

Adaptability of competitive electricity reforms

A modular analysis

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Abstract

Competitive electricity reforms have been implemented in Europe and the US for the last 18 years. None of the reform has been put in place in a sufficiently "complete" manner from the beginning and no reform has "survived" over several years without major changes. In the face of the changing nature of electricity reforms, adaptability is thus a central question. The aim of this paper is to propose an analytical framework of the adaptability of electricity reforms based on the concept of modularity. In the first part of this paper we show that a specific analytical framework is needed to analyse electricity reforms. These reforms have two characteristics which shape their adaptation. Firstly, electricity reforms are "modular" objects (Baldwin [2007]). Secondly, electricity reforms are produced in an institutional process which is neither "complete" (Pistor and Xu [2003]) nor instantaneous. These characteristics explain that there is a need to adapt reforms over time. In the second part of the paper, we propose a typology of adaptations of reforms based on the framework developed by Williamson [1991] for contracts. In case of inconsequential disturbances, reforms will adapt quasi-automatically, by autonomous decisions of the governance structure. In case of middle-range or consequential disturbances, there is a risk of "misalignment". To solve the problem of misalignment, the reform participants try to adapt the rules by Coasian bargaining. Finally, in the case of strong disturbances, or when bargaining is not feasible, the adaptation of reform is in the hands of legislative and executive institutions (North [2005]). These institutions can reform the reforms (Joskow [2006], Hogan [2002]). The consequence of these different kinds of adaptations is that electricity reforms follow "constrained" reform paths, where minor changes are easy to implement and bigger changes more difficult to realise although not impossible. The importance of each type of adaptation can be interpreted as a consequence of the decision rights of the different participants in the reform: regulator, stakeholders and the institutional environment.

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INTRODUCTION

Competitive electricity reforms have been conducted for the last 18 years in several countries. However, no uniform pattern of introducing competition in electricity markets has emerged (Correljé et al. [2008]) and there is still debate on the best way to implement this type of reforms (Littlechild [2006]). The diversity of reforms is reflected in the different choices made by countries concerning for example the design of electricity markets. For example, wholesale markets can be organized as mandatory “pools”, like in the UK at the beginning of the 1990’s. They can also be organized as voluntary “power exchanges”, whose role in wholesale transactions can be variable. For example, in Norway, the wholesale market “Nord Pool” is mandatory only for cross-border sales, but represents a significant part of wholesale exchanges. In France on the contrary, there exists a power exchange but wholesale electricity transactions are mostly based on bilateral contracts. Therefore, the French power exchange represents only a small proportion of total wholesale transactions.

There are not only differences in the current design of reforms, but there is also an ongoing debate on the best way to implement them. While there is some unanimity on some “key components” of restructuring, regulatory reform and the development of competitive markets for power², many questions are still debated. For example, there is no unanimity on the benefits of retail competition for small customers (Chao et al. [2008]) or on the best way to guarantee sufficient production capacities to supply demand at all times (Finon et al. [2008]). And even if there is unanimity on some elements, states are not always able or willing to implement the “textbook” model of reform. Institutional constraints limit their ability to reform. For example, in some countries, the state cannot restructure the electricity sector due to protection of property rights of private companies (Dubois [2007]). Sometimes, states also pursue other policies which limit their ability to create really competitive electricity sectors³.

The diversity of possible reform designs and the still ongoing debate on the best way of conducting them result in a need of adapting them over time. Some reform adaptations concern only “detail” rules. However, it is often necessary to modify some core elements, i.e. to realize “reforms of reforms” (Joskow [2006], Hogan [2002]). The aim of this paper is to provide a framework for analyzing the adaptive properties of reforms.

The first part discusses why there is such a strong need for adaptable reforms. Reforms have to be adaptable both for technical reasons and for institutional reasons. Technically, reforms can be analyzed as “modular” objects (Baldwin [2007]). Because of the specificities of electricity, reforms cannot be realized instantaneously and in a “complete” manner. Institutionally, the “production process” of these reforms is shared among different institutions (Dubois [2007]). At the definition stage of reforms, legislative and executive institutions have to decide over an *ex ante* design of the reform. However, for reasons of imperfect information and bounded rationality, the legislative and executive institutions cannot define this initial design in a sufficiently precise manner. At the implementation stage, other institutions, which form the “governance structure” of the reform, have to complete its design by establishing more precise rules – rules that can be applied by the companies operating in the sector. They also have to enforce these rules. This process of defining the operation rules governing a competitive electricity sector is not instantaneous. As the production process of electricity reforms is an “imperfect” one, there is a strong need of adaptations of reforms over time.

The second part proposes an analytical framework for analyzing the adaptation of reforms. Adaptations are needed for reasons linked to their technical and institutional

² These key components are the following : (1) privatization of state-owned utilities, (2) vertical separation of competitive segments, (3) horizontal restructuring of the generation segment, (4) horizontal integration of transmission and network operations, (5) the creation of voluntary wholesale spot energy and operating reserver market institutions, (6) the application of regulatory rules and supporting network institutions, (7) the unbundling of retail tariffs, (8) specification of arrangements for supplying customers until retail competition is in place, (9) the creation of independent regulatory agencies, (10) provision of transition mechanisms. (Joskow [2006]).

