirm the prior expectations. There are causal relationships between RL and RQ to TDLOSS for all income groups such that as the quality of regulation increases, efficiency in industry is expected to increase. Likewise, in the case of lower quality of regulation, electricity theft will tend to increase. Similarly, the rule of law is the most important factor of institutional capacity while demonstrates the tendency of complying with the rules in its simplest. Development of the institutional capacity of the country results in an increased tendency to follow the rules of the game, and consequently, the existing rules and institutions increase the efficiency of the markets. As a result, a causality relationship from the rule of law to transmission and distribution losses shows that the relationship between the rule of law and economic development also applies to regulated industries from the perspective of electricity theft issue.

Investigating the role of institutions and governance for different countries in improving the efficiency and production capacity of the electricity market, Cubbin and Stern (2006) emphasize two important conditions for efficiency in infrastructure industries: high quality regulatory and better governance. Higher regulatory quality increases investments while at the same time, bringing the market to a higher level of efficiency and growth. In addition, in the industries where better governance is ensured, the likelihood of making mistakes is decreasing, the acceleration of regulations is increasing, and the efficiency-reducing situations in the market can be managed better. The studies that use the rule of law as an important institutional

variable in researching the efficiency in the electricity market emphasize the critical role of institutions in the failure of reforms or achieving sectoral achievement and efficiency.

Another interesting relationship that supports a significant role of the rule of law and its dominant power is while a unidirectional causality in the high-income group from transmission and distribution losses to the rule of law, bi-directional causality is emerging for other income groups. In fact, this shows that in countries where the rule of law is established, economic outcomes are affected by this environment. Since the rule of law is an arduous process, its post- establishment often requires more complex interactions. Consequently, miscellaneous causal linkages have been found in economic growth (e.g., Butkiewicz and Yanıkkaya, 2006), foreign direct investments (e.g., Benassy-Quere et al., 2007) or environmental and energy efficiency (e.g., Mavragani et al., 2016) relationship in developing countries. On the one hand, institutions or the rule of law encourages economic activities; on the other hand, greater economic activity demands more rule of law and institutional accumulation in countries. The heterogeneous causality relationship between electricity theft and the rule of law in high- and lower-income group countries indicates that the same effect may also be reflected in electricity theft.

Another featured finding occurs in the causal relationship between regulatory quality and electricity losses. While there is no significant causality from electricity theft to regulatory quality in high- and lower-middle-income country groups, this direction of causality results is significant in upper-middle and low-income countries. Basically, illegal electricity rates are very low in developed countries. Just the share of minimized technical losses is quite high, and illegal usage or non-technical losses are quite low. By contrast, in lower middle-income countries, both technical and non-technical losses are quite high. The average rate of transmission and distribution losses is 7.56 % for high-income and 14.09% for lower middle-income countries as we demonstrate in Table 4.4. for the last year. In this case, the same causality relationship can occur

because of the quite low T&D loss rates in developed countries. These countries may not give priority to T&D loss due to well-designed rules and regulation. Furthermore, the causality running from the rule of law to regulatory quality also indicates that the rule of law is dominant in influencing the effectiveness of existing systems, through creating huge positive externalities in high-income countries. This finding about the lower middle-income group may have been caused by the fact that illegal use of electricity in countries is not considered as a crime or illegal activity[39], and even it could be ignored in some specific periods[40]. Besides, some countries in our lower middle-income sample stand out with this result. As mentioned above, the countries with high losses such as India, Pakistan, and Nigeria, and where electricity theft is strictly a socio-economic problem are involved in this sample. In developing countries, energy or electricity is seen as a political good (Huda and McDonald, 2016:78; Oğuz et al., 2014), and often the illegal usage of electricity is not seen as a problem to be solved by the regulatory authority, as the social cost of tackling theft is too high. Therefore, the lack of causality relation from transmission and distribution losses to the quality of regulation can support this argument.

Additionally, similar to studies using particular or all of WGI, we employ another index which is the interaction of two sub-indicators[41] as regulatory quality and the rule of law to demonstrate the institutional quality of regulated industries for each group. Also, finding the substitute or complementary characteristics (Stern and Cubbin, 2005) of the rule of law and regulatory quality is crucial to reveal the aggregated effects. Then we reconsider Granger causality relationships between transmission and distribution losses and institutional quality. There are remarkable findings which are different from the previous analysis. First, there is no significant causality between the

[39] Jamil and Ahmad (2013) develop a model investigating the criminal motivations of electricity theft, although the recent studies overlooked the criminal characteristics of electricity theft.

[40] See Min and Golden (2014).

[41] We have employed the average of "the rule of law" and "regulatory quality" indicators similar to Al-Marhubi (2004) and Bjornskov (2006) which used average of particular sub-indicators to investigate "institutional quality" or "governance".

institutional index and electricity theft in low-income countries. When we draw this index to examine the institutional quality, it can be concluded that low-income countries do not have any institutional linkages in a regulatory environment that could affect illegal electricity. As Levy and Spiller (1994) emphasize, more ineffective regulation rules can be established to provide a credible commitment in countries with lower institutional capacity. However, institutional governance does not often exist, and there is no environment that can provide regulatory and economic efficiency in low-income countries. While the rule of law and regulatory quality are associated with illegal usage alone, the lack of an aggregated effect indicates that social norms, rules, regulations, and economic structure do not have the ability to establish institutional capacity.

Second, we have found a unidirectional causality from electricity theft to the rule of law, though causality from regulatory quality to theft does not exist in lower-middle-income countries in the previous analysis. In fact, this situation was a social issue rather than an economic one. According to current analysis results, which we identified the institutional quality index, the emergence of causality from illegal usage to institutional quality may show that the effect of the rule of law is more influential in these countries. Taken together, these findings may shed light on the rule of law. Because, the rule of law comprises institutions, legal rules, and regulations, supports the enforcement of contracts, well-organized regulatory processes, market efficiency. Also, the rule of law should not be considered as a substitute for better regulatory effects on electricity theft; it has the characteristics of complementary.

4.7. Conclusion

The origin of our starting point is that the institutional processes introduced by North (1990a) shape economic and social activities. Subsequent empirical studies emphasize that economic development stems from good institutions. Besides, as people's income increases, they increase their demands for institutional opportunities such as

regulation, bureaucracy, security, law, and order (Barro, 1996; Glaeser et al., 2004). In the long run, income levels of countries with different institutional backgrounds are differentiated. Therefore, in countries where the rule of law is established, economic activities might be more successful and more likely to be affected by positive externalities created by institutional endowments. Countries in which the rule of law is not fully established can produce more complex results in economic activities.

Even the rule of law is still a controversial subject; many studies emphasize that the rule of law is a crucial feature of countries' institutional infrastructure enhancing economic development, regulatory systems, foreign investments, and utilities efficiency. There is a developing body of literature to describe the role of the rule of law and economic performance within the new institutional economics framework that seek to property rights, credible commitment, enforcement of contracts, rent-seeking and corruption. In this context, the role of institutions in regulatory environments has received substantial critical attention in recent studies. Maiorano and Stern (2007:168) indicate that while infrastructure and economic growth support each other, better regulatory governance enhances infrastructures; regulatory governance and economic growth are responsive to countries' institutions. Also, Levy and Spiller (1994) stress the importance of countries different characteristics which are associated with the institutional endowment that content to ease the tension between the regulatory process and other conditions. Thus, firstly, we prefer to employ different income group countries and investigate the potential effects of the rule of law and regulatory quality on electricity theft that harms both social, economic, and regulatory efficiency.

This study sets out examining causal relationships between electricity theft, which is not only an economic problem for electricity utilities and society, and the rule of law and regulatory quality as a reflection of institutional endowment using panel Granger causality test. The sample consists of 17 countries for each high, upper-middle, lower income, and 13 low-income countries to pay sufficient attention to economic and institutional characteristics between the period of 1996-2014.

The empirical findings suggest that the unidirectional causality effect running from the rule of law to transmission and distribution losses is effectual for all sub-income country groups. Likewise, the equally capable effect is statistically significant for regulatory quality to transmission and distribution losses for each subsample. However, Granger causality effects have unanticipated results as existing the same causality pattern of high- and lower-middle-income. Transmission and distribution losses Granger cause regulatory quality in upper middle- and low-income panels, whereas in the high and lower middle sample cannot validate this relation. Also, it is crucial examining the direction of causal effects between the rule of law and regulatory quality for each sample to evince which institutional component drive another. The empirical results suggest that while the rule of law Granger causes regulatory quality in high-income countries; the exact opposite causality exists in other sub-income country panels.

The results of the institutional quality index, which we identify as the interaction or average of the rule of law and regulatory quality indexes, are not different from sub-index results for country panels, except low-income countries. Even the rule of law, regulatory quality, and transmission and distribution losses have bi-directional causality pattern in our first estimation; we do not find any statistically significant effect on institutional quality. First of all, these findings answer our research question that can we encounter the effect of the rule of law in regulated or utilities industries. Thus, we examine the specific case that electricity theft, which damages industrial and economic efficiency, also calls forth social and economic consequences. Secondly, most of the time, the failure of controlling electricity theft arises out of high social costs due to electricity is a political good. Our results suggest that usage of regulatory policy for social policy goals reduces the belief in the rule of law in the society. Social issues should be dealt with social policies. Using indirect methods to subsidize some groups in the society creates the problem of identification of the correct groups and waste resources quality (Cooter and Ulen, 2016) that also harms the rule of law and regulatory quality in developing countries. Also, the established the rule of law would

reduce the electricity theft and lead efficiency as in developed countries, and the electricity theft is mainly driven by the establishment of effective regulatory systems and driven by the huge externalities arise from the rule of law.

Our empirical results provide more comprehensive channels conducting illegal usage that causing the economic consequences. The regulated industries should be considered as the microcosm (Cubbin and Stern, 2006) of an aggregated economy that is highly influenced by existing institutions, the rule of law, and regulatory systems. If the rule of law could not be established currently in one country, the policymakers might pay regard to improve the institutional environment. Middle- and low-income countries have relatively higher transmission and distributions losses that appear in less efficient regulatory governance influence countries' the rule of law environment. Lack of well-organized rules and regulations harm the rule of law and increase electricity theft. As a matter of fact, characteristics of utilities are highly sensitive to regulatory commitment, rent-seeking, administrative capabilities, and so norms, behaviors, political cycles. While tackling illegal electricity usage, the policymakers should not rule out the vague nature of theft linked to political and social governance alongside pure economic and financial conditions.

The electricity losses cause to be charged more to end-users and raises, increases social costs, hampers investments, and above all damage the rule of law endowments of countries. As the countries' the rule of law leads lower electricity theft, the fact that when the illegal activities are not regarded as a crime or engaging some specific illegal activities such electricity theft, not to be accepted as a norm damages the rule of law and regulatory governance. By reflecting the cost of electricity theft to all customers turn an economic problem into a political problem and encourage political rent-seeking. The result is increased tariffs for the whole society and legitimizing illegal use indirectly. Also, we argue that there has to be the political will to support economic and technical policy changes to reduce electricity theft to acceptable levels regarding

economic efficiency. So, greater efforts should be performed to the rule of law which indicates that the rule obedience of citizens or regulatory commitment.

CHAPTER 5

CONCLUSION

This dissertation consists of three essays on the connection between the rule of law and regulatory governance in electricity market. We use the new institutional economic approach in each essays. This approach is based on the assumption that a higher quality of institutions has strengthened economic performance. Hence, the new institutional approach to regulation assumes that better regulatory governance promote regulated industries' performance. According to new institutionalist perspective, regulatory governance is the mechanism which constrains regulatory discretion and solves conflicts in the regulatory process (Levy and Spiller, 1994). This describing is commonly used in many studies which investigates the impact of regulatory governance on infrastructure industries. Regulatory governance and the rule of law are connected with some special features. Accountability, clarity, transparency, predictability, independence, etc. are the common features of the existence of the rule of law. The emphasis on the rule of law plays a crucial role in protecting the regulatory governance and institutions. By focusing on the problems of political interferences and independence of regulatory agencies as examples of deviations from the rule of law lead us to reveal problems more clearly and as part of the greater picture.

We start with the introduction. The following chapter is the first essay of the dissertation. In this part, we aim to present theories of regulation, stressing the new institutional economic approach to regulation by focusing on transaction costs, regulatory commitment, regulatory governance and the rule of law. A better understanding of regulatory commitment, regulatory governance and the rule of law provide us to establish a connection with other essays. Additionally, we review the electricity sector reforms by showing the main elements and drivers of reforms according to developing and developed countries. This essay has shown that the most

challenging aspect of reform is to implement reform elements under weak regulatory rule-making and governance. Furthermore, the reform experiences show that reducing transmission and distribution losses and achieving efficiency through incentive-based regulations are strongly subject to institutional endowments, regulatory governance and enforcement capabilities which are closely associated with the rule of law.

The second essay investigates that the connection between the rule of law and regulation with an emphasis on on the recent Turkish electricity market experience. We contribute to the literature by addressing the institutional dimension of electricity regulation in the Turkish electricity markets by focusing Turkey's tariff design and eletricity losses. The weak ties between the rule of law and regulation encourage government opportunism. The increasing government involvement in regulated industries creates a path toward public ownership. The results of this essay shows that the EMRA should aim to increase consistency in its decisions and be more transparent in tariff procedures. It should also implement policies to reduce electricity theft. Marginal cost-based pricing (for example, a distribution region-based electricity tariff) would reduce theft and encourage distribution companies to focus on theft. It would also make the revenue-cap model more effective. More importantly, it would improve accountability and reduced the political burden on the regulator.

The last essay provides an empirical analysis for ascertaining of the causality linkages between regulatory quality, the rule of law and electricity losses. We stress that the transmission and distribution losses also include electricity theft. Electricity theft is not only an economic or technical issue. Many countries suffer from electricity losses and challenged to restrain. We show the conceptual linkages the rule of law, regulatory quality and electricity losses, and then we analyze causality relationships by panel data econometric approach. The annual data of the study covers the period 1996 to 2014 for 64 countries from the different parts and income levels of the world. We test each income group to find out income-group specific results. Because, the literature on the new institutional economics assume that higher income results higher institutional

quality, and the opposite relationship may also occur. Our aim is to track this relationship in the regulated industries. Our results show that unidirectional causality relationship is running from the rule of law and regulatory quality to electricity losses is siginificant for all income groups. While, the bidirectional relationship does not exist for high income countries, the other income groups show bidirectional relationships. We also control the interaction of the rule of law and regulatory quality, then we test the causality between transmission and transmission losses. We find that the individual results of high, upper-middle, and lower-middle income countries show similar causality relationships. But, there is no causality linkages between institutonal quality and electricity losses. This result gives point to the nonexistent institutional capacity of low-income countries.

