



**HAL**  
open science

# Making an Exception: Market Design and the Politics of Reregulation in the French Electricity Sector

Thomas Reverdy, Daniel Breslau

► **To cite this version:**

Thomas Reverdy, Daniel Breslau. Making an Exception: Market Design and the Politics of Reregulation in the French Electricity Sector. *Economy and Society*, 2019, 48 (2), pp.197-220. 10.1080/03085147.2019.1576434 . halshs-02046974

**HAL Id: halshs-02046974**

**<https://shs.hal.science/halshs-02046974v1>**

Submitted on 29 Nov 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Thomas Reverdy & Daniel Breslau (2019): Making an exception: market design and the politics of re-regulation in the French electricity sector, *Economy and Society*,

#### Abstract

By subjecting market participants to uncertain and volatile prices, the liberalization of public concerns generates opposition that threatens its own survival. This paper asks how this contradiction is resolved in practice. We examine the case of the French electric power industry. When this sector was liberalized and integrated with European markets, a period of unexpectedly high prices brought strenuous objections from the French electro-intensive industries, and a crisis in political support for liberalization. Based on interviews with key participants and analysis of the documentary record, we trace a series of efforts to reach a political accommodation. Liberalization has not realized the neoliberal imaginary of an efficient and peaceful allocation of state services. But it has effectively transformed the terms under which political-economic struggles proceed, mediating, constraining and governing the politics of distribution.

Keywords: France; electricity market; regulation; competition; liberalization.

Thomas Reverdy (corresponding author), CNRS, Science Po Grenoble, Grenoble-INP, PACTE, University Grenoble Alpes, 46 av Félix Viallet, Grenoble Cedex 1 38031, France. E-mail: [thomas.reverdy@grenoble-inp.fr](mailto:thomas.reverdy@grenoble-inp.fr)  
Daniel Breslau, Department of Science, Technology, and Society, Virginia Tech, Blacksburg, VA 24061-0447, United States. E-mail: [dbreslau@vt.edu](mailto:dbreslau@vt.edu)

The record of European economic integration through liberalization is uneven and paradoxical. On one hand, individual states have achieved something like a wholesale transformation of their relationships to markets and societies. National legacies of state structures, described for the first three or four postwar decades in terms of the tripartite Liberal-Statist-Corporatist classification (Esping-Anderson, 1990; Shonfield, 1966), have been greatly attenuated over the years since (Hall & Soskice, 2001). Accompanying the decline of distinctive state structures, and the convergence of policy-making regimes across states, analysts of political economy have described a general 'retreat of the state' (Strange, 1996). For France, the focus of this paper, the state abandoned the post-war policy of dirigisme, adopting a local flavour of neoliberalism, where the state's economic role is, at least officially, confined to the support to markets (Levy, 2006, 2008; Schmidt, 2017). The European Union's enforcement agencies, primarily the European Commission and its Directorate General for Competition, have been a further agent of convergence, by enforcing the Union's prohibitions on anti-competitive state intervention (BuchHansen & Wigger, 2014, p. 81).

But despite the profound and convergent institutional transformation, European liberalization has been an uneven and nonlinear process. If its ambition has been the full realization of a market economy, with market-based pricing of all goods and services, then that ambition has been achieved neither completely nor uniformly (Smith, 2016). As it frames the rules and actors of the economy, it generates overflows, emergent breakdowns in the market logic (Callon, 1998b). The agreements that underlie the European Union provide for departures from neoliberal orthodoxy in case of market failures, crises or externalities (Davies, 2013). But markets that are not determined to be inefficient nonetheless fail due to organized opposition and what we refer to as a 'political market failure', in which the consequences of the market itself, particularly the behaviour of prices, provokes demands by powerful and sympathetic actors to be sheltered from the volatility and extremes of market prices. Thus, Menz describes a range of failures of labour markets, in which national constituencies pressed for, and obtained, protection from liberalization measures (Menz, 2005). The resulting process of reforms to the reforms has left a variety of hybrid institutions. In the electric power industry, the subject of this paper, price-setting markets coexist with subsidies for renewable generation, state intervention to promote investment for the sake of system reliability, and protections for particular groups of customers (Correljé & de Vries, 2008; Glachant & Finon, 2005). As with liberalization itself, all of these instances of exception and re-regulation can only be accomplished through state action (Levy, 2006).

This paper examines a case of political market failure and re-regulation, and asks how demands for relief from market prices can be accommodated within the liberalization project. How does the liberalization project manage the opposition that it generates? The re-regulative response, and even the limited return to 'economic patriotism' (Clift & Woll, 2012), has not overturned markets, and the coexistence of the competitive markets and their negation, namely administered prices and subsidies, raises the question of

how these contradictory logics are reconciled. How are market relations preserved globally while a variety of non-market mechanisms, often for the same commodities and the same industries, are adopted locally? This is not a trivial question, since non-market pricing can be corrosive to the legitimacy of market mechanisms. A subsidy, for instance, what the European Union calls 'state aid', easily provokes grievances among those who do not benefit (Fligstein & Sweet, 2002).

Markets, we argue, are political institutions (Fligstein, 1996). Neoliberal reforms have not abolished politics. And they have not realized their maximal goal of an efficient and peaceful allocation of all state services at market-based prices. But markets mediate, constrain and govern the politics of distribution. The liberalization project has effectively transformed the terms under which political-economic struggles proceed. The market regime defines the ways that claims can be formulated and legitimated; it is a world with its own justificatory logic and conception of the common good (Boltanski & Thévenot, 2006). And it constrains the possible remedies for claims against the market order. The market itself supplies the terms for repairing political market failures (Breslau, 2013). The result is a politics of market design, where actors are constrained to stake claims and articulate grievances indirectly, in terms of the rules of the market, rather than as direct claims on the distribution of resources. Their requests for state remedies, and claims on resources, are formulated as claims on market rules. The state's response is therefore confined to actions consistent with the shift in its role from 'market-steering' to 'market-supporting' (Levy, 2006).

Consistent with the theme of this special issue, this paper is devoted to an analysis of the dynamic of liberalization and re-regulation, failure and repair. By studying the activities of the agents who are elaborating the rules of the markets, we are able to describe, first, how the work of market design mediates the political struggle involving state actors, pro-liberalization European authorities, and national economic actors; and second, how the resulting rules are not a simple outcome of the political forces, but are shaped and constrained by the model of the market itself. Our analysis is informed by the 'performativity' approach to understanding the role of economics, both theory and measurement, in the constitution of markets (Callon, 1998b; MacKenzie et al., 2007; Silvast, 2017). But we place the process of market design within a social institutionalist understanding of the context, which treats market formation as a political process structured by frames of meaning (Fligstein, 1996). The resulting analysis allows us to trace the dynamic of liberalization and re-regulation through the politics of market design and price calculation. We show how the dominant institutional model of the electricity market, the outcome of a political process mediated by economic experts, itself mediates the subsequent struggles between promoters of the market model and resistance from national industrial actors.