³ For example, some states are pursuing policies of national champions which *de facto* limit competition on their national energy market (Monopolkommission [2004]).

production process and also because of the possibility of unforeseen events⁴. We consider that these adaptations take place in an institutional framework that is given. It is the framework that has been built by the initial reform, a framework where some rights have been allocated to the governance structure of the reform. However, the rights of the governance structure cover only certain parts of the reform. Therefore, some adaptations can be realized by the governance structure, when it owns the rights to make the necessary adaptations, but for other adaptations, others owners of rights have to intervene. This is for example the case when the legislative framework of the reform has to be adapted. Therefore, we classify reform adaptations in “minor” and “major” adaptations. “Minor” adaptations are made within the institutions of the reform, i.e. the governance structure, while “major” adaptations are made by adapting the institutions of the reform, using for example the legislative and executive institutions. Because this classification in “minor” and “major” adaptations highlights the role and the specificities of the different institutions involved in the adaptation process, it is useful for explaining the adaptation capacity of electricity reforms.

1. THE INTRINSICALLY DYNAMIC NATURE OF ELECTRICITY REFORMS

Defining and implementing competitive electricity reforms is not an easy task. These reforms still raise many questions more than ten years after their beginning. In practice, very different reform models have been implemented, and most of the reforms that were initially put in place have been modified after a certain time. For example, in the UK, the mandatory “Pool” of 1989 has been replaced by the NETA (New Electricity Trading Arrangement) in 2001 which was itself replaced by the BETTA (British Electricity Trading and Transmission Arrangements) in 2003 (Newbery [2006]). In Germany, the initial reform of 1998, which was a reform without a regulator (Glachant et al. [2008]) has been modified in 2005 by a law creating a regulator in charge of access to networks. In California, adaptations of the initial reform had to be realized due to the crisis of 2000 and 2001 (Holburn et al. [2002]). Thus reforms are intrinsically dynamic. We explain their dynamic nature by two factors.

The first one relates to the organizational construction of reforms: we show that they are realized by cutting electricity sectors into separate “modules”, linked by standardized interfaces. As reforms are modular, each module can be designed quasi-independently, which explains why a huge diversity of reforms is possible. Modularity also has another consequence: it allows to design modules progressively and to adapt them independently over time. Thus, modularity contributes to the dynamic nature of reforms.

The second factor relates to institutional properties of reforms. Electricity reforms are institutionally difficult to produce and their production process involves many participants, ranging from the legislative and executive institutions to regulators, other public bodies, and even individual economic agents of the sector, like the transmission system operators. The reason for that lies in the fact that the details of the operational conception of reform matter. And these details cannot be controlled in the initial reform stage. Initial reforms therefore are initially incomplete and have to be completed over time, by adding many detailed rules to the initial reform. The institutional production process of reforms is therefore another reason of their dynamic nature.

1.1. Electricity reforms are modular objects

The modular nature of electricity reforms can be understood by looking at the technical specificities of electricity. Electricity is not storable. It flows on networks that are natural monopolies and have a character of essential facilities. In addition, electricity demand cannot be predicted with certainty. As the price elasticity of electricity demand is weak, the level of demand is not influenced by its price level. Because of these specificities of electricity, markets cannot be created in that sector like in classical commodity sectors. Some parts of the sector (production, supply) can be organized in the form of markets while others (typically the transmission and distribution networks) remain organized as a

⁴ Examples of unforeseen events include the exercise of market power on wholesale markets (Holburn et al. [2002]) or a supply crisis (Von der Fehr et al. [2005]).