Since the 1980s, liberalization, and privatization policies have been implemented to increase infrastructures' efficiency. The electricity market is one of the most important infrastrucures which is affected by this process. Efficiency efforts have been related to increase generation capacity, electricity utilization, establishing an independent regulator, and decreasing electricity losses. Hence the laws and reforms adopted. In this process, it is seen that the transfer of regulations from developed countries that have adopted the rule of law to developing countries where the concept has not yet been fully formed, has caused malfunctioning in the functioning of regulations. Within this framework, competition, regulatory authority, regulatory process, and independence and acceptance of regulatory governance as a whole are important for the existence of the rule of law.

When the regulatory processes are reviewed from the new institutional economics perspective, we have seen that the rule of law and regulatory governance come to the forefront. Earlier theories consider the regulation as a distribution of wealth, while the NIE approach focuses on institutional factors in ensuring efficiency in regulatory processes. Therefore, the institutional design of regulations is seen as more important than regulation objectives or tools, especially in developing countries. A major reason

for ignoring institutional factors is the inability to identify the causes and consequences of institutional change. We address this gap and offer a detailed empirical an discussion of a potential path for introducing institutional variables into economic studies on electricity regulation.

The international institutions have an increasing concern on regulatory governance and the rule of law. The World Bank's Global Indicators Group launched a project named "The Global Indicators of Regulatory Governance". This project aims to investigate how governments interact with the public in the regulatory process by focusing on transparency and accountability. The first results of the project focus on citizen engagement in rule-making. The results show that higher citizen engagement in rulemaking tends to have better regulatory governance and stronger rule of law. When the data set expands, further studies may analyze the impact of regulatory governance and the rule law in more extensive areas.

REFERENCES

Acemoglu, D., & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy*, 113(5), 949-995.

Acemoglu, D., & Robinson, J. A. (2005). *Economic Origins of Dictatorship And Democracy*. Cambridge University Press.

Acs, Z. J., Desai, S., & Hessels, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics*, *31*(3), 219-234.

Andres, L., Guasch, J. L., & Azumendi, S. L. (2008). Regulatory governance and sector performance: methodology and evaluation for electricity distribution in Latin America. *The World Bank.*

Aixalá, J., & Fabro, G. (2008). Does the impact of institutional quality on economic growth depend on initial income level?. *Economic Affairs*, 28(3), 45-49.

Alchian, A. A. (1965). Some economics of property rights. Il politico, 816-829.

Andrews, C. J. (2008). Greenhouse gas emissions along the rural-urban gradient. *Journal of Environmental Planning and Management*, 51(6), 847-870.

Arango, L. G., Deccache, E., Bonatto, B. D., Arango, H., & Pamplona, E. O. (2017). Study of Electricity Theft Impact on the Economy of a Regulated Electricity Company. *Journal of Control, Automation and Electrical Systems*, 28(4), 567-575.

Atiyas, I., 2012. Economic Institutions and Institutional Change in Turkey During the Neoliberal Era. *New Perspectives on Turkey*, 47, 57-81.

Atiyas, I., Cetin, T., Gulen, G. (2012). Reforming Turkish Energy Markets: Political Economy, Regulation and Competition in the Search for Energy Policy. *Springer Science & Business Media.*

Atiyas, I., Dutz, M. (2005). Competition and regulatory reform in Turkey's electricity industry.

Averch, H., & Johnson, L. L. (1962). Behavior of the Firm Under Regulatory Constraint. *The American Economic Review*, 1052-1069.

Bacon, R. (1999). A Scorecard for Energy Reform in Developing Countries. Viewpoint. World Bank, Washington, DC. Avaliable at: https://openknowledge.worldbank.org/handle/10986/11487

Bacon, R. W., & Besant-Jones, J. (2001). Global Electric Power Reform, Privatization, and Liberalization of the Electric Power İndustry in Developing Countries. *Annual Review of Energy And The Environment*, *26*(1), 331-359.

Bagdadioglu, N., & Odyakmaz, N. (2009). Turkish Electricity Reform. *Utilities Policy*, *17*(1), 144-152.

Bakovic, T., Tenenbaum, B., & Woolf, F. (2002). *Regulation by Contract: A New Way to Privatize Electricity Distribution?*. The World Bank.

Baron, D. P., & Myerson, R. B. (1982). Regulating a Monopolist with Unknown Costs. *Econometrica: Journal of the Econometric Society*, 911-930.

Barro, R. J. (1996). Democracy and Growth. *Journal Of Economic Growth*, 1(1), 127.

Baskaran, T., Min, B., & Uppal, Y. (2015). Election Cycles and Electricity Provision: Evidence from a Quasi-Experiment with Indian Special Elections. *Journal of Public Economics*, 126, 64-73.

Başaran, A., & Bağdadioğlu, N. (2010). Türkiye Elektrik Sektöründe Reform Süreci, Regülâsyon ve Rekabet Politikası. *Sosyoekonomi*, *12*(12).

Bazilian, M., Nakhooda, S., & Van de Graaf, T. (2014). Energy Governance and Poverty. *Energy Research & Social Science*, 1, 217-225.

Becker, G. S. (1983). A Theory of Competition Among Pressure Groups for Political Influence. *The Quarterly Journal of Economics*, *98*(3), 371-400.

Bénassy-Quéré, A., Coupet, M., & Mayer, T. (2007). Institutional Determinants of Foreign Direct İnvestment. *World Economy*, 30(5), 764-782.

Benli, E. and Benli, H. (2017). Cheaper Cost Avoider Approach to the Electricity Loss and Theft in Turkey. *Network Industries Quarterly* 19, 13-16.

Berg, L. A., & Desai, D. (2013). Background Paper: Overview on the Rule of Law and Sustainable Development for the Global Dialogue on the Rule of law and the Post-2015 Development Agenda. Paris: UNDP.

Besant-Jones, J. E. (2006). *Reforming Power Markets in Developing Countries: What Have We Learned?* (pp. 1-164). Washington, DC: World Bank.

Bingham, T. (2011). *The Rule of Law*. Penguin UK.

Buchanan, J.M. (1980). Rent Seeking and Profit Seeking, in James M. Buchanan, Robert

D. Tollison and Gordon Tullock (Eds.), *Toward a Theory of the Rent Seeking Society*, College Station: Texas A&M University Press, pp. 3-15.

Busse, M., & Hefeker, C. (2007). Political Risk, Institutions and Foreign Direct İnvestment. *European Journal of Political Economy*, *23*(2), 397-415.

Butkiewicz, J. L., & Yanikkaya, H. (2006). Institutional Quality and Economic Growth: Maintenance of the Rule of law or Democratic Institutions, or Both?. *Economic Modelling*, 23(4), 648-661.

Carothers, T. (2003). Promoting the Rule of Law: The Problem of Knowledge, Working Paper, 34. Carnagie Endowment for International Peace.

Cetin, T. (2014). Structural and Regulatory Reform in Turkey: Lessons from Public Utilities. *Utilities Policy*, 31, 94-106.

Cetin, T. & Oguz, F. (2007). The Politics of Regulation in the Turkish Electricity Market. *Energy Policy* 35, 1761-1770.

Coase, R. H. (1960). The Problem of Social Cost. In *Classic Papers in Natural Resource Economics* (pp. 87-137). Palgrave Macmillan, London.

Cochrane, J.H. (2015). Rule of Law in the Regulatory State. Avaliable at: https://johnhcochrane.blogspot.com/2015/08/rule-of-law-in-regulatory-state.html

Cooter, R. D. (1996). The rule of state law and the rule-of-law state: economic analysis of the legal foundations of development. In Annual World Bank Conference on Development Economics (Vol. 1997).

Cooter, R., & Ulen, T. (2016). *Law and Economics*. Addison-Wesley.

Cubbin, J., & Stern, J. (2005). Regulatory effectiveness and the empirical impact of variations in regulatory governance-electricity industry capacity and efficiency in developing countries. The World Bank.

Cubbin, J., & Stern, J. (2006). The Impact of Regulatory Governance and Privatization on Electricity Industry Generation Capacity in Developing Economies. *The World Bank Economic Review*, 20(1), 115-141.

Dam, K. W. (2007). *The Law-Growth Nexus: The Rule of Law and Economic Development*. Brookings Institution Press.

Demsetz, H. (1968). Why regulate utilities? The Journal of Law and Economics, 11(1), 55-65.

Depuru, S. S. S. R., Wang, L., & Devabhaktuni, V. (2011). Electricity Theft: Overview, Issues, Prevention and a Smart Meter Based Approach to Control Theft. *Energy Policy*, 39(2), 1007-1015.

Dollar, D., & Kraay, A. (2003). Institutions, Trade, and Growth. *Journal of Monetary Economics*, 50(1), 133-162.

Domah, P., Pollitt, M., & Stern, J. (2002). Modelling the Costs of Energy Regulation: Evidence of Human Resource Constraints in Developing Countries. *Department of Applied Economics Working Papers CMI EP*, 11.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger Non-Causality in Heterogeneous Panels. *Economic Modelling*, 29(4), 1450-1460.

Durakoğlu, S. M. (2011). Political Institutions of Electricity Regulation: The Case of Turkey. *Energy Policy* 39, 5578-5587.

Erdogdu, E. (2014). The Political Economy of Electricity Market Liberalization: A Cross-Country Approach. *The Energy Journal*, 91-128.

Erdogdu, E. (2007). Regulatory reform in Turkish energy industry: An analysis. *Energy Policy* 35, 984-993.

Erdogdu, E. (2011). What happened to efficiency in electricity industries after reforms? *Energy Policy*, 39, 6551-6560.

Erdogdu, E. (2013). A cross-country analysis of electricity market reforms: Potential contribution of New Institutional Economics. *Energy Economics*, 39, 239-251.

Estache, A., & Wren-Lewis, L. (2009). Toward a theory of regulation for developing countries: Following jean-jacques laffont's lead. *Journal of Economic Literature*, *47*(3), 729-70.

Estache, A., Guasch, J. L., Iimi, A., & Trujillo, L. (2009). Multidimensionality and renegotiation: Evidence from transport-sector public-private-partnership transactions in Latin America. *Review of Industrial Organization*, *35*(1-2), 41.

Fischer, R., & Galetovic, A. (2003). Regulatory governance and chile's 1998–1999 electricity shortage. *Policy Reform*, 6(2), 105-125.

Fuller, L. L. (1969). The morality of law 152. Yale University Press.

Gasmi, F., Noumba Um, P., & Virto, L. R. (2007). Political accountability and regulatory performance in infrastructure industries: an empirical analysis. The World Bank.

Gassner, K., & Pushak, N. (2014). 30 years of British utility regulation: Developing country experience and outlook. *Utilities Policy*, 31, 44-51.

Gaur, V., & Gupta, E. (2016). The determinants of electricity theft: An empirical analysis of Indian states. *Energy Policy*, 93, 127-136.

Gilardi, F. (2009). *Delegation in the regulatory state: independent regulatory agencies in Western Europe*. Edward Elgar Publishing.

Gilardi, F., Maggetti, M. (2011). The independence of regulatory authorities. *Handbook on the Politics of Regulation*, 201.

Glaeser, E. L., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2004). Do institutions cause growth?. *Journal of economic Growth*, 9(3), 271-303.

Glauner, P., Valtchev, P., State, R., Duarte, D. (2018). Non-Technical Losses in the 21st Century: Causes, Economic Effects, Detection and Perspectives. Avaliable at: https://www.researchgate.net/publication/325297875_Non-Technical_Losses_in_the_21st_Century_Causes_Economic_Effects_Detection_and_Perspectives

Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.

Gual, J., & Trillas, F. (2006). Telecommunications policies: measurement and determinants. *Review of Network Economics*, 5(2).

Hadfield, G. K., & Weingast, B. R. (2014). Microfoundations of the rule of law. *Annual Review of Political Science*, 17, 21-42.

Haggard, S., & Tiede, L. (2011). The rule of law and economic growth: where are we?. *World Development*, 39(5), 673-685.

Haggard, S., MacIntyre, A., & Tiede, L. (2008). The rule of law and economic development. *Annual Review of Political Science*, 11, 205-234.

Hanretty, C., & Koop, C. (2013). Shall the law set them free? The formal and actual independence of regulatory agencies. *Regulation & Governance*, 7(2), 195-214.

Hantke-Domas, M. (2003). The public interest theory of regulation: non-existence or misinterpretation?. *European journal of law and economics*, *15*(2), 165-194.

Hart, O., & Moore, J. (1988). Incomplete contracts and renegotiation. *Econometrica: Journal of the Econometric Society*, 755-785.

Hattori, T., & Tsutsui, M. (2004). Economic impact of regulatory reforms in the electricity supply industry: a panel data analysis for OECD countries. *Energy Policy*, 32(6), 823-832.

Hayek, F. A. (1960). *The Constitution of Liberty*.(Second Impression.). University of Chicago Press.

Hayek, F. A., 1973. *Law, Legislation and Liberty*. Routledge & Kegan Paul, London.

Henisz, W. J. (2002). The institutional environment for infrastructure investment. *Industrial and corporate change*, *11*(2), 355-389.

Henisz, W. J., & Zelner, B. A. (2002). Interest groups, political institutions and electricity investment. *Mimeo*.

Hertog, P. D. (2000). Knowledge-intensive business services as co-producers of innovation. *International journal of innovation management*, *4*(04), 491-528.

Holburn, G. (2001). Political risk, political capabilities and international investment strategy: Evidence from the power generation industry. *Richard Ivey School of Business, University of Western Ontario*.

Holburn, G. L. & Spiller, P. T. (2002). Institutional or structural: lessons from international electricity sector reforms. *The Economics of Contracts: Theories and Applications*, Cambridge University.

Huda, M. S., & McDonald, M. (2016). Regional cooperation on energy in South Asia: Unraveling the political challenges in implementing transnational pipelines and electricity grids. *Energy policy*, 98, 73-83.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of econometrics*, 115(1), 53-74.