We develop this account with reference to the case of the electric power industry in France, in the context of European integration through the extension of a standardized market model (Jamassb & Pollitt, 2005). The

political, economic, and indeed physical, characteristics of this industry may make it particularly prone to demands for re-regulation. Since the power system is essential infrastructure, the stakes in assuring its reliable and uninterrupted provision are exceedingly high, and state actors are often reluctant, despite their commitment to liberalization in general, to leave the planning of resources and investment to market forces. The price of electricity can have profound effects on core sectors of the economy as well as residential consumers of power, and thus there are strong reasons for both buyers and sellers of electricity to seek protection from price risks. Finally, the legacy of regulation and industrial policy is nearly an international universal, since nearly every liberalized electric system was either a state-regulated monopoly or publically owned within the memory of its current managers and customers (Sioshansi & Pfaffenberger, 2006). This legacy takes a particularly salient form in the French case, providing an alternative institutional and valutive frame for judging prices and pressing for relief from market prices.

A few emergent themes of our analysis are worth pointing out here. First, we find that the politics of the market interacts with the behaviour of market prices. The maintenance of a stable coalition among state and industrial actors, and thus a stable market, depends on an additional actor, namely, the market itself. In the prices it sets, the market can act to reinforce or weaken the political support for the market, even inducing its political failure. Prices are not only economic signals that market participants monitor in order to guide decisions on production and investment. They are also political signals that inform decisions on whether to continue to support the market model, and the liberalization project as a whole. Second, market designers, in responding to the political failure of the market, are constrained to save the liberalization project globally, while accommodating the defectors locally. In the European case, this means upholding national obligations under the Treaty of Rome, establishing the European Economic Community (Buch-Hansen & Wigger, 2014; Cini & McGowan, 1998). Market designers try to devise a mechanism to provide relief from market prices for specific actors while complying with the European Commission and its Directorate General for Competition (DG Competition). As our case illustrates, the configuration and boundaries of the market are the outcome of an exploration that seeks to reconcile political demands for relief from the market with the institutional requirements of the market itself.

### The case – liberalization of the French electric power industry

The case study presented in this paper is part of a project focused on the adaptation of French industry to energy sector liberalization including gas, electricity and energy services from 2004 to 2010 (Reverdy, 2014). More than 100 interviews were conducted, mainly with energy suppliers and industrial clients. For this paper, the focus is limited to the electricity market and is based on interviews with academics (3), parliamentarians (2),

administration (2), energy regulation commission (1), energy suppliers (3), industrial customers (4). The interviews lasted between 1 and 2 hours and were mostly carried out in the interviewees' place of work. The interviews were transcribed and then analyzed. In addition, Reverdy analyzed a set of official documents, including public reports, legislation and media reports. Transcripts of the public conferences (each year between 2004 and 2010) of the 'Club Energie et Développement', a French association convened by the parliamentarian François-Michel Gonnot, was also helpful in tracing the political debates.

During the first years of liberalization in continental Europe, the European Commission and national regulators worked to develop an integrated European market for electricity. They pursued this aim by facilitating cross-border trade, organizing a network of independent regulators in each country, establishing interconnected spot markets, and limiting the influence of existing monopolies. The term deregulation would be misleading as a description of these reforms; whatever the benefits of competition, they cannot be realized spontaneously by freeing prices from regulation. Trade in electricity must conform to the technical requirements of the power system, particularly the transmission grid, and must be coordinated with the operation of the grid itself (Karnøe, 2010). Operators match offers and bids in the market in a way that minimizes generation costs within the constraints of the transmission system. Due to the high concentration of ownership in the power industry, market monitors constantly track prices relative to the predicted competitive prices and invoke 'mitigation' measures to limit the exercise of market power. Rather than enforcing competition itself, they insist that prices should approximate the predicted outcome of a competitive market (Breslau, 2011). Regulators also enforce open access of new entrants to the network.

French industrialists campaigned in favour of liberalization before the European Commission. Taking into account the country's specifics, and especially France's extensive reliance on a baseload served by nuclear power and hydropower, the government believed that short-term effects of liberalization on the sector's organization would be negligible. The government was confident about the long-term advantages, and focused above all on maintaining cohesion with other European countries. When the market was launched, most energy-intensive industrialists<sup>1</sup> exercised their eligibility, i.e. their right to buy electricity on the free market (except those benefiting from a long-term contract at a preferential rate). Prices on the wholesale markets initially declined, confirming the 'promise' of their promoters.

The European market, as developed from 2000, benefited from the accumulated expertise and devices developed in other countries, particularly the United States, where liberalization has led to a variety of relatively successful experiences. The international network of economic experts, through experience with a range of power systems and regulatory jurisdictions, has arrived at a general model for wholesale electricity markets,

and this model serves as an institution (Scott, 2001). This institutionalized market is supported by theorized representations, technical devices, computational techniques and specialized training. The design that has been adopted in most instances of restructured wholesale markets, and of which the European market is one variation, uses a centralized price-calculating algorithm that approximates the theoretical price that would be achieved in an idealized competitive market. It consists of a day-ahead auction in which generators specify quantities of power and the prices at which they are willing to provide them for every hour of the next day. Buyers submit their bids, which are generally simply quantities demanded for each hour, with some buyers also specifying the highest price at which they are willing to buy each unit of power. The central system operator then aggregates the offers, and arranges them in 'merit order' from lowest to highest price, to form a supply curve. The aggregated bids form the demand curve. The point of intersection of the two curves determines the market price to be paid by all buyers, with adjustments due to the limited capacity of transmission lines. A separate price is calculated for each hour of the day. All offers at the market-clearing price or lower receive that price for their offered power, while those who offered at a higher price are not dispatched – they have been priced out of the market. Figure 1 provides a simplified illustration of the procedure for determining electricity prices.

Under competitive conditions, the supply curve for power is expected to reflect the different operating costs of generating technologies (Caramanis et al., 1982). Although nuclear plants involve enormous initial capital investments, the cost of generating each megawatt-hour of power is much lower than most other types of generation, particularly those using fossil fuels.