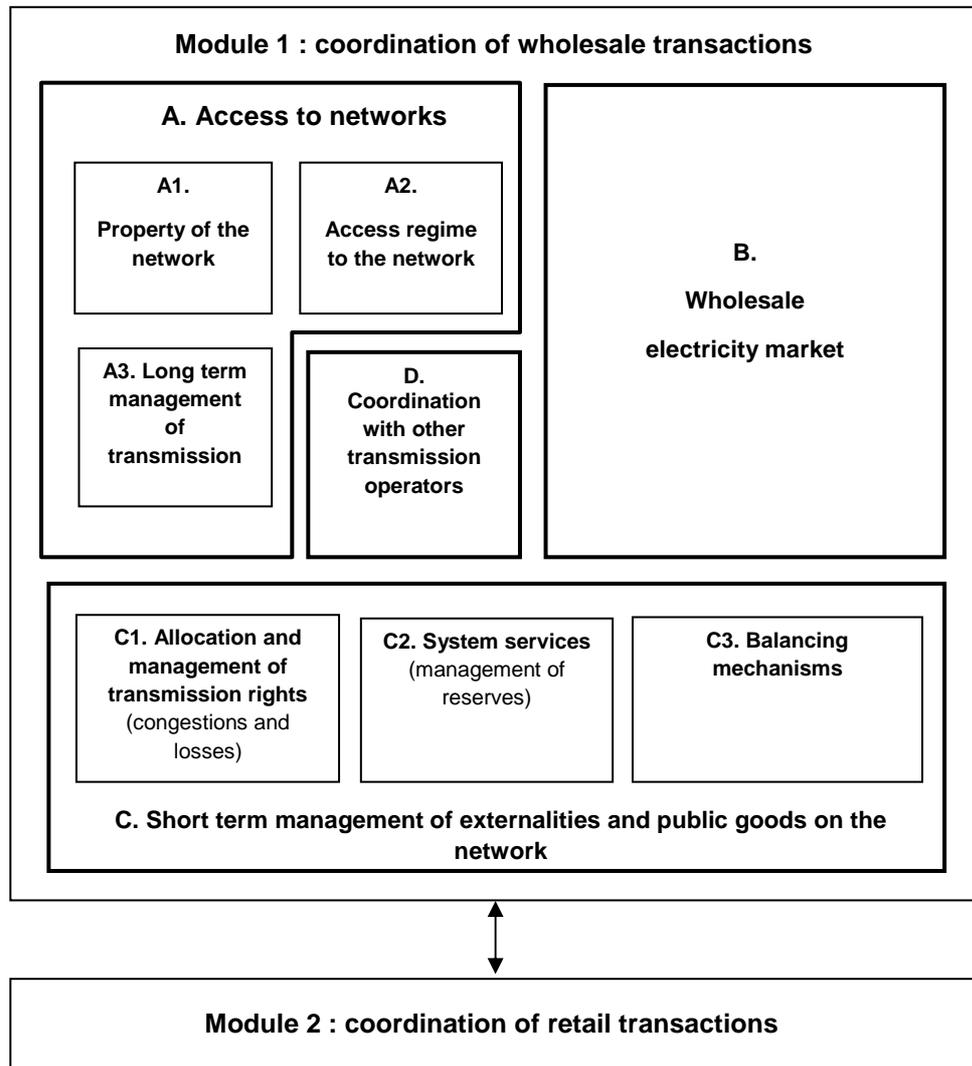
monopoly. In addition, the “market part” and the “network part” of the sector are technically dependent one from each other. Therefore the creation of markets, for example at the wholesale level, can be realized only by splitting electricity transactions in their different components, for example allocation and management of transmission rights, management of reserves and balancing mechanisms. This requires the creation of a sequence of markets, which “simulates” the functioning of competitive markets (Wilson [2002]). In this sequence, some markets like the market for “real time energy” (balancing markets) are closely linked to the networks (Saguan [2007]).

To create competitive markets it is thus necessary to split electricity transactions into different “modules” (Baldwin [2007]) which can be reformed independently one from each other. Each “module” forms a coherent whole and can be organized in different ways. The different modules combine to each other more loosely, and are sometimes independent from each other. As some interdependencies exist among modules in the electricity sector, these modules can be considered as linked one with each other by relations of “weak institutional complementarity” (Aoki [2001], Pagano [2005]). This concept of weak institutional complementarity suggests that one variant of one module fits best with one specific variant of another module, but can also be combined with other variants, but at the expense of the overall efficiency of the system. One consequence of the weak institutional complementarities between modules is that a variety of different systems can exist, as many different variants of different modules can be combined together. One possible representation of a modular organization of an electricity reform is given in figure 1.

In such a modular organization of reforms, we first distinguish the transactions on the wholesale markets (module 1) from the transactions on the retail markets (module 2). In this paper, we discuss only the first module in detail⁵, because competitive wholesale markets are a pre-condition for opening retail markets and are therefore the step of competitive opening of this industry. This module can be divided into four main sub-modules (Dubois [2007]). The first one (A) is related to the access of networks. As electricity network remain a natural monopoly, competitive reforms must first ensure open access to these networks. Then, competitive rules can be created for the wholesale electricity market (sub-module B), for example by creating organized power pools or power exchanges. A third sub-module (C) is related to transactions which have to be organized to support competitive wholesale markets. These transactions are linked with the network activities, but they can be organized in a competitive manner. When they are organized as markets, they enter in the “sequence of markets” identified by Wilson [2002]. Finally, a last sub-module (D) is related to questions of interconnections of the national electricity grids. If national networks are interconnected, the coordination of different transmission system operators can improve the functioning of competitive markets, as the cross-border electricity flows create *de facto* interdependencies between national markets.

⁵ A detailed presentation of the second module concerning retail transactions can be found in Dubois and Saplacan [2008].

Figure 1 – a modular representation of electricity reforms



Sources: Hunt [2002], Wilson [1998 and 2002], Glachant [2003a], Rious [2006]

We use this modular representation of electricity reforms as a basis to explain the diversity of reforms and their dynamic nature.

Firstly, modularity explains the huge diversity of “real” reforms. This diversity results from the multiplicity of variants of each module. For example, different possibilities for the management of congestions (sub-module C1), which are network externalities. A first variant is one where congestions are not internalized. Another variant consists in introducing a “zonal” pricing, where congestions are internalized between certain geographical areas (“zones”) but not internalized within a zone. Finally, a last variant consists in internalizing all congestions, by defining “nodal” tariffs, i.e. tariffs which are different at each node of the network (Pignon [2003]). As a consequence of the multiplicity of variants, each national electricity reform is a particular combination of variants of different modules. The probability to see two identical reforms is thus very low.