Imam, M., Jamasb, T., Llorca, M., & Llorca, M. (2018). Power Sector Reform and Corruption: Evidence from Electricity Industry in Sub-Saharan Africa. *IDEAS Working Paper Series from Repec.*

Indian power sector loses $16.2b to theft every year. (2015, January 21). Retrieved from https://asian-power.com/ipp/in-focus/indian-power-sector-loses-162b-theft-every-year.

Inter-American Dialogue's Latin American Energy Advisor. "How Widespread Is Oil and Electricity Theft in Latin America?." (2010). Retrieved from https://digitalrepository.unm.edu/la_energy_dialog/33

Jamasb, T. (2006). Between the state and market: Electricity sector reform in developing countries. *Utilities Policy*, *14*(1), 14-30.

Jamasb, T., & Pollitt, M. (2005). Electricity market reform in the European Union: review of progress toward liberalization & integration. *The Energy Journal*, 11-41.

Jamasb, T., & Pollitt, M. (2000). Benchmarking and regulation: international electricity experience. *Utilities policy*, 9(3), 107-130.

Jamasb, T., & Pollitt, M. (2005). Electricity market reform in the European Union: review of progress toward liberalization & integration. *The Energy Journal*, 11-41.

Jamil, F. (2013). On the electricity shortage, price and electricity theft nexus. *Energy policy*, 54, 267-272.

Jamil, F., & Ahmad, E. (2010). The relationship between electricity consumption, electricity prices and GDP in Pakistan. *Energy policy*, 38(10), 6016-6025.

Jimenez, R., Serebrisky, T., & Mercado J. (2014). Power lost: sizing electricity losses in transmission and distribution systems in Latin America and the Caribbean. Avaliable at: https://publications.iadb.org/en/publication/16883/power-lost-sizing-electricity-losses-transmission-and-distribution-systems-latin.

Joseph, K. L. (2010). The politics of power: Electricity reform in India. *Energy Policy*, 38(1), 503-511.

Joskow, P. L., & Rose, N. L. (1989). The effects of economic regulation. *Handbook of industrial organization*, *2*, 1449-1506.

Joskow, P. L. (1998). Electricity sectors in transition. *The Energy Journal*, 25-52.

Joskow, P. L. (2002). Transaction cost economics, antitrust rules, and remedies. *Journal of Law, Economics, and Organization*, 18(1), 95-116.

Joskow, P. L. (2003). Electricity sector restructuring and competition: Lessons learned. *Cuadernos de economía*, 40(121), 548-558.

Joskow, P. L. (2006). Introduction to electricity sector liberalization: lessons learned from cross-country studies. *Electricity market reform: an international perspective*, 1, 1-32.

Joskow, P. L. (2008). Lessons learned from the electricity market liberalization. The *Energy Journal*, *Special Issue*. The Future of Electricity: Papers in Honor of David Newbery.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the rule of law*, 3(2), 220-246.

Kessides, I. (2004). *Reforming infrastructure: Privatization, regulation, and competition*. The World Bank.

Kessides, I. N. (2012). The impacts of electricity sector reforms in developing countries. *The Electricity Journal*, 25(6), 79-88.

Kirmanoğlu, H. & Kahveci, M. (2016). Restructuring the Electricity Sector in Turkey: Who are the Beneficiaries? in Handbook of Research on Public Finance in Europe and the MENA Region. IGI Global, pp. 429-446.

Kirkpatrick, C. (2006). 11 Regulatory impact assessment. International handbook on economic regulation, 232.

Kirkpatrick, C., Parker, D., & Zhang, Y. F. (2005). Price and profit regulation in developing and transition economies: A survey of the regulators. *Public Money and Management*, 25(2), 99-105.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & Politics*, 7(3), 207-227.

Krever, T. (2011). The legal turn in late development theory: The rule of law and the World Bank's development model. *Harvard International Law Journal*, 52, 288-319.

Krueger, A. O. (1974). The political economy of the rent-seeking society. *The American economic review*, 64(3), 291-303.

Laffont, J. J., & Tirole, J. (1993). *A theory of incentives in procurement and regulation*. MIT press.

Laffont, J. J. (2005). *Regulation and development*. Cambridge University Press.

Laffont, J. J. (1999). Political economy, information and incentives. *European Economic Review*, 43(4-6), 649-669.

Law, S. H., & Bany-Ariffin, A. N. (2008). Institutional infrastructure and economic performance: dynamic panel data evidence. *Transition Studies Review*, 15(3), 542-557.

Law, S. H., Lim, T. C., & Ismail, N. W. (2013). Institutions and economic development: A Granger causality analysis of panel data evidence. *Economic Systems*, 37(4), 610-624.

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*, 108(1), 1-24.

Levy, B., & Spiller, P. T. (1993). Regulation, institutions, and commitment in telecommunications: A comparative analysis of five country studies. *The World Bank Economic Review*, 7(suppl_1), 215-252.

Levy, B., & Spiller, P. T. (1994). The institutional foundations of regulatory commitment: a comparative analysis of telecommunications regulation. *The Journal of Law, Economics, and Organization*, 10(2), 201-246.

Lewis, F. B. (2015). Costly 'Throw-Ups': Electricity Theft and Power Disruptions. *The Electricity Journal*, 28(7), 118-135.

Littlechild, S. C. (1983). Regulation of British Telecommunications' Profitability. Report to the Secretary of State. Department of Industry.

Littlechild, S. C., & Beesley, M. (1989). The regulation of privatized monopolies in the United Kingdom. *Rand Journal of Economics*, *20*(3), 454-472.

Maggetti, M. (2007). De facto independence after delegation: A fuzzy-set analysis. *Regulation & Governance*, 1, 271-294.

Maggetti, M. (2009). The role of independent regulatory agencies in policy-making: a comparative analysis. *Journal of European Public Policy*, 16, 450-470.

Maiorano, F., & Stern, J. (2007). Institutions and telecommunications infrastructure in low and middle-income countries: The case of mobile telephony. *Utilities Policy*, 15(3), 165-181.

Marangoz, C. (2013). *Illegal electricity use in Turkey: Causes and policy implications* (Doctoral dissertation, Vanderbilt University).

Mavragani, A., Nikolaou, I., & Tsagarakis, K. (2016). Open economy, institutional quality, and environmental performance: a macroeconomic approach. *Sustainability*, 8(7), 601.

McCubbins, M. D., Noll, R. G., & Weingast, B. R. (1987). Administrative procedures as instruments of political control. *JL Econ. & Org.*, *3*, 243.

Ménard, C., & Shirley, M. M. (Eds.). (2005). *Handbook of new institutional economics* (Vol. 9). Dordrecht: Springer.

Min, B., & Golden, M. (2014). Electoral cycles in electricity losses in India. *Energy Policy*, 65, 619-625.

Møller, J. & Skaaning, S. E. (2012). Systematizing thin and thick conceptions of the rule of law. *Justice System Journal*, 33, 136-153.

Nagayama, H. (2007). Effects of regulatory reforms in the electricity supply industry on electricity prices in developing countries. *Energy Policy*, 35(6), 3440-3462.

Nagayama, H. (2010). Impacts on investments, and transmission/distribution loss through power sector reforms. *Energy Policy*, 38(7), 3453-3467.

Nepal, R., & Jamasb, T. (2015). Caught between theory and practice: Government, market, and regulatory failure in electricity sector reforms. *Economic Analysis and Policy*, 46, 16-24.

Never, B. (2015). Social norms, trust and control of power theft in Uganda: Does bulk metering work for MSEs?. *Energy Policy*, 82, 197-206.

Newberry, D. M. (2002). *Privatization, restructuring, and regulation of network utilities* (Vol. 2). MIT press.

Newbery, D. (2004). Issues and Options for Restructuring Electricity Supply Industries. Avaliable at: https://doi.org/10.17863/CAM.5090

Niskanen, W. A. (1968). The peculiar economics of bureaucracy. *The American Economic Review*, *58*(2), 293-305.

Noll, R. G. (2000). Telecommunications reform in developing countries. *Economic policy reform: The second stage*, 183-242.

North, D. C. (1989). Institutions and economic growth: An historical introduction. *World development*, 17(9), 1319-1332.

North, D. (1990a). *In Institutions, Institutional Change and Economic Performance (Political Economy of Institutions and Decisions).* Cambridge: Cambridge University Press.

North, D. C. (1990b). A transaction cost theory of politics. *Journal of theoretical politics*, 2(4), 355-367.

North, D. C. (1991). Institutions. *Journal of economic perspectives*, 5(1), 97-112.

North, D. C. (1993). Institutions and credible commitment. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, 11-23.

North, D. C., Wallis, J. J., & Weingast, B. R. (2009). *Violence and social orders: A conceptual framework for interpreting recorded human history*. Cambridge University Press.

OECD (2015) Regulatory Policy Outlook. Retrieved from https://www.oecd-ilibrary.org/governance/oecd-regulatory-policy-outlook-2015_9789264238770-en

Oğuz, F. (2011). Bilgi, regülasyon ve rekabet: bir piyasa süreci yaklaşımı. *Doğuş Üniversitesi Dergisi*, 6(2), 253-267.

Oğuz, F., Akkemik, K. A., & Göksal, K. (2014). Can law impose competition? A critical discussion and evidence from the Turkish electricity generation market. *Renewable and Sustainable Energy Reviews*, 30, 381-387.

Oğuz, F., Göksal, K., 2017. *Should Turkey change the regulatory model for electricity distribution*? in: Finger, M., Oğuz, F., Bert, N., Razaghi, M., Kupfer, D., Bouchard, K. (Eds.). Chair MIR – EPFL.

Omri, A. (2014). An international literature survey on energy-economic growth nexus: Evidence from country-specific studies. *Renewable and Sustainable Energy Reviews*, 38, 951-959.

Ozbugday, F. C., Ogunlu, B., & Alma, H. (2016). The sustainability of Turkish electricity distributors and last-resort electricity suppliers: What did transition from

vertically integrated public monopoly to regulated competition with privatized and unbundled firms bring about? *Utilities Policy,* 39, 50-67.

Ozturk, I. (2010). A literature survey on energy–growth nexus. *Energy policy*, 38(1), 340-349.

Payne, J. E. (2010). A survey of the electricity consumption-growth literature. *Applied energy*, 87(3), 723-731.

Peltzman, S. (1976). Toward a more general theory of regulation. *The Journal of Law and Economics*, *19*(2), 211-240.

Peltzman, S. (2000). Prices rise faster than they fall. *Journal of political economy*, 108(3), 466-502.

Polemis, M. L. (2016). New evidence on the impact of structural reforms on electricity sector performance. *Energy Policy*, 92, 420-431.

Pollitt, M. G. (2002). The declining role of the state in infrastructure investments in the UK. *Private initiatives in infrastructure: Priorities, incentives and performance*, 67-100.

Pollitt, M. (2008). Electricity reform in Argentina: Lessons for developing countries. *Energy Economics*, 30(4), 1536-1567.

Pollitt, M. G. (2009). *Electricity liberalisation in the European Union: A progress report.*

Pollitt, M. G. (2012). The role of policy in energy transitions: Lessons from the energy liberalisation era. *Energy policy*, 50, 128-137.

Posner, R. A. (1974). Theories of Economic Regulation. *Bell Journal of Economics*, 5(2), 335-358.

Power Theft, Retrieved from http://dtechsepm.com/power-theft/.

Raz, J. (1979). *The Authority of Law*. Oxford Univ. Press, Oxford.

Rigobon, R., & Rodrik, D. (2005). The rule of law, democracy, openness, and income: Estimating the interrelationships1. *Economics of transition*, 13(3), 533-564.

Robinson, J. A., & Acemoglu, D. (2012). *Why nations fail: The origins of power, prosperity, and poverty*. Crown Business, New York.

Rodrik, D. (2000). Institutions for high-quality growth: what they are and how to acquire them. *Studies in comparative international development*, 35(3), 3-31.

Rodrik, D. (2007). *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth.* Princeton, NJ: Princeton Univ. Press.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, 9(2), 131-165.

Rose, N. L., & Joskow, P. L. (1988). The diffusion of new technologies: evidence from the electric utility industry.

Schick, A. (1998). Why most developing countries should not try New Zealand's reforms. *The World Bank Research Observer*, 13, 123-131.

Shklar, J. N. (1987). Political theory and the rule of law. Hutchinson and Monahan (Eds), *The Rule of Law: Ideal or Ideology*, Toronto: Carswell.

Simon, H. A. (1997). *Models of bounded rationality: Empirically grounded economic reason* (Vol. 3). MIT press.

Skaaning, S. E. (2010). Measuring the rule of law. *Political Research Quarterly*, *63*(2), 449-460.

Slapin, J. B. (2015). How European Union membership can undermine the rule of law in emerging democracies. *West European Politics*, 38, 627-648.

Smith, W. (1997). Utility regulators: the independence debate. Public policy for the private sector, 127(1).

Smith, T. B. (2004). Electricity theft: a comparative analysis. Energy policy, 32(18), 2067-2076.

Spiller, P. T. (1990). Politicians, Interest Groups, and Regulators: A Multiple-Principals Agency Theory of Regulation, or" Let Them Be Bribed". *The Journal of Law and Economics*, 33, 65-101.

Spiller, P. T., & Urbiztondo, S. (1994). Political appointees vs. career civil servants: A multiple principals theory of political bureaucracies. *European Journal of Political Economy*, *10*, 465-497.

Spiller, P. T., & Tommasi, M. (2008). The institutions of regulation: An application to public utilities. *In Handbook of new institutional economics (pp. 515-543)*. Springer, Berlin, Heidelberg.

Spiller, P. T. (2013). Transaction cost regulation. *Journal of Economic Behavior & Organization*, 89, 232-242.

Spiller, P. T. (1996). Institutions and commitment. *Industrial and corporate change*, 5(2), 421-452.

Steadman, K. U. (2011). *Essays on electricity theft.* State University of New York at Binghamton.

Steiner, F. (2001). Regulation, Industry Structure and Performance in the Electricty Supply Industry. *OECD Economic Studies*, 32.

Stern, J. (1997). What makes an independent regulator independent?. *Business Strategy Review*, 8(2), 67-74.

Stern, J. (2003, August). What the Littlechild Report actually said. *In PROCEEDINGS-CRI* (pp. 7-30).