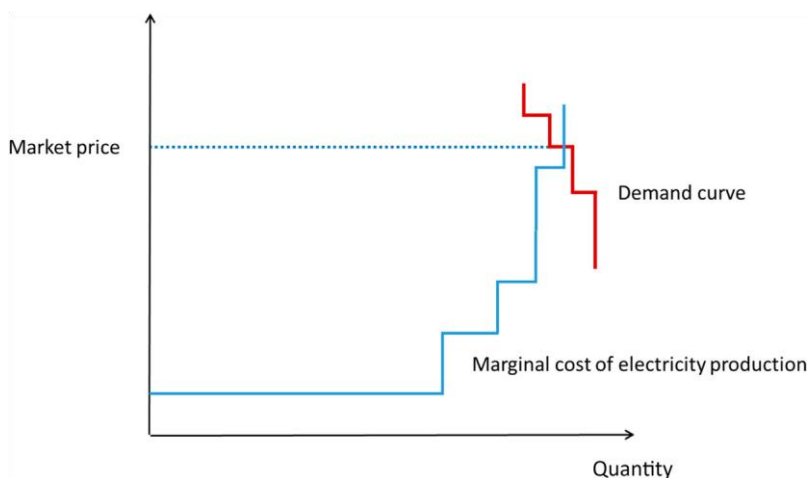


Figure 1. Price formation in the electricity market.

Coal-fired plants, though not used extensively in France, have a somewhat higher cost of production. Various types of natural gas-fired plants cost even

more, at least during the years covered here, and are bid into the market at a higher price. Peaking plants, with high-cost fuel and low efficiency, but which can be quickly ramped up or down, are the highest priced source. The demand for power, or load, at any time determines which type of plant will be 'marginal', the highest-priced generator running at that time. The price of the marginal plant sets the price for the entire system. When the load requires the use of more expensive sources, which is the case during most daytime hours, nuclear plants will receive a price set by those more expensive sources, and well above their own production costs. They thus get to pocket an 'inframarginal rent', the difference between the market price, set by higher-cost marginal suppliers, and their own production costs. They need part of that rent to recover the enormous cost of the initial investment and pay for other fixed costs. But it can yield a substantial profit when generating capacity is scarce.

Market actors have agreed, together with the regulator, to adopt this calculation formula, which is also used by regulators in market control. Indeed, this market is subject to close monitoring of prices and investments to verify that there has been no collusion or abuse of dominant positions (Joskow, 2008). Monitors continually compare actual price and generator bids to theoretical prices based on the prediction that the price in a competitive market should reflect the marginal costs, and generators should, under ideal competitive conditions, submit bids based on their own costs.

Finally, the construction of a European electricity market requires the coupling of various national markets. Border connections, previously developed by national suppliers for the sharing of power and infrastructure during extreme events, were expanded by the transportation system operators for the purpose of full integration. A truly integrated market requires the free flow of power across borders, which can only be achieved by greatly relieving transmission bottlenecks at national frontiers. These couplings have been systematically sought inside Europe through an economic integration policy. The evolution of the material and contractual infrastructure has been complemented by a data communications infrastructure that has gradually connected transactions between market players across national borders, thus constituting interconnected European markets.

### Freer markets, higher prices

Shortly after the adoption of a competitive wholesale market in 2000, economic and political actors were faced with a large and unanticipated rise in prices, lasting from 2004 until 2008. After initially benefitting from a particularly attractive price compared with the regulated tariff, electricity buyers faced a substantial increase, to such an extent that the market rate consistently exceeded the regulated rate. The increase in prices was general to Europe, and its causes were the subject of intense debate. Electro-intensive industrialists were the first to point out this increase in 2003. With their



extensive experience negotiating cost-based prices, the industrialists had intimate knowledge of the production costs of their major suppliers of power. Viewed from the perspective of their historic relationship with the power suppliers, the market prices were now well above the production costs of the nuclear plants, and were therefore unjust and unjustified. The industrialists expressed their concerns publicly (Aghetti, 2003; Montfort, 2006; UNIDEN, 2004): they felt that the low prices they obtained during the initial years had been a trap, and they suspected that the producers had colluded to manipulate prices.<sup>2</sup> The highly concentrated structure of the market, with competition limited to a small number of large incumbent producers, seemed to support the plausibility of collusion or 'economic withholding', the submission of bids well above production costs.

Faced with the industrialists' mobilization, the French government was slow to react.<sup>3</sup> It also benefitted from the higher revenues earned by the largely state-owned fleet of nuclear power plants. During this period, the Finance Ministry was actively preparing to sell off some of the capital of the state electricity producer EDF to private investors. Given the context, EDF's electricity revenues, due to the high prices, enhanced the value of the company, and therefore the profit to be gained from the sale of its capital. The French government was also a prisoner of its own consistency. By supporting marketbased pricing and the partial privatization of EDF, it had thrown its lot in with liberalization, and had awakened new economic actors ready to invest in an opened electricity market. It would have been exceedingly difficult to reverse course.

But state actors did go as far as investigating the claims put forth by the large industrial electricity customers. At the beginning of 2004, the Economy and Finance Ministry asked the General Council of Mines and the General Finance Inspectorate to study the market's operation and thereby shed light on the debate. The two administrative bodies formed a committee that conducted a series of interviews, and collected economic data from a long list of stakeholders, including European actors. It set out to adjudicate the claims of the industrial consumers, compared to the arguments of the EDF, which claimed that the high prices were simply the result of the healthy functioning of a competitive market.<sup>4</sup>

The Prévot report (2004) presented a detailed rationale for the spot pricing model, described above, in the wholesale electricity markets. The model appeared to have the endorsement of nearly all economists, who based their support on micro-economic reasoning: a competitive market sets prices at the marginal cost of production. The report used this 'marginal production cost' to justify the increase in market prices and the difference between market prices and production costs (p. 5). The prices that the large French industrial consumers regarded as unjust were deemed to represent the normal and healthy functioning of the market. According to this theory, in an integrated French-German electricity market, it was to be expected during times of relatively high load that the wholesale spot price would be aligned with the costs of the most expensive installations used to meet demand, namely,

German natural gas-fired turbines (p. 12). But these prices were much higher than those the industrial customers had paid under the old regulated system, where prices were based on average costs. Furthermore, this price level created a windfall inframarginal rent for the nuclear industry.

Through a conservative and careful empirical analysis, the report confirmed the economic theory. The high prices could not be attributed to market power exercised by EDF, or collusion among large power producers. Rather, the prices approximated the predictions of economic theory, by which the costs of the marginal producer set the market price. Due to general shortages of capacity throughout Europe, the peaking generators were used more often, and due to the increasing price of natural gas, those generators were more expensive than before (European Academies Science Advisory Council, 2006). The prices were not only the normal consequence of a competitive market, but were necessary for the market to function as an efficient allocation device. Without the high prices, the market would not be sending the correct price signals, and would therefore not provide an incentive for new investment in generation.

French academic economists joined the debate in 2007. David Spector (2007), a member of the Paris School of Economics, concurred with the analysis of the Prévot report. Finon and Glachant (2008), two other economists specialized in energy markets, did the same. All agreed that the high prices would persist or even increase in the future: the current market price reflected the scarcity of nuclear power plants. Economic expertise highlighted the specific case of the French market and made it possible to deconstruct the widelyheld expectation on which all European policy was based: 'the opening of markets to competition brings prices down'. As Marcel Boiteux, a renowned French economist, CEO of EDF for many years, and identified personally with the establishment of France's nuclear patrimony, described the situation, 'it is no longer a question of opening up competition in order to reduce prices, as one might have initially believed, but of raising prices to allow competition. What a superb paradox ...' (Boiteux, 2008).