Secondly, modularity is linked with the dynamic nature of reforms. As reforms are an innovation compared with the previous monopolistic organization of the electricity sector, it is difficult to define an initial reform design. Especially in the first years of reform, many of the “ingredients” of competitive reforms were unknown and efficient reform designs could only emerge as a result of a learning process. In this situation of uncertainty one solution consisted in starting by reforming a limited number of modules, and then to reform

additional modules. This dynamic process of introducing competition in general has followed a logical sequence, where wholesale transactions have been reformed before retail transactions. And, within the module of wholesale transactions, the first measures concerned the opening of access to networks (sub-module A) and the creation of wholesale markets for energy (sub-module B), the short term management of externalities and public goods on the networks (sub-module C) being reformed in later stages. This sequence of reform decisions is a “logical” sequence, which can easily be explained. To reform sub-module C by creating competitive mechanisms for the management of externalities and public goods, it is necessary that there already exists a competitive wholesale market. Therefore, sub-module B must be reformed before sub-module C. And, to create competitive wholesale markets, the corresponding transactions must be feasible, meaning that access to networks of producers and customers (sub-module A) must be ensured. Thus modularity imposes an initial sequence in introducing competition in electricity sectors. In addition, as the interdependencies among the different modules are not perfectly known at the time of initial reform, some reform readjustments can be necessary over time to take into account the institutional complementarities among modules. Thus, modularity explains not only the diversity of reforms, but also their dynamic nature.

1.2. Electricity reforms are produced in a multilevel institutional process

In addition to the factors related to their modular nature, the institutional production process of reforms also explains their dynamic nature. In particular, electricity reforms are produced in a multilevel institutional process which can be a complex one. In practice, several institutions participate in the definition of reforms, which explains that they are elaborated and adapted progressively rather than instantaneously. At a first level, reforms are initiated by a country’s legislative and executive institutions, but these institutions only define the broad lines of reforms. Therefore, there exists a second level of institutions participating in the definition and adaptation of reforms. These institutions form the “governance structure” of the reform. Therefore, to fully understand the dynamic of reforms, it is necessary to analyze both the powers of legislative and executive institutions and those of the governance structure.

The legislative and executive institutions of the states are the first level of reform producers. They play a role in the launching of the reform because, for a reform to get started, participants in these institutions must consider it desirable (World Bank [1995]). They also play a role in defining the initial characteristics of the reforms. Because only those measures that are institutionally feasible, i.e. are supported by those decision makers who have the power on deciding them, will be realized (Heller, Keefer and McCubbins [1997]). Thus the legislative and executive institutions play an initial role in the production of reforms. Their action results in an initial reform law. But this reform law is always “incomplete”, i.e. it does not unambiguously stipulate for all future contingencies (Pistor and Xu [2003]). Two main reasons explain this incompleteness of reform laws.

Firstly, legislative and executive institutions have a very limited knowledge on issues of electricity sector reforms. They are “political” decision makers, and their lawmaking power covers many different issues. Therefore, they are unable to know precisely what are the technical and economic issues at stake in the electricity sector. As a consequence, they are unable to decide what will be the precise characteristics of reforms. Their role is limited to defining reform laws in their broad lines *i.e.* establish the *ex ante* design of a reform. For example, they stipulate to what extent the sector will be opened to competition, they can create a regulator and define what will be the regulator’s powers.

Secondly, the incompleteness of reform law can be explained by the fact that legislative and executive institutions cannot play their rulemaking function frequently. In most countries, electricity laws and their important modifications are decided in intervals of 5 years or more. This is a usual rhythm for changing legislations. But, as previously discussed, modularity imposes more frequent changes of rules. As there are uncertainties concerning the most appropriate variant of modules to choose and uncertainties due to the discovery of complementarities among modules, some “fine tuning” is needed to adapt reforms.

For these reasons, reform laws never define the new sector rules in a sufficiently precise manner for the companies to start operating competitive transactions. For example, reform laws do not define precisely rules of network access or tariffs of network access. Neither do reform laws create organized markets. Their role is limited to modifying the rights and obligations of different economic agents, but the definition of these rights is incomplete. The exact nature of the rights and obligations produced by the reform will be known only in the process of reform implementation, when these rights and obligations are exercised. And to exercise their rights, a more precise definition of the rules is necessary, else competitive transactions cannot start.

Therefore, a second level of reform producers plays an important role in electricity reforms. These producers are the “governance structure” of the reform (Levy and Spiller [1994]). It is sometimes established at the starting of the reform, for example when legislators delegate some tasks to regulatory bodies. This has been the case in most European electricity reforms⁶. But the governance structure can also pre-exist to competitive reforms, like in the US. In the US, the federal regulator FERC and the public utility commissions of the states that were in place since the beginning of the 20th century took over the functions of a governance structure for competitive reforms. They exercise some rulemaking powers and, of course, they have strong enforcement powers of the reforms. But the regulators are not the only participants in the governance structure. The competition authorities can also participate by defining some rules (Glachant et al. [2008]). And in the electricity sector, an important rulemaking function is in the hands of the stakeholders themselves. For example, in the British electricity reform of 1990, the UK Power Pool was an organization controlled by stakeholders. The Pool was self-regulated. In particular, it was free to define its own operating rules (Glachant [1998]). In many countries, the transmission rules are defined by the transmission system operators (TSO) themselves. And at the European level, the role of stakeholders has been institutionalized in the “Florence Process or Forum”, which played a role in elaborating regulatory proposals⁷ and institution-building (Eberlein [2005]). The production of rules by stakeholders is justified by the fact that many technical aspects of the reforms must be known to define precise reform rules. And the regulator often does not have sufficient technical expertise to deal with these questions.