Stern, J., & Cubbin, J. (2005). Regulatory effectiveness: The impact of regulation and regulatory governance arrangements on electricity industry outcomes. The World Bank.

Stern, J., & Holder, S. (1999). Regulatory governance: criteria for assessing the performance of regulatory systems: an application to infrastructure industries in the developing countries of Asia. *Utilities Policy*, 8(1), 33-50.

Stigler, G. J. (1971). The theory of economic regulation. *The Bell journal of economics and management science*, 3-21.

Tamanaha, B. Z. (2004). *On the rule of law: History, politics, theory*. Cambridge University Press.

Tasdoven, H., Fiedler, B. A., & Garayev, V. (2012). Improving electricity efficiency in Turkey by addressing illegal electricity consumption: A governance approach. *Energy Policy*, *43*, 226-234.

Tiba, S., & Omri, A. (2017). Literature survey on the relationships between energy, environment and economic growth. *Renewable and Sustainable Energy Reviews*, 69, 1129-1146.

Tiryaki, R. (2013). The Evolution of Turkish Electricity Market Regulation. Unpublished manuscript. Avaliable at: http://crninet. com/2013/2c.% 20Tiryaki-Paper. pdf [Last accessed on 12.03. 2017].

Tirole, J. (1999). Incomplete contracts: Where do we stand?. *Econometrica*, 67(4), 741-781.

Tullock, G. (1967). The welfare costs of tariffs, monopolies, and theft. *Economic Inquiry*, *5*(3), 224-232.

Ullah, K., Arentsen, M. J., & Lovett, J. C. (2017). Institutional determinants of power sector reform in Pakistan. *Energy policy*, 102, 332-339.

Urbiztondo, S. (1994). Investment without regulatory commitment: The case of elastic demand. *Journal of Regulatory Economics*, *6*(1), 87-96.

Vickers, J., & Yarrow, G. (1991). The British electricity experiment. *Economic Policy*, 6(12), 187-232.

Viscusi, W. K., Harrington Jr, J. E., & Vernon, J. M. (2005). *Economics of regulation and antitrust*. MIT press.

Weingast, B. R. (1995). The economic role of political institutions: Market-preserving federalism and economic development. *Journal of Law, Economics, & Organization*, 1-31.

Weingast, B. R. (1997). The political foundations of democracy and the rule of the law. American political science review, 91(2), 245-263.

Weingast, B. R. (2013). Why developing countries prove so resistant to the rule of law. *Global perspectives on the rule of law, in: Heckman, J. J., Nelson, R. L., & Cabatingan, L. (Eds.)*. Routledge. 28-51.

Wijayatunga, P. D., Fernando, W. J. L. S., & Shrestha, R. M. (2004). Impact of distributed and independent power generation on greenhouse gas emissions: Sri Lanka. *Energy conversion and management*, 45(20), 3193-3206.

Williamson, O. E. (1976). Franchise bidding for natural monopolies-in general and with respect to CATV. *The Bell Journal of Economics*, 73-104.

Williamson, O. E. (1979). Transaction-cost economics: the governance of contractual relations. *The journal of Law and Economics*, 22(2), 233-261.

Williamson, O. E. (1993). Opportunism and its critics. *Managerial and decision economics*, 14(2), 97-107.

Williamson, O. E. (1994). The institutions and governance of economic development and reform. *The World Bank Economic Review*, 8(suppl_1), 171-197.

Williamson, O. E. (1998). Transaction cost economics: how it works; where it is headed. *De economist*, 146(1), 23-58.

Williamson, O. E. (2000). The new institutional economics: taking stock, looking ahead. *Journal of economic literature*, 38(3), 595-613.

Williams, E. W., & Coase, R. H. (1964). The Regulated Industries-Discussion. *American Economic Review*, *54*(3), 192-197.

Williams, J. H., & Ghanadan, R. (2006). Electricity reform in developing and transition countries: A reappraisal. *Energy*, *31*(6-7), 815-844.

Winther, T. (2012). Electricity theft as a relational issue: A comparative look at Zanzibar, Tanzania, and the Sunderban Islands, India. *Energy for Sustainable Development*, 16(1), 111-119.

World Bank. (1997). *World development report 1997: The state in a changing world*. Oxford University Press, Incorporated.

World Bank. (1994). *World Development Report 1994: Infrastructure for Development: Executive Summary*. World Bank.

World Bank. (2003). World Development Report 2003:Sustainable Development in a Dynamic World--Transforming Institutions, Growth, and Quality of Life

World Bank. (2015). *Turkey's energy transition milestones and challenges*. Washington, D.C.: World Bank Group.

World Bank. (2017). *World Development Report 2017 Governance and the Law*. Washington, D.C.: World Bank Group.

Xu, G. (2011). The role of law in economic growth: a literature review. *Journal of Economic Surveys*, 25, 833-871.

Yurtseven, Ç. (2015). The causes of electricity theft: An econometric analysis of the case of Turkey. *Utilities Policy*, 37, 70-78.

Zhang, Y. F. (2010). Towards Better Regulatory Governance? Regulatory reform in selected developing countries, 2003–7. *Public Management Review*, 12(6), 873-891.

Zhang, Y., Parker, D., & Kirkpatrick, C. (2005). Competition, regulation and privatisation of electricity generation in developing countries: does the sequencing of the reforms matter?. *The Quarterly Review of Economics and Finance*, 45(2-3), 358-379.

Zhang, Y. F., Parker, D., & Kirkpatrick, C. (2008). Electricity sector reform in developing countries: an econometric assessment of the effects of privatization, competition and regulation. *Journal of Regulatory Economics*, 33(2), 159-178.

APPENDICIES

Appendix A. List of Country Groups

High-income	Upper Middle-income	Lower Middle-income	Low-income
Australia	Algeria	Bangladesh	Congo, Dem. Rep.
Belgium	Belarus	Bolivia	Eritrea
Canada	Brazil	Cameroon	Ethiopia
France	Bulgaria	Egypt, Arab Rep.	Haiti
Greece	Dominican Rep.	Georgia	Mozambique
Ireland	Jamaica	India	Nepal
Italy	Malaysia	Indonesia	Senegal
Netherlands	Mexico	Kenya	Syrian Arab Rep.
Norway	Namibia	Nigeria	Tajikistan
Portugal	Paraguay	Pakistan	Tanzania
Spain	South Africa	Sri Lanka	Togo
Sweden	Thailand	Sudan	Yemen, Rep.
Switzerland	Turkey	Ukraine	Zimbabwe
United Kingdom	Russian Fed.	Ghana	
United States	China	Kyrgyz Rep.	
Uruguay	Azerbaijan	Morocco	
Argentina	Colombia	Tunisia	

Appendix B. Regulatory Quality

Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. This table lists the individual variables from each data source used to construct this measure in the Worldwide Governance Indicators

Code	Concept Measured
Representative Sources	
EIU	Unfair Competitive Practices Price Controls Discriminatory Tariffs Excessive Protections Discriminatory Taxes
GCS	Burden of Government Regulations Extent and Effect of Taxation Prevalence of Trade Barriers Intensity of Local Competition Ease of starting a new business Effectiveness of anti-trust policy Stringency of environmental regulations
HER	Investment Freedom Financial Freedom
IPD	Ease of starting a business governed by local law? Ease of setting up a subsidiary for a foreign firm? Share of administered prices

	Does the State subsidize commodity prices (i.e. food and other essential goods, excluding oil)? Does the State subsidize the price of petrol at the pumps? Importance, de facto, of barriers to entry for new competitors in markets for goods and services (excluding the financial sector and beyond the narrow constraints of the market)… related to the administration (red tape etc.) Importance, de facto, of barriers to entry for new competitors in markets for goods and services (excluding finance and beyond the narrow constraints of the market)… related to the practices of already established competitors Efficiency of competition regulation in the market sector (excluding financial sector)
PRS **WMO**	Investment profile *Regulatory burden.* The risk that normal business operations become more costly due to the regulatory environment. This includes regulatory compliance and bureaucratic inefficiency and/or opacity. Regulatory burdens vary across sectors so scoring should give greater weight to sectors contributing the most to the economy.

	Tax inconsistency. Tax inconsistency also captures the risk that fines and penalties will be levied for non-compliance with a tax code that appears disproportionate or manipulated for political ends.
Non-representative Sources	
ADB	Trade policy
ASD	Regional integration Business regulatory environment Trade policy
BPS	Business regulatory environment How problematic are labor regulations for the growth of your business? How problematic are tax regulations for the growth of your business? How problematic are customs and trade regulations for the growth of your business?
BTI	Organization of the Market and Competition
EBR	Price liberalisation Trade & foreign exchange system Competition policy
IFD	Enabling conditions for rural financial services development Investment climate for rural businesses Access to agricultural input and product markets
PIA	Business regulatory environment

	Trade policy
WCY	Protectionism in the country negatively affects the conduct of business
	Competition legislation in your country does not prevent unfair competition
	Price controls affect pricing of products in most industries
	Access to capital markets (foreign and domestic) is easily available
	Ease of doing business is not a competitive advantage for your country
	Financial institutions' transparency is not widely developed in your country
	Customs' authorities do not facilitate the efficient transit of goods
	The legal framework is detrimental to your country's competitiveness
	Foreign investors are free to acquire control in domestic companies
	Public sector contracts are sufficiently open to foreign bidders
	Real personal taxes are non distortionary
	Real corporate taxes are non distortionary
	Banking regulation does not hinder competitiveness
	Labor regulations hinder business activities
	Subsidies impair economic development
	Easy to start a business

WJP	Factor 6: Regulatory Enforcement

Code	**Data Source Name**
ADB	African Development Bank Country Policy and Institutional Assessments
AFR	Afrobarometer
ASD	Asian Development Bank Country Policy and Institutional Assessments
BPS	Business Enterprise Environment Survey
BTI	Bertelsmann Transformation Index
CCR	Freedom House Countries at the Crossroads
EBR	European Bank for Reconstruction and Development Transition Report
EIU	Economist Intelligence Unit Riskwire & Democracy Index
FRH	Freedom House
GCB	Transparency International Global Corruption Barometer Survey
GCS	World Economic Forum Global Competitiveness Report
GII	Global Integrity Index
GWP	Gallup World Poll
HER	Heritage Foundation Index of Economic Freedom

HUM	Cingranelli Richards Human Rights Database and Political Terror Scale
IFD	IFAD Rural Sector Performance Assessments
IJT	iJET Country Security Risk Ratings
IPD	Institutional Profiles Database
IRP	IREEP African Electoral Index
LBO	Latinobarometro
MSI	International Research and Exchanges Board Media Sustainability Index
OBI	International Budget Project Open Budget Index
PIA	World Bank Country Policy and Institutional Assessments
PRC	Political Economic Risk Consultancy Corruption in Asia Survey
PRS	Political Risk Services International Country Risk Guide
RSF	Reporters Without Borders Press Freedom Index
TPR	US State Department Trafficking in People report
VAB	Vanderbilt University Americas Barometer
VDM	Varieties of Democracy Project
WCY	Institute for Management and Development World Competitiveness Yearbook

WJP	World Justice Project Rule of Law Index
WMO	Global Insight Business Conditions and Risk Indicators

Appendix B. Rule of Law

Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. This table lists the individual variables from each data source used to construct this measure in the Worldwide Governance Indicators

Code	Concept Measured
Respresentative Sources	
EIU	Violent crime
	Organized crime
	Fairness of judicial process
	Enforceability of contracts
	Speediness of judicial process
	Confiscation/expropriation
	Intellectual property rights protection
	Private property protection
GCS	Business Cost of Crime and Violence
	Cost of Organized Crime
	Reliability of Police Services
	Judicial Indepdendence
	Efficiency of Legal Framework for Challenging Regulations
	IPR protection
	Property Rights
	Informal Sector
GWP	Confidence in the police force
	Confidence in judicial system

	Have you had money property stolen from you or another household member? Have you been assaulted or mugged?
HER	Property Rights
IPD	Degree of security of goods and persons by criminal organizations (drug trafficking, weapons, prostitution...) Degree of judicial independence vis-à-vis the State Degree of enforcement of court orders Timeliness of judicial decisions Equal treatment of foreigners before the law (compared to nationals) Practical ability of the administration to limit tax evasion Efficiency of the legal means to protect property rights in the event of conflict between private stakeholders? Generally speaking, does the State exercise arbitrary pressure on private property (e.g. red tape...)? Does the State pay compensation equal to the loss in cases of expropration (by law or fact) when the expropriation concerns land ownership? Does the State pay compensation equal to the loss in cases of expropration (by law or fact) when the expropriation concerns production means?

	Degree of observance of contractual terms between national private stakeholders
	Degree of observance of contractual terms between national and foreign private stakeholders
	In the past 3 years, has the State withdrawn from contracts without paying the corresponding compensation... vis-à-vis national stakeholders?
	In the past 3 years, has the State withdrawn from contracts without paying the corresponding compensation... vis-à-vis foreign stakeholders?
	Respect for intellectual property rights relating to… trade secrets and industrial patents
	Respect for intellectual property rights relating to… industrial counterfeiting
	Does the State recognize formally the diversity of land tenure system?
PRS	Law and Order
TPR	Trafficking in People
VDM	Liberal component index (measuring rule of law, judicial independence, checks and balances)
WMO	*Expropriation.* The risk that the state or other sovereign political authority will

	deprive, expropriate, nationalise, or confiscate the assets of private businesses, whether domestic or foreign. *State contract alteration.* The risk that a government or state body alters the terms of, cancels outright, or frustrates (usually through delay) contracts it has with private parties without due process. *Contract enforcement.* The risk that the judicial system will not enforce contractual agreements between private-sector entities, whether domestic or foreign, due to inefficiency, corruption, bias, or an inability to enforce rulings promptly and firmly.
	Contract enforcement. The risk that the judicial system will not enforce contractual agreements between private-sector entities, whether domestic or foreign, due to inefficiency, corruption, bias, or an inability to enforce rulings promptly and firmly.
Non-representative Sources	
ADB	Property rights and rule based governance
AFR	Over the past year, how often have you or anyone in your family feared crime in your own home?