The European Commission's Directorate General for Competition (known as DG Competition) admitted the possibility of elevated prices due to market concentration, but insisted that the remedy was further promotion of competition (Kroes, 2006). This is why at the end of 2005, the DG Competition decided to undertake an enquiry into the level of competition in the markets.<sup>5</sup> In the report (DG COMP, 2006), the DG Competition emphasized its conviction that a structurally more open market would lead to virtuous behaviour by market players. More surprising still, from a French viewpoint, was the DG Competition's acceptance of a high electricity price level: it considered that a high price level was not necessarily a sign of market dysfunction and could have a positive effect on investment decisions. The main problem identified in the

report was that a high price level would not necessarily lead to investment if the market was highly concentrated. The producers could slow investment and share the resulting scarcity rents amongst themselves. Incumbent producers would prefer to maintain a condition of scarcity than to build more generating capacity. Persistent barriers to entry of new suppliers enhanced the ability of incumbents to continue to benefit from scarcity. For this reason, the DG Competition again emphasized the need to move ahead with market liberalization so that competition operated in a satisfactory manner and focused on dismantling the vertical integration of the industry, separating generation from transmission and distribution of power. The market model itself and its redistributive effects were not questioned.

At the core of the ongoing dispute was a conflict between two modes of valuation. On one hand, the forces in favour of liberalization of the electricity market were compelling. These included the European Commission and its General Directorate for Competition, the French Ministry of Finance, EDF management, and a growing constituency of new and potential entrants, including their financial backers. For them the market promised the most efficient way of providing power. The price signals rendered by the market, moreover, provide the best guide to investment. Within this frame, prices are evaluated according to their consistency with the aggregate functioning of the market. High prices, and high rents, could be justified if they were accurate signals, if they represented faithfully the state of the market. Prices kept close to the production costs of power generators would be deemed unfair, since they would distort the signal, and perpetuate a shortage by not providing potential investors with a 'build' signal.

The second mode of valuation was activated as a response to the high prices. Large electricity customers, and especially those for whom electricity is a major industrial input, follow prices, not only as an economic signal, but as a political signal as well. Prices guide investment and production decisions, but also decisions whether to dissent from the market and to appeal to outof-market relief. The variation of the electricity price is thus a key determinant in the temporality of liberalization reforms. In an industry with prices that are subject to wide cyclical swings, it is easier to maintain political support when prices are lower than average costs. As Borenstein and Bushnell (2015) observed in the case of the United States, the consent of powerful energy customers with the liberalization project is partly a function of prices. When market prices are low, consumers consent to liberalization and to their own transformation into calculating market actors. But when prices rise well above the costs of the traditional suppliers, they are able to block promarket reforms.

In response to the shockingly high prices, French industry evoked the evaluative frame associated with the long history of dirigisme and national industrial policy. For French industry, particularly the 'electro-intensive'

industries of aluminium, chemicals, steel, transport and others, their relationship to the incumbent suppliers of electricity, particularly the 'historic' nuclear plants owned by EDF, is not the impersonal link between buyers and sellers. It is a privileged link between the national industrial sector and the state, for the purpose of national development. According to this frame, EDF is an electric utility and also a national institution. Indeed, the state-owned nuclear power industry had occupied a central role in a technopolitical regime linking technology to policies of industrial development and cultural imagery of the nation's radiant future (Hecht, 2009, p. 334). Its mission is not necessarily to maximize returns for its investors, but to be a central component of industrial policy. Its provision of power at rates based on the production cost is the return on many years of state investment in the development of nuclear power. At a very material level, the very existence of electro-intensive industry in France depends on privileged access to state-owned power plants (Prévoit, 2004, p. 27). Although it stands in stark opposition to the liberalization promoted by the European Union, and adopted by the French state, the historical arrangement between the state, EDF and electro-intensive industry has retained considerable legitimacy because it constitutes the material reality of the French industrial economy. Market-based prices, with the potential, now realized, to rise well above the cost-based rates, violate the implicit terms of this post-war industrial order.

#### Solution I: working within the market

The industrialists, via the Union of Energy-Using Industry (UNIDEN),<sup>6</sup> demanded that regulated prices be reintroduced. However, for the French government, which was in the process of organizing the liberalization of the entire market, a return to regulated prices was out of the question. Nevertheless, the Minister of Industry, Francis Mer (himself a former manager from the electrointensive industry) was especially sensitive to what the electro-intensive users were saying. While the government did not regard the grievance of the industrialists as warranting a reversal in its liberalization plans, it was willing to search for an accommodation.

The Prévoit committee recommended a market-based approach intended to hedge the industrialists' exposure to volatile and high prices. This would be a remedy for the grievances of the electro-intensive industries, but would not require a return to state-supervised regulation (p. 31). The industrialists would negotiate a long-term contract with EDF based on average expected market rates. The committee drew inspiration from the Finnish European Pressurized Reactor (EPR) at Olkiluoto, financed by a purchasing consortium of electricity-consuming industrialists. The purchasing consortium signed long-term contracts that hedge its members against price volatility. The

Prévoit committee sought to transpose this approach to France, i.e. to set up a consortium that would sign a long-term contract with EDF. The consortium,<sup>7</sup> named Exeltium, was the object of several discussions between UNIDEN and EDF, and with the Ministry of Economy and Finance (including Energy and Industry). The negotiations extended over four years, against the backdrop of rising market prices, shifting demands from EDF, and the 2008 financial crisis. The terms of the contract were not finalized until March of 2010.

This possible remedy faced two objections from the pro-liberalization European authorities. The Ministry was concerned that the European Commission might view the long-term contract between the Exeltium consortium and EDF as a thinly disguised form of state aid, prohibited under the updated Treaty of Rome. With its controlling share still in the hands of the French state, EDF could not be counted on to behave like a calculating market participant in negotiating the price. And the deep involvement of the state in negotiating the deal raised the (justified) suspicion that the state, through its Ministry of Commerce and Finance, was engineering the deal in order to benefit a powerful private constituency. Moreover, according to economic models of the market, prejudicial treatment toward one set of customers could depress prices generally, harming competing producers of power.<sup>8</sup> To justify the arrangement, the parties had to prove that both the contract and the price remained 'plausible', in other words, that it was in the economic interest of EDF as a profitmaking firm to sign a long-term contract at a price below the market price. The state and EDF needed to demonstrate that the contract represented genuine market behaviour rather than favouritism. Furthermore, if there was to be price discrimination, it should be price discrimination that made sense in terms of the parties' business interests. For example, the lower price could be necessary to avoid the loss of electro-intensive industrial activities at risk of being transferred abroad, an outcome that economically-rational electricity producers would try to avoid.