The precise rules of electricity reforms are co-produced by a variety of actors. There is however a fundamental distinction between the different types of actors. While the regulators’ responsibilities are a result of a delegation of powers of the institutions of the state, the origin of responsibilities of other rule “producers” is less clear, which impacts their legitimacy in the rule definition process. Thus the regulators are particular actors in that process, as they exert quasi-legislative functions, some executive functions, and also quasi-judicial functions. Therefore, they play a crucial role for the “credible commitment capacity” of reforms (Gilardi [2005]) and the performance of the regulated sectors (Andres et al. [2008], Cubbin et al. [2005]).

In practice, the process of production of reform rules by the legislative and executive institutions and by the governance structure is neither immediate nor perfect. The different reform “producers” define rules over a long time period. In addition, some rules have to be modified relatively frequently, to adjust to unforeseen events and to make improvements. An illustration of this type of process is the adaptation of rules of access to networks in Germany. After the reform law of April 1998 which created a right of access to networks for all customers, self-regulatory bodies, the associations of the electricity sector and of big electricity customers, defined rules starting from September 1998. These private rules were

⁶ However, there is no uniformity concerning the powers of these regulators (CEER [2005]). Even the creation of a regulator is not a necessary component of initial reforms, as demonstrated by the case of Germany. Germany opened its electricity sector to competition in 1998 without creating a sector specific regulator. The definition of conditions of network access was thus totally left to self-regulation. The only public body with enforcement powers was the competition authority.

⁷ “The Florence Process was particularly successful in building institutions such as ETSO or the CEER. These institutions proved crucial in establishing a permanent and fruitful dialogue between the main actors and for the technical elaboration of regulatory proposals in the new European electricity order. Institution building also helped to restructure the industry, and empower new players who drive the reform process forward. Crucially, the successful role of CEER was to put the regulatory addressees under pressure to give reasons for and, subsequently, adjust their positions.” (Eberlein [2005], p. 76)

renegotiated periodically to better fit to the needs of the different parties. Until 2005, when a new law created a regulator for access to electricity networks, they were renegotiated two times, in December 1999 and December 2001.

To conclude, there are two important reasons explaining the need of adaptation of electricity reforms. The first one is related to the technico-economic specificities of electricity sectors. As electricity transactions are constrained by strong technical specificities, competition cannot appear spontaneously and reforms can only be realized by re-creating artificially competition by introducing a sequence of market (Wilson [2002]). This is done by reorganizing electricity sectors in order to split electricity transactions into “modules”, which are reformed sequentially. The second reason is linked with the production process of the reform. This production process involves legislative and executive institutions as well as sector-specific regulators and stakeholders. This multi-layer production process imposes a progressive reform process and also later modifications of rules to readjust them in case of disturbances.

2. THE TWO LEVELS OF ADAPTATION: ARRANGEMENT VS. GOVERNANCE

If adaptation is necessary in electricity reforms, how is it realized? Intuitively, one would like to distinguish between “big” and “small” adaptations, “big” adjustments, like those induced for example by a supply crisis, being probably of a different nature than smaller adjustments. But what makes the difference between “big” and “small” adaptations? Our thesis is that the distinction between the two categories is not driven by the object of adaptation (i.e. changing one specific module is not systematically a “big” or “small” adaptation), but by institutional aspects, i.e. *who* owns the right to realize a given adaptation. If the governance structure owns the rights necessary to realize the adaptation, then it can realize the necessary modifications of reform arrangements. But if the rights of the governance structure are insufficient to realize the necessary adaptations, then the decision to adapt the reform can only be made by the legislative and executive institutions of the state, and they generally require a modification of the governance of reform. After a discussion of the adaptation needs of reforms and of the role of decision rights on adaptations, we analyze the two levels of adaptation – adaptation of arrangements and adaptation of governance.

2.1. The two levels of adaptation

As previously discussed, adaptation needs result both from the modular nature of reforms and from their institutional production process. These two factors result in a dynamic process of expanding “competitive” rules through the sector and of refining these competitive rules. Therefore, there exists a “natural” process of evolution of reforms, which can be described as a process that can be decomposed in three logical stages. In a first stage, the main objective is to open access to electricity networks, by creating rights of access to these networks. In a second step, an initial design of competitive is put in place. However, this initial design is often imperfect and its characteristics are a result of what is institutionally feasible at this stage. Finally, a third step consists in “refining” the market design (Newbery [2005]). This is necessary because the development of competitive transactions sometimes increases the interrelations between modules, requiring the replacement of some variants of modules by other variants, which are better adapted to the higher competitive intensity of the sector. One example of this type of refinements is the development of congestion rules that better internalize the effects of the networks. In systems with few competitive transactions, a full internalization of congestions is not necessarily an important ingredient of initial reforms. But with the development of competitive transactions, it becomes more and more important to take explicitly the congestions into account, which requires a formal design of congestion management mechanisms. This dynamic of reforms consists not only in a refinement of rules, it also results in a widening of the scope of the reform, as many aspects that were not included in the initial reform have to be included at later stages.