	Over the past year, how often have you or anyone in your family had something stolen from your house? Over the past year, how often have you or anyone in your family been physically attacked? How much do you trust the courts of law? Trust in police
ASD	Property rights and rule based governance
BPS	How often is following characteristic associated with the court system: Fair and honest? How often is following characteristic associated with the court system: Enforceable? How often is following characteristic associated with the court system: Quick? How problematic is crime for the growth of your business? How problematic is judiciary for the growth of your business?
BTI	Separation of powers Independent Judiciary Civil rights
CCR	Rule of Law
FRH	Judicial framework and independence (FNT)
GII	Public Management

	Rights Gender
IFD	Access to land Access to water for agriculture
LBO	Trust in Judiciary Trust in Police Have you been a victim of crime?
PIA	Property rights and rule based governance
VAB	Trust in supreme court Trust in justice system Trust in police Have you been a victim of crime?
WCY	Tax evasion is a common practice in your country Justice is not fairly administered in society Personal security and private property are not adequately protected Parallel economy impairs economic development in your country Patent and copyright protection is not adequately enforced in your country
WJP	Factor 3.1: Crime is effectively controlled (Order and Security) Factor 7: Civil Justice Factor 8: Criminal Justice

Code	Data Source Name
ADB	African Development Bank Country Policy and Institutional Assessments
AFR	Afrobarometer
ASD	Asian Development Bank Country Policy and Institutional Assessments
BPS	Business Enterprise Environment Survey
BTI	Bertelsmann Transformation Index
CCR	Freedom House Countries at the Crossroads
EBR	European Bank for Reconstruction and Development Transition Report
EIU	Economist Intelligence Unit Riskwire & Democracy Index
FRH	Freedom House
GCB	Transparency International Global Corruption Barometer Survey

CIRRICULUM VITAE

GAMZE KARGIN AKKOÇ

Adress: Ankara Yıldırım Beyazıt University, Esenboğa Kampüsü, Esenboğa/ANKARA

Email: gamzekargin@gmail.com

gkargin@ybu.edu.tr

EDUCATIONAL BACKGROUND

Ankara Yıldırım Beyazıt University, Ankara, TURKEY: July 2019

Ph.D., Economics

Ankara Yıldırım Beyazıt University, Ankara, TURKEY: August 2013

M.A., Economics

Dokuz Eylül University, İzmir, TURKEY: June 2009

B.A., Economics

PROFESSIONAL EXPERIENCE

Research Assistant, Department of Economics, Faculty of Political Sciences, Ankara Yıldırım Beyazıt University, Ankara, TURKEY, August 2011-

PUBLICATIONS

Durusu Çiftçi, Dilek; Kargın Akkoç, Gamze (2019). "Convergence of Crime in Turkey: Time Series Analysis with Accounting Structural Breaks." Finans Politik Ekonomik Yorumlar, 56(647), 101-123.

Akkoç, Uğur; Kargın Akkoç, Gamze (2017); "Analysis of Fiscal Sustainability in Turkey via Quantile Cointegration", Maliye Dergisi. (Emerging Sources Citation Index).

Kargın Akkoç, Gamze; Akkoç, Uğur; Fikirli, Özlem (2018); "Total Factor Productivity and Technology Transfer in Brics-T Countries", Uluslararası İktisadi ve İdari İncelemeler Dergisi(21), 101-118., Doi: 10.18092/ulikidince.349292

BOOKS AND BOOK CHAPTERS

Cyrptocurrencies in all Aspects, ”Does Bitcoin Act As a Hedge Evidence From Turkey” (2019), edited by Fatih Ayhan and Burak Darıcı.

AWARDS, SCHOLARSHIPS, AND FELLOWSHIPS

The Scientific and Technological Research Council of Turkey, National Scholarship Programme for PhD Students. 2014-present.

Organizing Committee Member, 37th International Conference of IATUR “Time Use Research and Well-Being: Past, Present and Future”, 5-7 August, 2015.

Erasmus Scholarship, Univerzita J. E. Purkyně v Ústí nad Labem, Czech Republic, 2007- 2008.

15th International Student Congress Encouragement Award. İzmir, Turkey, 2012.

TURKISH SUMMARY

Bu tez çalışmasının temel amacı, kurumların elektrik sektöründeki rolünü incelemektir. Bu amaca ulaşmak için yeni kurumsal iktisat yaklaşımı kullanılmıştır. Yeni kurumsal iktisat (YKİ), ülkelerin iktisadi performanları ya da ülkeler arasındaki performans farklılıkları araştırılırken kurumların rolünün ihmal edilemeyeceğini belirtir. Douglas North kurumları "oyunun kuralları" olarak tanımlar ve kurumları oluşturanın iktisadi, sosyal ve politik etkileşimler olduğunu belirtir. YKİ tam bilgi, sınırsız rasyonalite, sıfır işlem maliyeti gibi neoklasik varsayımları reddetmektedir (Menard ve Shirley, 2005). Çünkü bu varsayımlar ekonomik performans farklılıklarını açıklamada yetersiz kalmaktadır. Bunlar yerine YKİ asimetrik bilgi, sınırlı rasyonalite ve pozitif işlem maliyetleri varsayımlarını kabul etmektedir.

Altyapı endüstrilerinde devletin rolü zamanla değişmektedir. 1990'ların başında, müdahaleci devlet yaklaşımı yerine düzenleyici devlet yaklaşımının benimsenmesi ile birlikte daha iyi düzenleme (better regulation) ve iyi yönetişim (good governance) kavramları önem kazanmıştır (Zhang, 2010). Özellikle altyapı endüstrilerinin diğer endüstrilerden ayrışan spesifik özelliklere sahip olması, bu endüstrilerde düzenleme ihtiyacını ortaya çıkarmaktadır. Bu özellikler şu şekildedir; büyük ölçek ve kapsam ekonomileri, yüksek batık maliyetler ve geniş kitlesel kullanım. Altyapı varlıkları yüksek sermaye girdisi gerektirdiğinden dolayı yatırımcılar, düzenleyici riskler ile daha çok karşı karşıya kalmaktadır. Bu durumda ölçek ve kapsam ekonomileri piyasadaki rekabeti sınırlandırmaktadır. Aynı zamanda enerji, su, ulaştırma ve telekomünikasyon gibi kamu hizmetleri çok sayıda kullanıcı tarafından tüketilmektedir. Sonuç olarak yukarıda sayılan üç özellik sözleşmeden doğan sorunlar ve kamu hizmetleri fiyatlandırmasının politikleşmesi nedeniyle devlet düzenlemesini gerektirmektedir (Stern ve Holder, 1999; Holburn ve Spiller, 2002; Spiller ve Tommasi, 2008).

Yeni kurumsalcı yaklaşım, kurumsal çevre (institutional environment) ve yönetişimi (governance) birleştirmektedir (Williamson, 2000). Levy ve Spiller (1994) bu kombinasyonu altyapı endüstrilerine uygulamaktadır. Bu durumda, düzenleyici etkinlik ve düzenleyici teşvikler (örn. regülasyonun amaçları ve araçları), düzenleyici takdir yetkisini kısıtlama mekanizması olan düzenleyici yönetişim tarafından belirlenmektedir. YKİ'a göre regüle edilen endüstrilerin bazı spesifik özelliklerinden dolayı düzenlenme ihtiyacı vardır. Ancak regülasyonlar rant arayışı ve fırsatçılığa neden olabilmektedir. Dolayısıyla, regüle edilen endüstrilerin iktisadi, sosyal ve politik yönlerini birlikte değerlendirmek gerekmektedir (Spiller ve Tommasi, 2005).

Bu bağlamda, tezin ilk kısmı, yeni kurumsalcı yaklaşımın daha iyi anlaşılabilmesi için düzenlemelerin teorik olarak gözden geçirilmesini sunmaktadır. Regülasyon teorileri, kamu yararı teorisinden bu yana farklı teoriler ve eleştiriler ile genişlemiştir. Kamu yararı teorisi, piyasa başarısızlığının varsayımları altında devlet müdahalesinin gerekliliğini savunmaktadur. Ancak 1970'lere gelindiğinde, ampirik çalışmalar ve doğal tekel teorisindeki ilerlemeler, güçlü devlet müdahalesi fikrini zayıflatmıştır. Daha sonra, ekonomik düzenleme teorisi (Stigler,1971; Posner,1974; Peltzman, 2000), baskı gruplarının refahını maksimize etmenin tekel gücüne yol açtığı yönündeki argümanlarını sunmuştur. Bu yaklaşım, hem siyaset bilimi hem de rant arayışı ve düzenleme tuzağı (regulatory capture) gibi iktisadi araçları da kullanmaktadır. Buna ek olarak, Buchanan (1980), Tullock (1967) ve Krueger (1974), rant arama faaliyetlerinin devletin başarısızlığına neden olan verimsiz sonuçlar ortaya çıkardığını vurgulamaktadır. Laffont (1999), Tirole (1999), Baron ve Myerson (1982) ise asimetrik bilginin düzenleyici sözleşmelerdeki rolünü araştırmaktadır. Bu yaklaşım, asimetrik bilginin ve eksik sözleşmelerin yatırım kararlarını nasıl etkilendiğini "incentive regulation theory" (güdü regülasyonu teorisi) çerçevesinde incelemektedir. Bu gelişmeler ışığında, altyapı endüstrilerinin düzenlenmesi rekabet ve özelleştirme politikalarını içermeye başlamıştır.

Regülasyonun ekonomik teorisi, kamu tercihi ve güdü regülasyonu teorileri, düzenleyici politika çıktılarını anlamak için bazı kurumsal ekonomi araçlarını ele almaktadır. Ancak YKİ yaklaşımı, düzenleyici kurumların kurumsal yönlerini ve düzenleyici performansı vurgulayarak düzenlemeler ile ilgili yaklaşımları bir adım daha ileri götürmektedir (Spiller ve Tommasi, 2008). Williamson (1994), işlem maliyetleri ekonomisinde yönetişim yaklaşımını sunarken, Levy ve Spiller (1994), düzenleyici amaçlardan ziyade düzenleyici yönetişimin önemini vurgulamaktadır. Çünkü iyi düzenleyici yönetişim, sağlam ve istikrarlı kurallar ve iyi dizayn edilmiş düzenleyici süreç endüstrinin performansını arttırmaktadır. Düzenleyici yönetişim, kurumsal çerçevesi zayıf olan gelişmekte olan ve geçiş ekonomileri için elektrik reformları sırasında daha da önemli bir sorun haline gelmiştir. Özellikle gelişmiş ve gelişmekte olan ülkeler arasındaki ekonomik performans farklılıklarının nedenleri içerisinde hukukun üstünlüğünün daha baskın olduğu belirtilmektedir (Dam, 2007; Haggard vd., 2008).

Yeni kurumsalcı yaklaşım temel olarak işlem maliyetlerini ve düzenleyici taahhütleri vurgulamaktadır. İşlem maliyetleri, düzenlemelerin eksik sözleşme özelliği nedeniyle ortaya çıkmaktadır. Dolayısıyla, bu maliyetler düzenleyici taahhüt sorunları yaratır. Ayrıca, düzenleme sürecinde ön plana çıkan düzenleyici yönetişim ve hukukun üstünlüğü regüle edilen endüstriler ve elektrik piyasası özelinde tartışılmaktadır. Odak noktamız elektrik reformu ve düzenlemesi için öne çıkan bu kurumsal bileşenlerin araştırılmasıdır. Elektrik reformları 1980'lerin başlarından itibaren gelişmiş ve gelişmekte olan ülkelerde uygulanmaktadır. Birçok araştırma ve uluslararası finansal kuruluş, düzenleyici yönetişimin artırıcı etkilerinin ihmal edilemeyeceğini göstermektedir. Bu noktada, düzenleme sürecindeki hukukun üstünlüğünün de rolü ve önemini tartışarak daha geniş bir perspektif sunmayı amaçlamaktayız. Buna göre, teşvik bazlı fiyat düzenlemesi ile iletim ve dağıtım kayıpları, düzenleyici yönetişim ve hukukun üstünlüğü ile yakından ilgili olan iki alandaki mevcut durumlar tartışılmaktadır. Çünkü düzenleyici yönetişim ve hukukun üstünlüğünün zayıf olduğu

endüstrilerde, fiyat ya da gelir tavanı düzenlemelerinin uygulanması ve elektrik kayıplarının azaltılması güçleşmektedir.

Gelişmiş ve gelişmekte olan birçok ülke son otuz yıldır altyapı reformlarını gerçekleştirmektedir. Serbestleşme hareketi ve kamu mülkiyetinin düşük performansı ile siyasi değişimler özelleştirmeyi tetiklemiştir. Ayrıca, uluslararası finansal kuruluşlar, özellikle gelişmekte olan ve daha az gelişmiş ülkeler için altyapı reform ve regülasyonlarının gerçekleştirilmesinde destekleyici kuruluşlar olmuşlardır. Bu durumun başlıca nedenleri zayıf yönetişim, zayıf sektörel performans, politik ve sosyal müdahaleler, makroekonomik koşullar ve ekonomik krizlerdir. Özellikle, yönetişim veya daha spesifik olarak düzenleyici yönetişim, reformların etkinliği için kritik bir faktör olarak kabul edilmiştir (Kirkpatrick, 2006). Gelişmiş ülkeler, reform süreçlerinde nispeten daha iyi performans gösterdiğinden, gelişmekte olan ülkelerdeki zayıf performansın nedenleri daha da önemli hale gelmiştir. Bu süreçte, altyapı reformu ve düzenlemesinin etkinliğini artırmak için düzenleyici yönetişimin ve daha iyi kurumsal çerçevenin önemi ön plana çıkmıştır.