Second, while DG Competition was satisfied that the long-term contract was structured in a way that did not constitute illegal state aid, it raised another objection. Evaluating the Exeltium arrangement in terms of its consequences for the structure of the market, the DG Competition worried that the arrangement would intensify the already high concentration of the electricity sector in France.<sup>9</sup> If the electro-intensive customers were to satisfy the bulk of their power requirements through Exeltium, and its purchases from the EDF-owned nuclear fleet, the deal would reduce the volume of consumption available to competing power suppliers and potential new entrants to the market. Therefore, the DG Competition requested a reduction in the quantity of power to be made available to the consortium. Ultimately, agreement was reached on quantity limit of 15 terrawatt-hours (TWh) per year, down from the consortium's original request of 40 TWh/year, a sum representing 10 per cent of the country's entire electricity consumption.

While the industrial customers had perhaps expected more robust relief, the parties to the Exeltium arrangement were subject to European requirements. Thus a solution, in the form of a longterm contract, had to be formulated in a way that neither distorted market prices, nor reduced competition. The result of state arbitrage with the purpose of protecting French industry, the Exeltium contract was framed as a voluntary business deal among private actors. It was constrained to perform the predicted behaviour of rational economic actors maximizing returns and hedging risk.

But this conformity with market institutions was never complete, and remained superficial in some important respects. It was weakened by a multitude of contradictions, the most obvious of which was the necessity of State sponsorship of an arrangement that was supposed to be the result of spontaneous private activity and thus consistent with the market. This impression was strengthened by the observation that the deal was manifestly non-consensual. The EDF executives were reluctant to sign the agreement because it obliged them to sell electricity below the market price, while still assuming investment risks. EDF management was also concerned that the industrial customers would bolt the agreement as soon as market prices decreased. For their part, UNIDEN representatives publicly threatened EDF with state arbitration, undermining the case that EDF would contract with the consortium voluntarily, due to business interests, without being subject to political pressures.<sup>10</sup> Nonetheless, this arrangement satisfied the requirements of the European authorities, who certified it as plausible and acceptable within the market institution.

#### Solution II: a return to the regulated tariff

In 2005, while French industrialists were heavily involved in setting up the Exeltium consortium, they gradually recognized that this approach would not provide the remedy they sought. Likely delays in setting up the consortium, while electricity prices continued to rise – doubling since 2003 – reinforced this conclusion. While Exeltium was being set up, various associations of industrial customers actively lobbied the French parliament in favour of a new regulated tariff. Members of parliament from the major parties identified with these demands. Meanwhile, in 2005 and 2006, due to the increase in the market price, EDF collected an inframarginal rent of 3 billion euros each year.<sup>11</sup> The price had become a matter of public concern, and led to the mobilization of many French parliamentarians, attempting to provide relief that could be reconciled with the European commitments to the development of an integrated electricity market.

French parliamentarians used a legal opportunity to seize the initiative. The parliament had been debating the possibility of restoring a regulated tariff to

individual customers. This resulted in a new but temporary regulated tariff for large industrial and commercial customers: the Transitional Regulated Tariff for Market Adjustment or TarTAM (tarif réglementé transitoire d'ajustement de marché). They justified this tariff with reference to distortions in competition between industrial customers who had subscribed to market offers and those who had remained loyal to the historical supplier. The tariff defined within the framework of the TarTAM set prices at an average between the cost-based regulated tariff and the market price. In August 2008, France decided to extend this mechanism until 30 June 2010 and to open it up to new beneficiaries. The short-term effects of the TarTAM were as expected. It had a redistributive impact in favour of industrial customers compared to what prices would have been under the market. In 2008, the redistributive effect was evaluated as 10 billion euros saved by industrial consumers, compared to what they would have spent at the market price. Also as expected, TarTAM reduced the rents received by nuclear plants as well as 'baseload' hydroelectric power plants.

This initiative from the French parliament represented a sharp break from the cautious strategy the government had adopted until then, and which had led the UNIDEN and the Ministry of Industry to regularly consult the DG Competition and set up proposals that complied as much as possible with European law on competition. Unlike the Exeltium consortium setup, which the European Commission had reluctantly accepted, the setting up of a new tariff, the TarTAM, was bound to trigger a virulent response and worsen relations between the French state and the European Commission. From the point of view of DG Competition, the TarTAM amounted to the reintroduction of a regulated tariff. They regarded this as an extraordinary step, which should be reserved for situations of vulnerable individual consumers. Interpreted from within the frame of the competitive market, it constituted state aid and an instance of price discrimination that could distort prices throughout the market. In 2007, DG Competition opened a formal investigation of aid supposedly granted to large and medium-sized enterprises in France in the form of an artificially low tariff, financed either directly or indirectly by the state. In 2009, the DG Competition extended the investigation with the same concerns (European Commission, 2009): the TarTAM was considered to be illegal state aid because it was selective, unfairly benefitting a single group of electricity consumers. It was anathema to notions of market efficiency maintained by the market's protectors. More importantly, it would open up the market to potentially cascading political claims. Furthermore, it revived the pre-market system of regulated prices for a single supplier, thus reinforcing the non-competitive structure of the French power industry. The European Commission, however, spared France any official condemnation, pending ongoing French efforts to find a new solution, to which we now turn.

### Solution III: coexistence

With the embattled TarTAM tariff scheduled to be retired, in 2008 the Minister for the Economy and the Minister for the Environment formed the Champsaur Commission, which was charged with formulating a solution to the French market that benefitted the consumer, assured the competitiveness of the French economy, and guaranteed control over electricity prices, all 'while meeting European liberalization requirements'. The Commission's charge recognized that the expectations were contradictory but nonetheless expected the Champsaur Commission to set up a 'market design' that would reconcile them (Champsaur, 2009). The Commission's chair, Paul Champsaur, was the president of the French regulatory authority for the telecom industry. He drew prestige and a certain legitimacy from the acknowledged success in liberalizing the French telecom market. The Commission included members of parliament and a range of experts, including an energy economist.

Until the work of the Champsaur Commission, the political demand for a stable price and the goal of a competitive market were seen as contradictory. The report, however, proposed and discussed two solutions (Champsaur, 2009). The first solution is one usually used to compensate for excessive rents that are the result of market failure. It consisted of setting up a tax on electricity produced by nuclear power while letting EDF sell freely on the market. The tax would be based on the nuclear rent, the difference between the price on the wholesale market and the average production cost for base consumption. This was a preferred solution for economists, since it would allow all wholesale prices to be determined by the market and would avoid possible market distortions introduced by subsidies or price discrimination. The nuclear plants would be allowed to collect the 'nuclear rent' but it would be taxed, with the tax revenues redistributed to various classes of power consumers. This solution, however, was summarily rejected by the Champsaur Commission, primarily because it would not relieve the main reason for the political failure of the market, namely, the instability of prices. Secondly, it would leave the immense market concentration intact in the hands of EDF.