In addition to this evolutionary process, some adaptation needs can result from unanticipated events, like a supply crisis⁸ or the exercise of market power of certain producers, or, in certain cases, by a bad functioning of the design of the reform. The exercise of market power is a major concern on electricity markets, which can require a modification of the rules of wholesale markets. A bad functioning of the design of the reform, like in California in 2001, also requires important changes of the reforms.

How are the necessary adaptations realized? Our thesis is that, to understand the process of adaptation, it is necessary to examine the “rights” on reform adaptations, i.e. how these rights are defined and how they are allocated. Our view on adaptation of reforms is based on Williamson’s analysis of adaptation of contracts (Williamson [1991]). This analysis is based on the distinction between three kinds of disturbances.

In case of “inconsequential” disturbances, reforms are adapted by the governance structure without negotiation because the governance structure owns all the necessary rights. Typically, this is the case when the regulator owns all the rights that are necessary to make an adaptation. However, in practice, most reforms define the rights of the governance structure in an incomplete manner because, at the beginning of a reform, legislators are unable to define in a “complete” manner all the future tasks of the regulator.

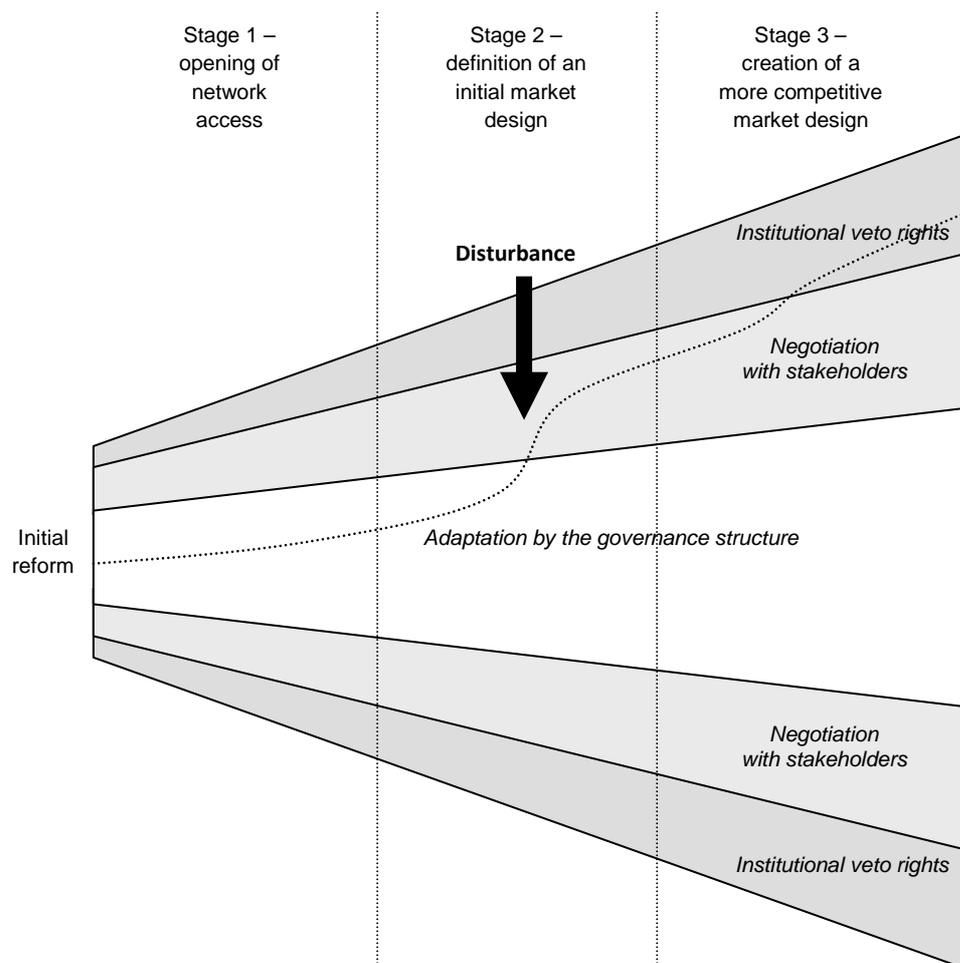
In case of more consequential disturbances, the rights of the governance structure are insufficient to realize the necessary adaptations without negotiating. A formal negotiation of some characteristics of the reform, for example with stakeholders, becomes necessary. In the electricity sector, there is an important area of decisions where the stakeholders own rights on the definition of additional rules of the reforms. They can use these rights to modify some rules. For example, the rights of defining rules on the modules related to the transmission network are often *de facto* in the hands of the transmission system operators (TSO) (Rious [2007], Barker, Tenenbaum and Woolf [1997]). Thus the TSOs are to intervene in any adaptation concerning these modules.