Yeni Kurumsal İktisat literatüründe (örn., North, 1989; Rodrik, 2000; Acemoglu ve Robinson, 2005) iktsadi aktörlerin davranış ve kararlarını şekillendirmesi beklenen politik, sosyal, ekonomik ve yasal kurumların uzun vadeli ekonomik büyüme üzerindeki etkileri sıkça vurgulanmaktadır. Ekonomik büyümenin yanı sıra, kurumların ekonomik performans üzerindeki etkileri de birçok çalışmaya konu olmuştur. Örneğin, literatürde doğrudan yabancı yatırımlar (Buss eve Hefeker, 2007; Benassy-Quere vd.,2007), girişimcilik (Acs vd., 2008), altyapı yatırımları (Henisz, 2002) ve ticaret (Dolar ve Kraay, 2003) ile kurumlar arasındaki ilişkiler gibi geniş yelpazeli çalışma alanları mevcuttur. Bununla birlikte regüle edilen endüstrilerde kurumların rolünü araştıran çalışmalar son yıllarda giderek artsa da sınırlı sayıda kalmıştır. Altyapı endüstrileri ekonomik büyüme, gelişme ve refah için önemli bir rol oynamaktadır. Bununla birlikte, kurumsal zayıflıklar ve kötü yönetişim altında bazı

spesifik özelliklere sahip endüstrilerin performansını iyileştirmek güçleşmektedir (World Bank, 1994). Levy ve Spiller (1994)'e göre, regüle edilen endüstrilerin reform performansları ülkeden ülkeye değişiklik gösterirken, bunun en önemli nedenlerinden biri düzenleyici yönetişimdir. Öyle ki, regülatif süreçler düzenleyici yönetişim ve düzenleyici araçlar (ya da teşvikler) olmak üzere iki yönlü bir tasarım problemi olarak ele alınmalıdır. Levy ve Spiller (1994) düzenleyici yönetişimi düzenleyici takdir yetkisini sınırlayan ve çatışmaları çözen bir sistem olarak tanımlarken, düzenleyici teşvikleri fiyatlandırma, sübvansiyonlar, giriş kontrolleri vb. araçlar veya amaçlar olarak tanımlamaktadır. Aynı zamanda, regülatif süreçler kurumsal bir tasarım gerektirmektedir. Öyle ki, Douglas North (1991), politik ve ekonomik kurumlar tarafından uyumlu bir şekilde uygulanan politikaların ekonomilerde verimli ve rekabetçi piyasalar oluşturulabileceğini belirtmektedir. Düzenleyici yönetişim, endüstrilerin performansını iyileştirmeye yönelik teşvikleri güçlendirmelidir. Cooter (1996) ve Weingast (1997) bu güçlendirme mekanizmasını hukukun üstünlüğü olarak tanımlamaktadır. Dahası, hem teorik hem de kavramsal çalışmalar, hukukun üstünlüğünün yönetişimin ve kurumsal kalitenin daha iyi bir ölçüsü ve göstergesi olduğunu vurgulamaktadır (Knack ve Keefer, 1995; Butkiewicz ve Yanikkaya, 2006; Haggard ve Tiede, 2011).

Regülatif süreçlerdeki değişen yapıyı daha iyi anlayabilmek amacıyla, regüle edilen endüstrilerin tarihsel olarak dönüşümünü incelemek amacıyla, elektrik reformlarının nedenleri ve sonuçlarını tartışmak yol gösterici olacaktır. Elektrik piyasasındaki reformlar, 1980'lerin başından itibaren ideolojik ve iktisadi nedenlerden dolayı geniş çapta yaygınlaşmıştır. Geleneksel düzenleme formlarının altyapı endüstrilerinde verimsizliklere neden olması sonucunda özel mülkiyet, rekabet, ayrıştırma (unbundling), teşvik bazlı fiyat düzenlemesi ve bağımsız düzenleyici kurumların öne çıkması ile elektrik piyasasında da düzenleyici süreçler yeniden şekillenmiştir (Newberry, 2002). Elektrik reformlarının itici gücü gelişmiş ve gelişmekte olan ülkeler için değişmekle beraber, reformların ana unsurları benzerdir. Jamasb vd. (2005),

gelişmekte olan ülkeler için faktörleri "push" (itici) ve "pull" (çekici) faktörler olarak sınıflandırmaktadır. İtici faktörler, kamu hizmetlerinin spesifik özellikleriyle daha fazla ilgilidir. Bunlar kamu sahipliğindeki altyapı endüstrilerinin düşük performansı, yüksek maliyetler, yüksek ve artan talep, eksik yatırımlar, yüksek kayıplar ve teknolojik gelişmeleri uygulamada geride kalınması olarak özetlenebilir. Gelişmiş ülkeler ve Latin Amerika ülkelerindeki reformların görece daha başarılı olması, Dünya Bankası ve IMF'nin kurumsal yeniden yapılanma konusundaki teşvikleri, gelişmekte olan ve az gelişmiş ülkelerdeki başarısızlıkların nedenlerini daha da kritik hale getirmiştir. Bununla birlikte gelişmekte olan ülkeler, zayıf kurumsal faktörler nedeniyle regüle edilen endüstrilerin performansını arttırma konusunda güçlükler yaşamıştır. Bu sonuç, iyi yönetişimin ve regüle edilen endüstriler için ülkelerin kurumsal kalitelerinin önemini daha da ön plana çıkarmıştır.

Elektrik sektörü reformları, kullanım kapasitesini, yatırımları, verimliliği arttırmayı ve elektrik kayıplarını azaltmayı amaçlamaktadır. Bu alandaki ampirik çalışmalar (örn., Cubbin ve Stern, 2006; Zhang vd., 2005, 2008; Erdogdu, 2011), daha iyi düzenleyici yönetişimin reformların etkinliği üzerindeki önemli etkisini vurgulamaktadır. Ayrıca, özelleştirme, rekabet, bağımsız düzenleyici kurumların ve daha iyi düzenleyici yönetişimin varlığında üretim kapasitesi artmaktadır. Reformun etkilerini araştıran çalışmaların ortak bulguları, kurumsal faktörler üzerine de bazı güçlü sonuçlar ortaya koymaktadır. İlk olarak, bağımsız düzenleyici kurumların varlığı, sektörel yatırım ve verimliliği artırıcı etki yaratmaktadır. Bir yandan reformun ana elementleri uygulamaya konmadan önce kurulmuş olan bağımsız düzenleyiciler özelleştirme, ayrıştırma ve rekabetin teşvik edilmesinden beklenen sonuçları alırken, eğer bağımsız düzenleyiciler piyasanın yeniden yapılandırılmasından sonra kurulmuşsa, beklenen etki ortaya çıkamayabilmekte ya da etki daha yavaş ortaya çıkabilmektedir.

Altyapı reformları, gelişmekte olan ülkeler için genel olarak düşük üretim kapasitesi, eksik yatırım ve yüksek iletim ve dağıtım kayıpları nedeniyle gerekli hale gelmiştir.

Bu alandaki çalışmalar da genellikle reform unsurlarının etkinliğini ölçerken performans göstergesi olarak üretim kapasitesi ve elektrik kayıplarını kullanmaktadır. İletim ve dağıtım kayıplarının teknik kısmı reformların ilk aşamalarında önemli ölçüde azaltılmıştır. Ancak, teknik olmayan kayıplar gelişmekte olan ülkeler için bir sorun olmaya devam etmiş ve bu kayıpları azaltmak güç olmuştur. Aynı zamanda, teknik olmayan kayıplar elektrik piyasası için hala önemli bir sorun teşkil etmektedir.

Gelişmekte olan ülkelerin reform süreçlerinde uygulamada güçlük çektiği bir diğer unsur da gelir ya da fiyat tavanı modelleri olmuştur. Birçok ülke ilk olarak İngiltere'de sunulduğu için İngiltere Modeli olarak adlandırılan ve fiyat tavanı ve piyasasının yeniden yapılandırılmasını içeren modeli kullanmaya başlamıştır. Bu model aynı zamanda piyasının yeniden yapılandırılması için bazı kilit noktalar da sunmaktadır. Model, teşvik esaslı düzenleme ile rekabete ve özelleştirmeye odaklanan ve yatırım ve verimliliği artıran temel karakteristikleri gerektirmektedir. Teşvik bazlı düzenlemeler farklı biçimler alsa da, çoğu ülke reformun erken aşamalarında maliyet esaslı düzenlemeye alternatif olarak fiyat tavanı ya da gelir tavanı düzenlemelerinden yaygın olarak yararlanmıştır. Temel amaç, tüketicilere fayda sağlayabilecek yatırım ve verimliliği artırmak için etkin teşvik mekanizmaları sağlamaktır (Jamasb ve Pollitt, 2000). Bununla birlikte, teşvik bazlı düzenlemelerden verimlilik kazanımlarının elde edilmesi, bazı düzenleyici ve kurumsal yönleri gerektirmesi nedeniyle daha güç olabilmektedir. Littlechild ve Beesley (1989), RPI-X modelinin etkinliğinin regülatif süreçlerin bir bütün olarak etkinliğinin sağlanmasına dayandığını vurgulamaktadır.

Kurumsal faktörler ile düzenleyici yönetişim arasında güçlü ilişkiler olsa da, bunların belirleyicileri ya da etkileri regüle edilen endüstriler için sınırlı sayıda çalışmaya konu olmuştur. Levy ve Spiller (1994), Stern ve Holder (1999) ve Spiller ve Tommasi (2008), düzenleyici yönetişimin belirleyicilerini kurumsal açıdan incelemektedir. Bu anlamda, North'un kurumsal birikim hakkındaki argümanı çok sık kullnılmaktadır. Bu nedenle, ülkelerin kurumsal birikimleri yasama, yürütme ve yargı kurumları, normlar,

gelenekler veya vatandaşların davranışları, sosyal çıkarlar ve idari yeteneklerle tanımlanır. Tüm bu kilit nitelikler, düzenleme sürecinde düzenleyici yönetişimi gösteren hesap verebilirlik, şeffaflık, meşruiyet, öngörülebilirlik ve özerklik ile de doğrudan ilişkilidir. Ayrıca, reformun en zorlu yanı, reform unsurlarını zayıf düzenleyici kural yapımı ve yönetişim altında uygulamaktır. Ayrıca, reform deneyimleri elektrik kayıplarının azaltılmasının ve teşvik esaslı düzenlemeler yoluyla verimliliğin sağlanmasının, hukukun üstünlüğü ile yakından ilişkili olan kurumsal birikime, yönetişime ve uygulama yeteneklerine bağlı olduğu ortaya çıkmaktadır.

Tezin üçüncü bölümünü oluşturan ikinci makale çalışması, Türkiye elektrik piyasası için hukukun üstünlüğü ile tarife yapısı ve elektrik kayıpları arasındaki ilişkiyi araştırmaktadır. Çalışmada, regüle edilen endüstriler için hukukun üstünlüğünün göstergesi olabilecek kriterler de sunulmaktadır. Hukukun üstünlüğü ile düzenleyici politika arasındaki bağlantı genellikle elektrik piyasalarında göz ardı edilmiştir. Yasal ve fiili bağımsızlık arasındaki tutarsızlık, regüle edilen endüstriler için hukukun üstünlüğünün varlığında bir gösterge olmaktadır. Buradan hareketle, tezin üçüncü bölümünde regüle edilen endüstriler için hukukun üstünlüğünün varlığını araştırarak, Türkiye elektrik piyasası için bir değerlendirme sunulmaktadır. Türkiye elektrik piyasası için hukukun üstünlüğünün etkilerini araştırmak için tarife yapısı ve kaçak elektrik kullanımı ile ilgili politikalar ve kararlar esas alınmıştır. Tarife yapısının ve yüksek kaçak elektrik oranlarının Türkiye elektrik piyasasında hukukun üstünlüğünün kurumsallaşmasını güçleştirdiği görülmektedir.

Hukukun üstünlüğü, otuz yılı aşkın bir süredir düzenleyici reformlarda kilit rol oynamıştır. Düzenleyici reformlar genellikle altyapı işletmelerinin serbestleştirilmesinin yanı sıra devlet işletmelerinin özelleştirmelerini de içermektedir. Serbestleşme programları, devlet oportünizmini azaltarak ve yatırımları artırarak verimliliği ve rekabeti arttırma konusunda ortak hedeflere sahiptir (Spiller ve Tommasi, 2008; Berg ve Desai, 2013). Ağ endüstrileri, onları diğer endüstrilerden

ayıran bazı özelliklere sahiptir. İlk olarak, büyük ölçekli üretim ve yüksek batık maliyetlerin gereksinimi, yüksek varlık özgüllüğü ve gelecekteki karlar için hükümete bağımlılığa yol açmaktadır. Ayrıca, bu batık maliyetler ve yüksek sermaye yoğunluğu, sürdürülebilir verimlilik ve büyüme için etkili bir kurumsal yapı gerektirmektedir (Spiller ve Tommasi, 2008; Cubbin ve Stern, 2006). İkincisi, kapsam ekonomileri ve piyasa yapısının sürekli dönüşümü (örneğin dikey entegrasyon veya reformlar) düzenleyici yapı tarafından getirilmektedir. Bu yapı, rant arayışı davranışlarını teşvik edebilir. Son olarak, kamu hizmetleri tüm toplum tarafından tüketilir. Hizmetin herhangi bir şekilde bozulması, hükümetler, çıkar grupları veya bireyler üzerinde farklı sonuçlar doğurabilir. Elektriğin ve diğer kamu hizmet kuruluşlarının diğer endüstrilerden ayırt edici özellikleri, bu endüstrileri hukukun üstünlüğünün olmadığı zamanlarda daha savunmasız hale getirmektedir (Holburn ve Spiller, 2002).

Son yıllarda, regülen edilen endüstrilerde reformların uygulanması daha zor hale gelmiştir. Özellikle gelişmekte olan ülkelerde, dünya genelinde devletin katılımının artması yaygınlaşmıştır (Robinson ve Acemoglu, 2012; Weingast, 2013; Hadfield ve Weingast, 2014). Serbestleşme cazibesini yitirmeye başlamış ve birçok gelişmekte olan ülkede verimlilik ile politik çıkarlar arasında değişimler yaşanmaya başlanmıştır. Tezin üçüncü bölümünü oluşturan makale, elektrik piyasası üzerinde durarak hukuk devleti ile düzenleme arasındaki bağlantıyı incelemektedir. Regüle edilen endüstrilerdeki kurumsal sorunları son dönemdeki Türkiye elektrik piyasasındaki seçilmiş deneyimlere odaklanarak ele almayı amaçlamaktayız. Hukukun üstünlüğü literatürde göreceli olarak göz ardı edildiğinden, öncelikle tanımlamalara odaklanarak, hukukun üstünlüğünün düzenleyici bir çerçevede nasıl tanımlanacağı ile ilgili bir yaklaşım sunmaktayız.