The Champsaur Commission report expressed a clear preference for a second alternative: redesign of the French electricity market through the introduction of 'regulated access to production for baseload consumption' (p. 14). This design provided the industrial customers with protection from high market prices, and granted them preferred access to the low-cost power produced by the nuclear fleet. But it linked this objective to a more aggressive measure to promote competition among electricity suppliers. The principle of this system is that competing suppliers and large customers of EDF could obtain part of their electricity through regulated access, at a



regulated tariff, and the remainder of their required power on the market. This system would be open to French competitors such as GDF-Suez or Direct Energie, or to foreigners, such as E.on or Enel. Such a system required defining precise criteria for determining the quantity of nuclear-generated electricity that EDF's competitors would be entitled to, and partitioning that power from electricity that would be sold at market prices. In the absence of such limits, EDF's competitors would have an incentive to purchase large quantities at the regulated price, only to resell them at the market price. To determine the quantity of nuclear-generated electricity that EDF competitors would be entitled to, it was therefore decided that an 'objective, transparent and non-discriminatory' criterion be adopted: 'the consumption structure of the portfolio of customers residing in France' (p. 14). In other words, the quantity of electricity sold by EDF to each competitor at the regulated tariff would be limited to the base load required by this competitor for its French consumers. EDF's competitors would have to produce the remainder of the power supplied to their French customers themselves or purchase it at the market price. They would then sell their electricity to their customers at a price that reflected the weighted average of the tariff of the regulated access (baseload) and the wholesale market price (peak load). For industrial customers with stable consumption, the retail price would reflect only the regulated tariff. The design would therefore neutralize the anticompetitive effects that had been objectionable in the case of the TaRTAM. The portion of nuclear-generated power reserved for regulated, cost-based pricing, could be justified as a pro-competitive measure, which allowed the European Commission to tolerate the fact that part of it constituted relief for French industry.

But the Champsaur Commission debated at length the issue of which resources would be included in the regulated tariff. Initially, it had defined the tariff in terms of cost-based access to all baseload generation, to refer to all of the low-cost generation that runs at all times to satisfy the constant minimum demand for power. This includes not only the French nuclear fleet, but also much of the country's hydropower. But here the Commission confronted legal and political opposition from the largest owner of hydropower in the country, other than EDF itself, namely GDF Suez (today Engie). This competitor of EDF was expected to strongly resist the requirement that it sell part of the electricity it produced at below the market rate. GDF Suez would have been able to contest the policy by filing an appeal with the State Council, arguing that the regulated rate violated the property rights it had acquired when it purchased the hydropower plants from the Compagnie Nationale du Rhône. Thus the Commission revised its recommendation, and drafted the New Organization of the Electricity Market or NOME (Nouvelle Organisation du Marché de l'Electricité) law to apply

the regulated rate to a new category, 'historic nuclear' plants, rather than all baseload generators. According to the author of the NOME Law,

The legal dispute was certain. I always had the desire to avoid voting for hypocritical laws, which could not be applied. Very soon, everyone followed the argument for historic nuclear and not baseload electricity, for which nobody was able to define the limits.<sup>12</sup>

The French government still needed to convince the European Commission before implementing the Champsaur Commission's recommendations. Discussions with the European Commission started before the Champsaur Commission. President Nicolas Sarkozy formally asked Neelie Kroes, head of the DG Competition, to abandon the condemnation of France in the TarTAM case, and committed to implementing this new market model as soon as possible. In his correspondence with the DG Competition, Prime Minister Francois Fillon explained the precise technical arrangements that would regulate access for competing suppliers.<sup>13</sup> The regulated sale of baseload electricity by EDF is presented as 'asymmetrical regulation of a dominant operator' to promote the entry of competition in the market. The TarTAM tariff had made the entry of new competitors nearly impossible. Already having higher costs than EDF's nuclear plants, new entrants to the market could not hope to recover their investments when prices were depressed by the TarTAM itself. The practice of asymmetric regulation, providing benefits to overcome the barriers to new entrants to a market, had been established by the DG Competition to liberalize the telecom industry (European Commission, 2000). Paul Champsaur had experience with this concept from his prior role as President of the French Telecom Regulation Authority. But there was no direct precedent for using the concept in an effort to force an electricity producer to sell its power at cost.

The DG Competition ultimately approved the Champsaur Commission's recommendation, placing greater emphasis on its competition-enhancing features while tolerating its limited departure from the ideal of marginal-cost based pricing. In their reply, Neelie Kroes and Andris Piebalgs recognized that the historic investments in nuclear power, with their low production costs, are difficult to integrate into the new market.<sup>14</sup> And the DG Competition admitted for the first time that if the tariffs were abandoned, 'consumers would probably benefit only to a limited extent from competition', conceding that the plan 'is likely to provide a major lever for competition'.<sup>15</sup> With a high price on the wholesale market, the suppression of the regulated tariffs would lead to higher prices for consumers. The DG conceded that the plan 'is likely to provide a major lever for competition' by allowing the competitors to have access to nuclear energy at a lower cost than the market price. With this regulated access, they would be able to compete

with the historical supplier. Finally, it argued that market-based pricing could coexist with regulated competition, even while expressing some concerns over the resulting technical complexity.

## Conclusion

According to economic theory, and political liberalism, exceptions to market pricing and added rules are justified in instances of market failure. Those are cases where, due to properties of the transacted goods, markets cannot be relied on to find a surplus-maximizing equilibrium allocation. Either some demand is unmet, or supply goes unclaimed. Public goods are a classic example. They are typically undersupplied because producers are unable to exclude those who don't pay for them from enjoying the good. Another example, goods with returns to scale, that tend to monopoly, are likely to be under consumed, since they are priced above the competitive equilibrium (Bator, 1958). Market failure therefore serves to define market boundaries, legitimizing exceptions to the market through state intervention, such as regulated prices, taxation of rents, or state provision of public goods. The technique of repair corresponds to the nature of the market failure.

But in the case of the *rente nucléaire*, excess revenues received by the French fleet of nuclear plants above their cost of operation, the analyses of market prices, and their relation to the marginal costs of generation, found that the market was working as predicted by economic theory, and the prices reflected the intersection of supply and demand curves under competitive conditions. But the large electro-intensive industrial firms continued to press their case, and their threat of exit from the French economy induced a crisis that demanded the attention of the government and parliament. This was not a market failure in the economic sense, but a political failure of the market.