Finally, in case of big disturbances, neither the governance structure nor the stakeholders are able to realize adaptations. This impossibility to adapt the reform at the regulator or stakeholder level is due to the fact that they can have insufficient rights on some decisions, or to the impossibility to decide changes by negotiating. The legislative and executive institutions are then the only ones able to realize the necessary changes. This was for example the case in the UK at the end of the 1990’s. In the second half of the 1990’s, the prices on the UK Power Pool rose as a consequence of market power of electricity producers. To solve these problems of market power, a change of the rules of the wholesale market was necessary. But, the Pool was controlled by stakeholders, and these stakeholders were unable to agree on a modification of the rules of the Pool. Therefore a reform of the reform was initiated by the British government. At the beginning of 2001, a new wholesale market, the NETA (New Electricity Trading Arrangement) was launched. This example illustrates what happens in case of “big” adaptation need. The rights of the governance structure and of the stakeholders often make it impossible to realize adaptations “within” the reform. The only way to realize the necessary adaptations is then to use the rights of the legislative and executive institutions, which are “veto rights” (Tsebelis [2002]).

The three modes of adaptation described by Williamson can be transposed to the analysis of reforms. They result in two major types of reform adaptations. A first one is adaptation of arrangements, which can be made at the level of the governance structure (autonomously or with negotiation). A second one is adaptation of governance, and it can only be realized by using the “veto rights” of the legislative and executive institutions. A representation of the dynamic of reforms is given in figure 2, where each reform can be represented as a path within a space of decisions which defines the scope of the reform.

⁸ For example, in the Norwegian hydro-based electricity system, a drought has led to supply shortages in the summer of 2003.

Figure 2 – Reform paths must repeatedly be adapted



The adaptations made by the governance structure and by the stakeholders are adaptations of “arrangements”. They are made within the institutional framework that has been set up by the initial reform. Therefore, we call them “minor” adaptations. The adaptations realized by the legislative and executive institutions can produce important changes of the reform rules, as these institutions have the ability to modify the rights of the governance structure. Therefore, we call them “major” adaptation”.

In the remaining of this article, we analyze the characteristics of these “minor” and “major” adaptations. The two types of adaptations differ not only by the characteristics of the owners of the rights. They also differ by their mode of interaction.

2.2. Minor adaptations of arrangements “within” the reform

When they own the necessary rights to decide over the needed adaptations, the institutions of reforms can realize changes of some rules without an intervention of the institutional environment. These “minor” adaptations can be realized in two ways. The simplest situation is the case where the governance structure, for example the regulator, has authority to modify some rules without negotiation. A more complex situation is the case where a negotiation is necessary with the stakeholders in order to adapt some reform arrangements. In practice, the possibility of the governance structure to adapt reforms in an autonomous way is limited by the definition and the allocation of rights that has been made at the initial reform stage. As the reform law is very incomplete, the powers of the regulator are limited to questions covered by the initial reform law. Therefore, “minor” adaptations are often made by negotiations with the stakeholders.

These negotiations often happen on a voluntary basis, by Coasian bargaining (Coase [1960]) among stakeholders. The role of this type of bargaining is often neglected in the analysis of reforms. However, in practice, this bargaining can play an important role in electricity reforms. This is especially true in countries where there have initially been weak regulators. For example, in Norway and Sweden, many adaptations could be made by the stakeholders, including the creation and modification of a common Nordic electricity pool, the Nordpool. Even the supply crisis of the summer 2003 in Norway, where problems of market power have been observed, could be solved within the institutional framework of the reform. Similarly, Germany, where no regulator had been created by the 1998 reform law, was able to implement a competitive reform, with a 100% opening of access to networks. Between 1998 and 2002, two adaptations of the initial reform design have been made by negotiations among stakeholders only. These examples show that the potential of adaptation of reforms based on “minor” adaptations can be very strong (Dubois [2007]).

But there are also cases where this capacity to realize “minor” adaptations weak. In the Californian crisis of 2000 and 2001, the “minor” adaptations of the reform were impeded by a series of factors linked to the definition and allocation of rights on the reform. In presence of strong problems of market power, a quick adaptation of the reform was impossible because, in the allocation of rights on the reform, regulatory powers were shared between the federal regulator, the FERC, who had jurisdiction over the wholesale market and the system operation, and the state regulator, the CPUC, who was responsible for regulating the retail market. When prices on the wholesale market rose to dramatic levels, FERC was unwilling to reform the rules of this market (Glachant [2003b]). At the same time, the state regulator was unable to change the price setting rules in order to link the retail prices to the wholesale prices (Holburn et al. [2002]). As a consequence, there were no obstacles to the exercise of market power on the wholesale market. On the retail market, the energy costs increased dramatically, but, the distribution companies were regulated at the state level, they still were subject to price caps. After the biggest electricity distributors went bankrupt, electricity price increases were passed on to consumers.