Hukukun üstünlüğünün elektrik piyasasındaki düzenlemeler üzerindeki etkilerine ilişkin kapsamlı bir çalışmanın olmayışı çalışmayı motive etmektedir. Elektrik düzenlemeleri ile ilgili literatür genellikle hukukun üstünlüğü meselesini odağa

almamaktadır. Kaçak elektrik kullanımı gibi hukukun üstünlüğü ile yakından ilgili konular dahi genellikle daha teknik bir bakış açısıyla tartışılmaktadır. İkinci bölümde belirtilen çalışmalar genel olarak düzenleyici yönetişimin bir bileşeni olarak hukukun üstünlüğünü kullanır. Yönetişimin ölçülmesinde geçerli olsa bile çalışmalar, hukukun üstünlüğünün ekonominin farklı alanları üzerinde diğer yönetişim veya kurumsal göstergelere göre daha fazla etkisi olduğunu göstermektedir. Bununla birlikte, çalışmalar iyi yönetişimin ve kurumsal çevrenin etkilerini arttırmanın önemini vurgularken, regüle edilen endüstrilerde hukukun üstünlüğünü özellikle incelememektedir. Buradan hareketle, Türkiye elektrik piyasasındaki elektrik düzenlemesinin kurumsal boyutlarını ele alarak literatüre katkıda bulunmayı amaçlamaktayız.

Türkiye elektrik piyasası, 1990'ların sonlarına kadar etkin çalışan bir piyasa sisteminin eksikliğinden muzdarip olmuştur. Düzenleyici reformlar bu sorunların giderilmesini amaçlamıştır. Elektrik reformu bağımsız bir düzenleyici kurum kurmayı ve piyasayı üretimden perakende satışa kademeli olarak özelleştirmeyi amaçlamaktadır. Düzenleyici reform yavaş başlamış olsa da, özel yatırımların seviyesini artırmak ve düzenleyici kurumun göreli bağımsızlığı, son on yılda daha liberal bir piyasa yapısını ortaya çıkarmıştır (Atiyas, 2012). Elektrik piyasası ile ilgili ampirik çalışmalarda genellikle hukukun üstünlüğü ile etkin bir piyasa mekanizması arasındaki bağlantı dolaylı olarak kurulmaktadır. Literatür, kurumsal çerçeve yerine çoğunlukla piyasa katılımcılarının (düzenleyici kurumlar dahil) eylemlerine odaklanmaktadır. Kurumsal faktörleri görmezden gelmenin temel bir nedeni, kurumsal değişimin nedenlerini ve sonuçlarını belirleyememektir. Bu boşluğu odağa almak ve kurumsal değişkenleri elektrik düzenlemeleri ile ilgili iktisadi çalışmalara dahil etmek için ayrıntılı bir tartışma sunmaktayız. Bu makale, regüle edilen endüstriler için hukukun üstünlüğünün anlamının tartışılmasıyla başlamaktadır. İlgili bölüm, literatürü takip eden kriterleri ve regüle edilen endüstrilerdeki hukukun üstünlüğünün seviyesini değerlendirip, Türkiye elektrik piyasasındaki bazı kilit konuları tartışarak devam etmektedir. Yakın

zamandaki Türkiye elektrik piyasası deneyimlerini kullanarak, gelişmekte olan bir ülkede düzenleyici politika için hukukun üstünlüğünün etkileri tartışılmaktadır.

Hukukun üstünlüğü ile düzenleme arasındaki zayıf bağlar devlet oportünizmini teşvik edebilmektedir. Regüle edilen endüstrilerdeki artan devlet katılımı, kamu mülkiyetine doğru bir yol yaratmaktadır. Firmalar rant arayışına yöneldiklerinde verimlilik artırıcı stratejilerden vazgeçmektedirler. Politik oportünizm, kâr arayışından rant arayışına geçişi teşvik eder (Buchanan, 1980). Bu durumda politik oportünizmin maliyeti düşerken, verimsiz sonuçlara doğru bir eğilim ortaya çıkmaktadır. Elektrik piyasasındaki ekonomik ve politik teşvikler ters yönde hareket ederler (Oğuz vd., 2014) ve bu süreçte yatırımlar düşmeye başlar. Sektördeki yatırımları teşvik etmek için daha fazla müdahale ortaya çıkar ve hizmet kalitesini korumak için şirketlere alternatif gelir kaynakları sağlanarak yatırımların sürekliliği sağlanmaya çalışılır. Sonuç olarak, serbestleşmeden uzaklaşılarak, devlet sahipliği tekrardan piyasada baskın oyuncu haline gelebilmektedir. Bu yapının ortaya çıkmasını engelleyebilecek bir mekanizma olarak hukukun üstünlüğüne yapılan vurgu, düzenleyici kurumların rant arama faaliyetlerinden korunmasında önemli bir rol oynamaktadır. Piyasa yapısı içindeki bu durumlara hukukun üstünlüğünden sapma örnekleri olarak odaklanmak, sorunları daha net ve daha büyük resmin bir parçası olarak görmemize yardımcı olabilmektedir.

Özetle, elektrik piyasında hukukun üstünlüğünü geliştirmenin önemli bir adımı, düzenleyici politikadaki kurumsal belirsizlikleri azaltmak olacaktır. EPDK kararlarında tutarlılığı arttırmayı ve tarife prosedürlerinde daha şeffaf olmayı hedeflemelidir. Ayrıca, kaçak elektrik kullanımını azaltmak için etkin politikalar uygulanmalıdır. Marjinal maliyete dayalı fiyatlandırma (örneğin, dağıtım bölgesi tabanlı bir elektrik tarifesi) kaçağı azaltma potansiyeline sahiptir ve dağıtım şirketlerini kaçak kullanımla mücadeleye odaklanmaya teşvik edebilir. Aynı zamanda bu durum gelir tavanı modelini daha etkili hale getirecektir. Daha da önemlisi,

sorumluluğu artıracak ve düzenleyici üzerindeki politik yükü azaltacaktır. Sonuç olarak hukukun üstünlüğü, düzenleme sürecinin bağımsızlığı ile yakından ilgilidir. Bu bölümde sunulan kriterler açısından, EPDK tarifelerde belirsiz kural düzenlemelerinden kaçınmalıdır. Ayrıca, uygulama süresinin sonuna kadar tarifelere bağlı kalarak, tek taraflı olarak kuralları değiştirmemelidir. Sonuçta verimlilik ve sektörde hukukun üstünlüğünün kurumsal yapısı ile ilgili gelişmelerin ortaya çıkması kaçınılmaz olacaktır.

Tezin üçüncü makalesini oluşturan dördüncü bölümde elektrikte teknik olmayan kayıplar, hukukun üstünlüğü ve düzenleyici kalite arasındaki ilişkiler ampirik olarak incelenmektedir. Hukukun üstünlüğü tam olarak yerleşmediğinde, düzenleyici süreçlerde yönetişim zayıflamakta ve kaçak elektrik kullanımının sosyal ve ekonomik maliyeti artmaktadır. Yeni kurumsal iktisat literatürü ile birlikte hukukun üstünlüğü ve ekonomik performans arasındaki ilişkileri inceleyen çalışmalar da literatürde sıklıkla yer bulmaya başlamıştır. Özellikle gelişmiş ve gelişmekte olan ülkeler için ekonomik performans ve kurumlar arasındaki nedensellik ilişkilerinin yönleri son yıllarda hukukun üstünlüğü odağa alınarak ivme kazanmıştır. Mikro ya da sektörel düzeyde bu ilişkileri inceleyen az sayıda çalışma olması nedeni ile bu çalışmanın odağı hukukun üstünlüğü, düzenleyici kalite ve özellikle gelişmekte olan ülkeler için toplumsal, politik ve iktisadi yönleri olan elektrikte teknik olmayan kayıplar arasındaki ilişkiler olarak belirlenmiştir.

Modern ekonomiler güçlü bir şekilde enerji bağımlılığına sahiptir. Ekonomik büyüme ve elektrik tüketimi arasındaki nedensellik ilişkisini araştıran literatür, son yıllarda güçlü kanıtlar sunmaktadır (Öztürk, 2010; Payne, 2010; Omri, 2014; Tiba ve Omri, 2017). Enerji verimliliğinin ve kurumsal özelliklerin önemi, büyüme-elektrik bağlantısı için temel faktörlerden biridir. Bu alandaki çalışmalar elektrik kayıplarının, enerji verimliliğine zarar veren, rekabeti bozan ve son kullanıcıların veya dağıtım

şirketlerinin sosyal ve ekonomik maliyetlerini artıran önemli faktörlerden biri olduğunu vurgulamaktadır.

Üretilen ve iletilen edilen elektrik arasındaki fark, kayıp olarak kabul edilir ve teknik ve teknik olmayan olarak iki temel form almaktadır. Teknik kayıplar, genellikle coğrafya, ulaşım, uzunluk ve hat kalitesi gibi ağ özelliklerinden dolayı iletim sürecinde meydana gelmektedir. Enerji verimliliğinin ana bileşeni olsa bile, kayıpları sıfıra indirmek neredeyse imkansızdır. Bu nedenle gelişmiş ekonomiler, iletim ve dağıtımdaki makul kayıp seviyelerini kabul eder (Jimenez, 2014). Bu seviye gelişmiş ülkelerde yaklaşık %6 ile %8 arasında değişmektedir ve bu minimum seviyenin aşılması, teknik olmayan kayıplar veya kaçak olarak kabul edilmektedir. Ayrıca, teknik olmayan kayıpların ekonomik maliyeti hem gelişmekte olan hem de gelişmiş ülkelerde farklı seviyelerde de olsa ortaya çıkmaktadır. Gelişmiş ülkelerde yasa dışı kullanım sınırlı olsa bile, toplam tüketimin büyüklüğü diğer yasa dışı faaliyetlerin maliyetleriyle karşılaştırıldığında önemli bir sosyal veya cezai bir sorun haline gelmektedir. Gelişmiş ülkeler, daha küçük ölçekte de olsa, kaçak elektrik kullanımı sorunuyla karşı karşıyadır. Örneğin Ofgem, İngiltere'deki kaçak elektriğin maliyetinin yılda yaklaşık 250 milyon £ olduğunu tahmin etmektedir. Kanada'da ise uyuşturucu üreticileri yüksek miktarda yasa dışı elektrik kullanmakta ve toplam üretim içerisinde önemli oranda kayıp ortaya çıkmaktadır.

Gelişmekte olan ülkelerde, elektriğin yasa dışı kullanımı çok daha yüksektir. Hindistan, Pakistan, Bangladeş ve Latin Amerika ülkeleri gibi ülkelerin kaçak kullanım oranları oldukça yüksektir. Örneğin, Hindistan'da kaçak elektrik kullanım maliyetinin 16,2 milyar dolar olduğu tahmin edilmektedir. Benzer şekilde, Brezilya ve Rusya da yasa dışı kullanımdan muzdarip olan ülkeler arasındadır. Ayrıca, Latin Amerika ve Karayip Ülkeleri'nin yarısı yaklaşık %20 kayıp rapor ederken, bu durumun yaklaşık 15 milyar dolar kayba neden olduğu belirtilmektedir. Dahası, teknik olmayan elektrik kayıplarının dünya çapındaki yıllık ekonomik maliyeti yaklaşık 100

milyar dolardır (Glauner vd., 2018). Ancak, gelişmekte olan ülkelerdeki yasa dışı elektrik kullanımı genellikle büyük bir cezai sorun olarak kabul edilmemektedir (Min ve Golden, 2014; Joseph, 2010). Aynı şekilde, Türkiye'deki kaçak elektrik kullanımı, genellikle sosyal bir sorun olarak ele alınmaktadır (Yurtseven, 2015). Gelişmekte olan birçok ülkede yasa dışı kullanım genellikle hükümetler tarafından hoş görülmekte ve toplum genellikle konuyu göz ardı edebilmektedir. Sonuç olarak, kaçak elektrik kullanımı gelişmekte olan ülkeler için bir suç unsuru olmasının yanı sıra sosyal bir sorun olarak ortaya çıkmaktadır (Smith, 2004; Depuru, 2011).

Kaçak elektrik kullanımı, ülkeler için hem ekonomik hem de sosyal etkiler barındırmaktadır. Bir yandan, ödenmemiş faturalar gelirleri azaltır (Arango ve diğerleri, 2017), enerji verimliliği kaçak kullanımdan büyük ölçüde etkilenir (Cubbin ve Stern, 2006; Jamil, 2013; Yurtseven, 2015) ve yatırımlar engellenir (Jamil ve Ahmed, 2010; Lewis, 2015). Öte yandan, kaçak elektrik, seçim döngülerinde hükümetlerin politik oportünizm ile sübvansiyon mekanizması olarak kullanılabilirken, karbon salınımlarını arttırarak çevresel bozulmaya neden olabilir ya da diğer yasa dışı faaliyetleri teşvik edebilecek sosyal sonuçlar yaratabilir. Düzenleyici politikaların sosyal politika hedefleri için kullanılması, toplumda hukukun üstünlüğüne olan inancı azaltmaktadır. Sosyal konular sosyal politikalarla ele alınmalıdır. Toplumdaki bazı grupları sübvanse etmek için dolaylı yöntemlerin kullanılması, doğru grupların belirlenmesi ve kaynakların ısrafı sorununu yaratır (Cooter ve Ulen, 2016).

Yukarıda bahsedildiği gibi, yasa dışı elektrik kullanımı, politik, sosyal ve ekonomik davranışların motive ettiği birçok boyuta sahiptir. Bu anlamda, bu çalışma, ekonomilerin kurumsal donanımlarının enerji verimliliği ve dolayısıyla kaçak elektrik kullanımı üzerinde önemli bir etkisi olduğu yaklaşımından hareket etmektedir. Kurumlar, politik, sosyal ve ekonomik etkileşimleri birbirine bağlayan yapıdır ve bu bileşenler formal ve enformal kurallarla oluşturulmuştur. Formal kurallar hukuku,

mülkiyet haklarını vb. içerirken, enformal kurallar normlar, yaptırımlar, tabular, gelenekler vb. ile ilgilidir (North, 1991: 97). Kurumsal iktisat literatürünün başından itibaren çok sayıda çalışma (örneğin, Knack ve Keefer, 1995; Rodrik, 2000; Dollar ve Kraay, 2003; Gleaser vd., 2004) kurumsal kalitenin ekonomik performans üzerindeki önemini vurgulamaktadır. Genel olarak daha iyi kurumsal kalitenin önemine atıfta bulunan bu çalışmalar, ekonomik büyüme ile kurumlar ilişkisini vurgulamaktadır. Bu bağlamda, bu bölüm, kurumların, özellikle de hukukun üstünlüğünün, regüle edilen endüstrilerdeki benzer etkilere sahip olup olmadığını araştırmayı amaçlamaktadır. Düzenleyici sürecin ve elektrik sektörünün verimliliğini zedeleyen, çoğunlukla zayıf yönetişim, kurumların ve hukukun üstünlüğünün eksikliği, düzenleme tuzağı vb.'den etkilenen kurumsal ve düzenleyici donanımın nedensel bağlantılarını açıklamayı hedeflemekteyiz.