At the heart of the political struggle over the pricing mechanism for electricity was a confrontation of two opposed frames of valuation. They arrive at opposed moral evaluations of the price of electricity in the European wholesale market, and starkly opposed understandings of the *rente nucléaire*. The French political class interpreted this quantity from the perspective of a set of relationships that comprise the late-twentieth century French industrial order. From this perspective, the nuclear rent is unjust and unjustifiable. Plants that exist for the purpose of the nation's industrial development cannot legitimately claim an entitlement to revenues well in excess of the costs of serving French industry, and which, moreover, are determined by the costs of natural gas peaking generators in Germany. And industrialists within this institutional order can legitimately ask why they should pay these rents to nuclear plants that were established for their benefit. Their relationship to the nuclear fleet is not one of undifferentiated customers to a seller, mediated by

impersonal market forces. They uphold a criterion of just prices based on the costs of their primary supplier, costs that they know very well due to many years of negotiating regulated prices. By pressing their grievance in the face of unexpectedly high electricity prices, the industries make it everyone's grievance. As national industries, their economic viability is a public concern. And the rents that the nuclear plants earn at the expense of these very industrialists are a public scandal.

This inherited French frame of interpretation, associated with a long history of state intervention, contributes to what the research on the varieties of capitalism calls the 'clash of capitalisms' (Callaghan & Höpner, 2005), a situation where Coordinated Market Economy states are resisting the liberal dynamic promoted by other western countries and EU institutions. Even if it has been undermined under the influence of EU institutions, state dirigisme is still embedded in the French political culture. But viewed from within the new institutional framework of the competitive electricity market, the *rente nucléaire*, or what economists refer to as an inframarginal rent, is not only just, but necessary. Moreover, it is self-correcting. As investors respond to the signal, capital is expected to move into the vacuum of the nuclear sector. Nuclear, or other inexpensive baseload power eventually becomes abundant enough that the high-cost German natural gas turbines are no longer needed most of the time, and cheaper generators set the price for the system. Here the criterion of justice is the efficient functioning of the market, the absence of collusion and the extent to which the price approximates the costs of the marginal supplier. Like the French industrial policy framework, the market is located in and supported by a configuration of actors and institutions, within which its legitimacy is established. It gains further support from its alignment with the goal of European integration.

However, the clash of capitalisms is not symmetrical. While the industrial customers viewed the high prices they were paying, and the nuclear rent, through the established frame of French industrial policy, this frame was excluded from consideration in European discussions. The frame of the economic model of the competitive market, even when it cannot be fully realized in practice, provides the terms for legitimate political-economic struggle. In opposing the liberalization, the large industrialists and their allies possessed a highly circumscribed repertoire of symbolic resources. They needed to convert their grievances to terms that were meaningful within the market order of the EU. As demonstrated by the ill-fated TarTAM. They could not legitimately demand to be the beneficiaries of a policy that was consistent with the historical French approach, but in the EU context constituted arbitrary price discrimination and a limitation to European market integration. They were unable to demand a return to the pre-market regulated regime. The set of powerful institutions, both at the national and European levels, in favour of opening the market, could not be resisted, because

participation in European trade was conditional on conforming to the neoliberal order established by the EU (Buch-Hansen & Wigger, 2014). Thus, from the start, when industrialists were met with prices that undermined their support for liberalization, they formulated their objections as claims of market failure. Their initial solution, the Exeltium buying consortium, though state-sponsored, was designed to conform to reasonable predictions of the behaviour of buyers that could plausibly emerge spontaneously from the market. After the rejection of the TarTAM as prohibited state aid, the market design project under the Champsaur Commission arrived at a formula that would provide a measure of relief to the electro-intensive industries, while satisfying the European requirements.

The solution to this problem, of reconciling the irreconcilable, was to 'replace political judgement with economic evaluation' (Davies, 2017), to reframe a political question of distribution and justice as an economic question of the functioning of a market. The search for a solution required converting the political failure of the market into a market failure in the economic sense. This is not to say that the solution itself is a straightforward implementation of economic theory, since it required a local violation of economic orthodoxy. Only through multiple rounds of negotiation, a protracted exploration identified a solution that provided an economic rationale for that violation of economics. The difficulty of the exploration was compounded by the realization that the closer a solution corresponded to the existing functioning of the market, the less adequate the relief it provided.

There is some evidence for the generality of the logic we describe, at least in the area of electricity liberalization. The DG Competition initially objected to mechanisms to support investment in renewable generating technologies, such as the feed-in tariff, considering it to be a subsidy that discriminated in favour of specific technologies and created market distortion (Pallesen, 2016). But the policy was eventually incorporated in the State Aid doctrine (European Commission, 2014) after a long political and institutional negotiation between the member states, the European Parliament and the Commission (Lauber & Schenner, 2011).

In another instance, Breslau describes the development of capacity markets in the United States, also during the early years of opening the grid to market pricing for power generation (Breslau, 2013). Peaking generators, needed for the reliability of the entire power system, reported that they were unable to cover their costs with the revenues the market was providing. The operators of the transmission grid worried that generating capacity would not keep up with growth in load unless they found a way to channel additional revenues to this critical category of generator. But the system operators and regulators refused a solution that would provide a direct subsidy 'out of market' to the affected generators, and instead set to work to develop a market-based solution. Economists developed an analysis for understanding the political

failure, the claims of the peaking generators, as a market failure, a general failure of the market to provide adequate incentives for investment. Economic consultants turned to the task of inventing a mechanism to reconcile the need to provide sufficient revenues to generators with the overall performance of the market. In Europe, the same adjustments of market organization have been put in place by some member states but are still controversial at the European level (Finon et al., 2017; Marty & Reverdy, 2017).

While neoliberal reforms have not realized a steady state of accepted rules of exchange, let alone their goal of complete markets, they have transformed the terms for formulating and justifying distributional claims. The concept of market failure itself is a technique for performing this conversion of claims for a greater share of market surplus into claims about the pathologies of the market. The overflows of liberalization (Callon, 1998a), when market prices undermine political support for the market, do not result in re-regulation in the sense of a return to state administration through pre-market mechanisms. Exceptions to market prices are integrated within the market, by elaborating new rules that inoculate the market as a whole from the possible distorting and politicizing effects of these exceptions. The liberalization project does not advance by reconfiguring the world in terms of the idealizations of free trade and competitive markets, conquering the inevitable resistance. Rather, it employs market designers to elaborate a hybrid institution that incorporates opposition, and thus regulates the continuing political struggle over collective concerns.

## Acknowledgements

The authors thank the editors of this special issue of *Economy and Society* for initiating a most productive conversation, as well as the reviewers, whose comments allowed us to sharpen and clarify some crucial points. We would also like to thank Michel Callon, Hervé Dumez, Marion Fourcade, Pierre François, Fabian Muniesa, Denis Segrestin and Philippe Steiner, for their support and helpful comments on the case study.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Notes

1 In 2000, the industrial sites that consume more than 16 GWh per year were affected by the opening of the market. They represented 30 per cent of the load of electricity, 107 TWh and 1300 sites.