The adaptability of reforms is thus very different from one country to another, depending on the definition and the allocation of rights among different institutions, especially the power of the regulator. In any case, the capacity to adapt reforms by Coasian bargaining among stakeholders will be limited after a certain time, because there will always be opponents to a further intensification of competition. One condition for the success of this type of bargaining is the existence of a common “area” where an agreement can take place. In competitive reforms, there is a strong probability that this area gets empty after a few years of reform. While some voluntary agreements can be reached in early stages of reforms to improve the economic efficiency of the reformed sector, these types of agreements will not be reached anymore when the objective of adaptations is to deepen competition in the sector. As further intensifications of competition create winners and losers, the losers in the pro-competitive process will not accept to enter into further renegotiations. The pro-competitive adaptation by negotiation is thus limited in time. If further adaptations are needed, they will require “major” adaptations, i.e. the intervention of the legislative and executive institutions.

2.3. Major adaptations of governance: “reforming the reform”

“Major” adaptations are undertaken by the legislative and executive institutions of the states. When the “minor” adaptation process is blocked and further adaptations of the reform are needed, these institutions can intervene, especially when a change in the definition and in the allocation of rights on the reform is necessary. But this change will always remain incomplete, for the same reasons that explain why initial reform laws are incomplete (information problems of the legislator, uncertainty, and bounded rationality). A “reform of the reform” is thus the starting point of a new process of implementation of incomplete rules.

For “major” adaptations to be adopted, they must be supported by the participants in the legislative process. In this process, different institutions (government, legislative chambers, president, etc.) hold veto rights over adaptations. Therefore, the decisions over major adaptations take the form of veto player games (Tsebelis [2002]). In these games, the outcome of the decision process is determined by the preferences of the different veto

players and their sequence of decision. The locations of these preferences determine whether a given adaptation will be preferred over the status quo. And the number of veto players influences the possibilities of adaptation too. When many different veto players have to agree on an adaptation and the preferences of these players are very different from each other, then, if they reach an agreement, this will be very stable, but this reduces the feasibility of further adaptations. This explains why all electricity reforms cannot be adapted over time in the most “efficient” way. Even if a reform adaptation can be considered as “desirable” from an economic point of view, this does not imply that this adaptation will be considered as important from the legislator’s point of view, or that the legislative and executive institutions will be able to agree on this adaptation.

These difficulties in realizing “major” adaptations of governance, and the recognition of the limitations of the ability of regulator to adapt electricity reform arrangements alone are probably also explain the development of “hybrid” forms of governance. In this type of “hybrid” forms, legislative bodies increasingly institutionalize the role of non-public bodies in the implementation process of reforms. This has been the case for several years at the European level, with the Florence for a, which were grouping regulators and stakeholders. In her proposal for a third legislative package of 2007, the European Commission wants to push further this type of solution, with the proposal of institutionalization of the cooperation among transmission system operators.

Finally, as the institutional environments of different countries have very different characteristics, different electricity reforms will also have very different properties in terms of “major” adaptability. When the possibilities of “major” adaptations are limited, the reform process can be blocked. Consequently, there is a probability that some reforms will not be able to reach the more competitive stages, unless the feasibility of “major” adaptations gets improved.

CONCLUSION

Competitive electricity reforms frequently need to be adapted because they are modular. In modular frameworks, initial reforms are necessarily incomplete. Therefore, they can be fully implemented only over a long time frame, because they have to be implemented and completed sequentially. The need to adapt reforms over time is also a consequence of their institutional production process. The production of reforms is first in the hands of legislative and executive institutions who define the reform law. It is then in the hands of a governance structure. Therefore, the process of defining the different aspects of a reform is not instantaneous but takes several years.

Electricity reforms are completed in different stages. They first concern a limited number of modules. Then, when competitive transactions develop in the sector, they are extended to a larger number of modules. During this reform process, some adaptation needs will necessarily appear, either to take into account the growing role of interdependencies among modules or in reaction to disturbances. The adaptation process that will be realized is not mainly determined by “technical” aspects. It is rather an institutional process and its characteristics are determined by the definition and allocation of rights “within” and “over” the reform. Depending on the definition and allocation of rights, reforms can either be adjusted by “minor” adaptations of arrangement, or by “major” adaptations of governance. But the minor and major adaptation capacities of reforms are not unlimited, which raises questions about the continuing of the process of pro-competitive adaptations of electricity sectors.

Different conclusions can be drawn from this analysis. The first one is that reformers should take into account the need of adapting reforms over time. Credibility is thus not the only criterion of good institutional practice. Reforms experience severe problems when they are credible but too inflexible. They must be built to be not only credible but also adaptable. The second conclusion is that the reform process can be stuck for institutional reasons. When stakeholders refuse to negotiate further adaptations, it is impossible to realize “minor” adaptations. When the institutional veto players are then not willing to reform the reform, the pro-competitive process can be stopped. This is one of the problems faced by many European electricity reforms.

One implication of our analysis is that this type of adaptation process is even more difficult to realize when different national reforms have to be harmonized. This is especially the case in Europe, where, in spite of European electricity directives, each national reform has been started with its own “modular” specificities. Each national reform also has different properties in terms of “minor” and “major” adaptability, the definition and allocation of rights being specific to each country. Therefore it is still very difficult to harmonize the different national reforms to create a single European electricity market. That’s why it is important to analyze the institutional properties of reforms, in order to get a better understanding of the possibilities of achieving a more competitive European electricity market.

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