Hukukun üstünlüğü tanımlaması formal olarak Albert Dicey tarafından oluşturulmuştur, o zamandan beri birçok farklı alan, süreç ve özelliği tanımlamak için kullanılmaktadır (Bingham, 2011). Başlangıçta, kavramın derinlemesine anlaşılması için yasal bakış açısı baskın iken YKİ'ın ardından, bu kavram yasal, sosyal, ekonomik, hatta kurumlarla etkileşimi gibi farklı açıdan değerlendirilmeye başlanmıştır. Son yaklaşımlar, politik ve ekonomik davranışların geleneksel kural ve normları takip ettiği ifadesinden kaynaklanmaktadır (Hadfield ve Weingast, 2014: 24). Hadfield ve Weingast'a (2014) göre, hukukun üstünlüğü toplumun ve ekonomideki kurumların formal ve enformal yönleriyle etkileşimlerinden ortaya çıkan bir denge ya da denge unsurudur. Hukukun üstünlüğü ile ekonomik performans arasındaki bağlantı, kurumsal iktisat ve hukukun üstünlüğü literatürünün ilerlemesiyle birlikte büyüyen bir alan haline gelmiştir. Ampirik literatür, hukukun üstünlüğünün ekonomik performansı desteklemedeki rolü konusunda önemli sonuçlar sunmaktadır (Dollar ve Kraay, 2003; Butkiewicz ve Yanıkkaya, 2006; Haggard ve Tiede, 2011). Son çalışmalar, hukukun üstünlüğünün ekonomik büyüme açısından önemini vurgulamaktadır. Hukukun üstünlüğünün zaman içinde ekonomik performansı etkilediği çeşitli kanallar vardır.

Haggard ve Tiede (2011)'e göre ise bu kavramı kişinin güvenliği, mülkiyet haklarının ve sözleşmelerin korunması, hükümetlerin kontrolü ve yolsuzluğun azaltılması olarak da sınıflandırabiliriz.

Bu çalışmanın başlangıç noktası, regüle edilen endüstrilerde hukukun üstünlüğünün nasıl tanımlanması gerektiğidir. Bu tanımlama tez çalışmasının ikinci makalesinde daha kapsamlı bir şekilde ele alınmaktadır. Bu bölümde, kurumsal yeterliliğin bir ülkenin gelişiminde etkili bir rolü var ise, benzer bir etki regüle edilen endüstrilerde de ortaya çıkabilir mi sorusuna ampirik olarak cevap aranmaktadır. Hukukun üstünlüğü ile ekonomik performans arasındaki bağlantıya ilgi artarken, hukukun üstünlüğü ve regüle edilen endüstrilerin performansı arasındaki bağlantılar konusunda az sayıda çalışma bulunmaktadır. Daha önceki ve son çalışmalar kurumlar ve makroekonomik göstergeler arasındaki nedensel ilişkiyi araştırmasına rağmen, hukukun üstünlüğü ile regüle edilen endüstrilerin performansları arasındaki ilişkiler ampirik olarak incelenme konusunda eksik kalmıştır. Bu çalışma, regüle edilen endüstrilerde hukukun üstünlüğü hakkında kısa ve açık bir teorik çerçeve sunmayı ve hukukun üstünlüğü, düzenleyici kalite ve kaçak elektrik arasındaki nedensellik ilişkilerini anlamak için ampirik sonuçlara ulaşmayı amaçlamaktadır. Sosyal ve ekonomik özelliklerin etkileşiminin araştırılması ve ortaya konması, ülkeler veya endüstriler için, özellikle sadece kurallar veya düzenlemeler ile çözülemeyen teknik olmayan problemlerde etkili sonuçlar üretilmesini sağlayabilir.

Hukukun üstünlüğü ile ekonomik büyüme arasındaki bağlantı, hukukun üstünlüğünün sosyal, ekonomik ve düzenleyici etkiler gibi karmaşık yapıların etkinliğini sağlamada vurgulanmaktadır (Dam, 2007). Bu bağlamda, düzenlemelerin ve kurumların etkinliği doğrudan ilişkilidir. Özellikle, hukukun üstünlüğü etkili düzenlemelerin varlığını sağlamaktadır (Berg ve Desai, 2013). Rigobon ve Rodrik (2005) ekonomik kurumlar, demokrasi, açıklık ve gelir arasındaki ilişkiyi incelerken, siyasi kurumları demokrasi ile ilişkilendirir ve ekonomik kurumları hukukun üstünlüğü ile ilgili görür. Bu

anlamda, farklı kurumlar arasındaki bağlantı, özellikle gelişmekte olan ülkelerde hukukun üstünlüğü, hukuk sisteminin kısmi yapılarından daha önemli bir rol oynamaktadır (Acemoğlu ve Johnson, 2005). Daha da önemlisi, hukukun üstünlüğü bir "kurumlar kümesi" olarak görülmeye başlanmıştır. Daha önceki ampirik çalışmalar, bir denge ya da kurum kümesi olarak hukukun üstünlüğünün önceden kurulduğu gelişmiş ülkelerde, ekonomi üzerinde baskın bir etkisi olduğu varsayımını desteklemektedir. Yani, ekonomik performans temel olarak hukukun üstünlüğünden kaynaklanmaktadır (örn., Law vd., 2013). Hipotezimiz daha yüksek hukukun üstünlüğü ve düzenleyici kalitenin kaçak elektriğin azalmasını sağladığıdır. Buna göre, bu çalışmanın amacı, elektrik piyasasının en temel sorunlarından biri olan yasa dışı elektrik kullanımının ülkelerin kurumsal kapasitelerine ve düzenleyici kaliteye bağlı olduğunu göstermektir. Kaçak elektrik kullanımı düzenleyici kalitenin bozulması ve hukukun üstünlüğünün zayıflaması ile yakından ilgilidir. Bu bölüm, elektrik piyası ve toplum için ekonomik bir sorun olmayan kaçak elektrik kullanımının kurumsal göstergeler ile nedensellik ilişkilerini incelemektedir. Bu kapsamda, panel Granger nedensellik testini kullanarak kurumsal birkimin bir yansıması olarak hukukun üstünlüğü ve düzenleyici kalite endeksleri ile kaçak elektriğin göstergesi olarak kullanılan dağıtım ve iletim kayıplarını ampirik olarak incelemekteyiz. Veri seti, 1996-2014 yılları arasındaki ekonomik ve kurumsal özellikleri ayrı ayrı değerlendirmek adına her yüksek, üst orta ve alt orta gelir gruplarından 17'şer ülke ve düşük gelir grubundan 13 ülke ile oluşturulmuştur.

Ampirik bulgular, hukukun üstünlüğünden kaçak elektrik kullanımına doğru tek yönlü nedenselliğin tüm alt ülke grupları için etkili olduğunu göstermektedir. Benzer şekilde, her bir alt örneklem için düzenleyici kaliteden kaçak elektrik kullanımına doğru istatistiksel olarak anlamlı nedensellik ilişkisi mevcuttur. Bununla birlikte, Granger nedensellik etkileri, yüksek ve alt orta gelir seviyesindeki ülkeler için kaçak elektrik kullanımından hukukun üstünlüğüne doğru ortaya çıkmamıştır. Bu durum gelişmiş ülkelerde beklenen bir sonuç iken, alt orta gelir grubundaki yüksek elektrik kayıplarına

sahip ülkeler açısından kaçak elektriğin bir suç olarak görülmediği görüşünü de destekleyebilir. Ayrıca, her bir örneklem için hukukun üstünlüğü ile düzenleyici kalite arasındaki nedensel etkilerin yönünü ve hangi kurumsal bileşenin bir başkasını yönlendirdiğini ortaya koymak çok önemlidir. Ampirik sonuçlar, hukukun üstünlüğünün yüksek gelirli ülkelerde düzenleyici kaliteye neden olduğunu gösteririrken, alt gelirli ülke panellerinde bu yönde bir nedensellik ilişkisi ortaya çıkmamaktadır. Bu durum da, aslında hukukun üstünlüğünün yerleşmiş olduğu ülkelerde bunun baskın kurum olduğunu da doğrulamaktadır. Öncelike bu bulgular regüle edilen endüstrilerde hukukun üstünlüğünün etkisiyle karşılaşabileceğimiz konusundaki araştırma sorumuza cevap vermektedir. Bu nedenle, endüstriyel performansa zarar veren kaçak elektrik kullanımının aynı zamanda sosyal ve ekonomik sonuçları da ortaya çıkardığı özel durumun varlığı söz konusudur. İkincisi, çoğu zaman, kaçak elektriğin kontrol edilmemesi yüksek sosyal maliyetlerden kaynaklanmaktadır. Çünkü elektrik aynı zamanda politik bir mal özelliği taşımaktadır. Hukukun üstünlüğünün kurulması, kaçak elektriği azaltacak ve gelişmiş ülkelerde olduğu gibi verimliliği arttıracaktır. Öyle ki, kaçak kullanım temel olarak etkin düzenleyici sistemlerin kurulmasından ve hukukun üstünlüğünden kaynaklanan büyük dışsallıklar tarafından yönlendirilmektedir.

Ampirik sonuçlarımız, ekonomik sonuçlara yol açan yasa dışı kullanıma daha kapsamlı bir kanal sunmaktadır. Regüle edilen endüstriler, mevcut kurumlardan, hukukun üstünlüğünden ve düzenleyici sistemlerden çok fazla etkilenen toplu bir ekonominin mikro kozmosu (Cubbin ve Stern, 2006) olarak değerlendirilmelidir. Eğer hukukun üstünlüğü ülkede kurulamazsa, politika yapıcılar düzenlemelerde beklenenden farklı davranabilirler. Orta ve düşük gelirli ülkeler göreceli olarak daha yüksek kayıplara sahiptir ve daha az etkili düzenleyici yönetişimde ortaya çıkan kayıplar ülkelerdeki hukukun üstünlüğünü de etkilemektedir. İyi düzenlenmiş kural ve düzenlemelerin olmaması hukukun üstünlüğüne zarar verir ve kaçak elektriği arttırır. Nitekim, altyapı endüstrilerindeki düzenleyici taahhüt, rant arama, idari kabiliyetler,

normlar, davranışlar ve politik döngülere karşı oldukça hassastır. Yasa dışı elektrik kullanımıyla mücadele ederken, politika yapıcılar salt ekonomik ve finansal koşulların yanı sıra siyasi ve sosyal yönetişime bağlı kayıpların doğasını da dışlamamalıdır.

Elektrik kayıpları son kullanıcılardan daha fazla ücret alınmasına neden olmakta, toplumsal maliyetleri arttırmakta, yatırımları engellemekte ve her şeyden önce ülkelerin kurumsal kalitesine zarar vermektedir. Ülkelerde yerleşmiş olan hukukun üstünlüğü, daha düşük elektrik kayıplarına yol açtığından, yasa dışı faaliyetlerin bir suç olarak görülmemesi veya kaçak elektrik kullanımı gibi bazı özel yasa dışı faaliyetlerde bulunulması halinde, bunların hukukun üstünlüğü ile ilgili görülmemesi yasa ve yönetmeliklere zarar vermektedir. Bazen düzenlemeler kaçakların maliyetini tüm tüketicilere yansıtarak, ekonomik bir problemi politik bir soruna dönüştürebilir ve bu da politik rant aramayı teşvik eder. Sonuç olarak, tüm toplum için tarifelerin artması ve dolaylı olarak yasa dışı kullanım meşrulaşır. Ayrıca, kaçak elektrik kullanımını ekonomik verimlilik açısından kabul edilebilir seviyelere indirmek için iktisadi ve teknik politika değişikliklerini destekleyecek kurumsal bir yönetişim kapasitesi olmalıdır. Bu nedenle, tüm iktisadi aktörlerin ve düzenleyici taahhüdün kurallara bağlılığını gösteren hukukun üstünlüğü için daha fazla çaba gösterilmelidir.

Sonuç olarak bu tez çalışması kapsamında düzenleyici süreçler yeni kurumsal ekonomi perspektifinden incelendiğinde, hukukun üstünlüğü ve düzenleyici yönetişimin ön plana çıktığı görülmüştür. Daha önceki teoriler düzenlemeyi bir servet transferi olarak görürken, YKİ yaklaşımı düzenleyici süreçlerde verimliliği sağlamada kurumsal faktörlere odaklanır. Bu nedenle, düzenlemelerin kurumsal tasarımı, özellikle gelişmekte olan ülkelerde, düzenleme amaçlarından veya araçlarından daha önemli görülmektedir. Kurumsal faktörleri görmezden gelmenin temel bir nedeni, kurumsal değişimin nedenlerini ve sonuçlarını belirleyememektir. Bu nedenle amacımız bu boşluğu ele alarak ve kurumsal değişkenleri elektrik piyasasındaki

düzenlemeler ile sorunlar kapsamında ilgili ekonomik çalışmalara dahil etmek için potansiyel bir yolun tartışılmasını sunmak olmuştur.

Son olarak uluslararası kurumların düzenleyici yönetişim ve hukukun üstünlüğü konusunda ilgisi artmaktadır. World Bank Global Indicators Group "Düzenleyici Yönetişimin Küresel Göstergeleri" adlı bir proje başlatmıştır. Bu proje, şeffaflık ve hesap verilebilirliğe odaklanarak, yönetmeliklerde hükümetlerin tüketiciler ile nasıl etkileşime girdiğini araştırmayı amaçlamaktadır. Projenin ilk sonuçları vatandaşların kural koyma sürecindeki katılımlarına odaklanmaktadır. Sonuçlar, vatandaşların kural koyma konusundaki katılımlarının daha iyi düzenleyici yönetişim ve daha güçlü bir hukuk devletinin oluşturulmasına katkı sağladığını göstermektedir. Veri seti genişlediğinde, daha ileri çalışmalar, düzenleyici yönetişimin ve hukukun üstünlüğü üzerine daha kapsamlı analizler de yapılabilecektir.