- 2 This issue has been publicly debated during the conferences ‘Energy policy and industrial policy [Politique énergétique et politique industrielle]’ (2 December 2003) and ‘The rise of energy price [La hausse des prix de l’énergie]’ (8 December 2004), organized by Énergie & Développement, presided over by the French deputy François-Michel Gonnot. 3 Based on the analysis of the interviews of members of the administration 4 Interview with Henri Prévot, February 2012.
- 5 The inquiry and the reports have been conducted by London Economics and Global Energy Decisions and is titled Structure and Performance of Six European Whole-sale Electricity Markets in 2003, 2004 and 2005.
- 6 Union des Industries Utilisatrices d’Energie, accounting for 70 per cent of the energy consumed by industry in France. 37 companies were members in 2008 – coming from the food industry, automotive, chemistry, cement and lime, electronics, energy, metals, paper, transport and glass.
- 7 The consortium was limited to electro-intensive industries, a category defined by the law of finance (2005-1720): the consumption of electricity should represent a minimum of t 2.5 kWh per euro value added. This criterion ensures that the cost of electricity has a preponderant impact on the value added of the plant.
- 8 This argument is based on interviews with the administration members, Henri Prévot, industrialists and members of the Exeltium consortium.
- 9 Commissioner Kroes welcomes amendments in EDF/Exeltium announced framework MEMO/08/533.
- 10 This argument is based on interviews and on the observation of the debate of the Finance Commission of the French parliament (10 January 2007) concerning the price of electricity.
- 11 Calculation from a comparison between average market price and official costs and the volume of industrial sector consumption observations of the market made by Energy Regulation Commission.
- 12 Interview with Jean Claude Lenoir, UMP deputy 7 June 2011.
- 13 François Fillon, Letter 4301, addressed to Neelie Kroes le 15 September 2009. This document, not public, was provided by a lobbyist after an interview.
- 14 Neelie Kroes, Andris Piebalgs, Letter CAB 25 D 2009 707, addressed to François Fillon, 15 September 2009. This document was provided by a lobbyist who was interviewed for this study. 15 Ibid.

## References

Aghetti, J.-P. (2003). Électricité: Parole de clients industriels [Electricity: Word from industrial customers] Les Échos.  
 Bator, F. M. (1958). The anatomy of market failure. *The Quarterly Journal of Economics*, 72(3), 351–379.

Boiteux, M. (2008). Qui empochera la rente nucléaire[Who will pocket the nuclear rent?]. *La Tribune*.  
 Boltanski, L. & Thévenot, L. (2006). *On justification: Economies of worth*. Princeton, NJ: Princeton University Press.  
 Borenstein, S. & Bushnell, J. (2015). The US electricity industry after 20 years of restructuring. *Annual Review of*

- Economics, 7, 437–463. Breslau, D. (2011). What do market designers do when they design markets? Economists as consultants to the redesign of wholesale electricity markets in the US. In C. Camic, N. Gross & M. Lamont (Eds.), *Social knowledge in the making* (pp. 379–403). Chicago, IL: University of Chicago Press.
- Breslau, D. (2013). Designing a marketlike entity: Economics in the politics of market formation. *Social Studies of Science*, 43(6), 829–851.
- Buch-Hansen, H. & Wigger, A. (2014). *The politics of European competition regulation: A critical political economy perspective*. London: Routledge.
- Callaghan, H. & Höpner, M. (2005). European integration and the clash of capitalisms: Political cleavages over takeover liberalization. *Comparative European Politics*, 3(3), 307–332.
- Callon, M. (1998a). An essay on framing and overflowing: Economic externalities revisited by sociology. In M. Callon (Ed.), *The laws of the markets* (pp. 244–269). Oxford: Blackwell.
- Callon, M. (1998b). Introduction: The embeddedness of economic markets in economics. In M. Callon (Ed.), *The laws of the markets* (pp. 1–57). Oxford: Blackwell.
- Caramanis, M. C., Bohn, R. E. & Schweppe, F. C. (1982). Optimal spot pricing: Practice and theory. *IEEE Transactions On Power Apparatus and Systems*, 101(9), 3234–3245.
- Champsaur, P. (2009). *Rapport de la commission sur l'organisation du marché de l'électricité* [Report of the Commission on the Organization of the Electricity Market]. Paris: La documentation française.
- Cini, M. & McGowan, L. (1998). *Competition policy in the European Union*. Basingstoke: Macmillan.
- Clift, B. & Woll, C. (2012). Economic patriotism: Reinventing control over open markets. *Journal of European Public Policy*, 19(3), 307–323.
- Correljé, A. F. & de Vries, L. J. (2008). Hybrid electricity markets: The problem of explaining different patterns of restructuring. In F. P. Sioshansi (Ed.), *Competitive electricity markets: Design, implementation, performance* (pp. 65–93). Oxford: Elsevier.
- Davies, W. (2013). When is a market not a market? 'Exemption', 'externality' and 'exception' in the case of European state aid rules. *Theory, Culture & Society*, 30(2), 32–59.
- Davies, W. (2017). *The limits of neoliberalism: Authority, sovereignty and the logic of competition* (Revised ed.). Los Angeles, CA; London: Sage.
- DG COMP. (2006). *DG Competition report on energy sector enquiry*, SEC (2006) 1724.
- Esping-Anderson, G. (1990). *The three worlds of welfare capitalism*. Princeton, NJ: Princeton University Press.
- European Academies Science Advisory Council. (2006). *Price setting in the electricity markets within the EU single market*. Brussels: European Academies Science Advisory Council.
- European Commission. (2000). *Europe's liberalised telecommunication's market: A guide to the rules of the game*. Commission staff working document.
- European Commission. (2009). *State Aid C 17/07, 2009/C 96/08 regulated electricity tariffs in France*. Brussels: European Commission.
- European Commission. (2014). *Guidelines on state aid for environmental protection and energy 2014–2020* (2014/C 200/01). Brussels: European Commission.
- Finon, D. & Glachant, J. M. (2008). *La hausse inéluctable des prix de l'électricité en France: Faut-il corriger les effets du marché continental européen?* [The inescapable rise in electricity prices



- in France: Should the effects of the European continental market be corrected?]. *Revue de l'Énergie*, 581, 5–16.
- Finon, D., Keppler, J. H. & Roques, F. (2017). Special section: Towards hybrid market regimes in the power sector. *Energy Policy*, 105, 547–549.
- Fligstein, N. (1996). Markets as politics: A political-cultural approach to market institutions. *American Sociological Review*, 61(4), 656–673.
- Fligstein, N. & Sweet, A. S. (2002). Constructing politics and markets: An institutionalist account of European integration. *American Journal of Sociology*, 107 (5), 1206–1243.
- Glachant, J.-M. & Finon, D. (2005). A competitive fringe in the shadow of a state owned incumbent: The case of France. *The Energy Journal*, 26, 181–204.
- Hall, P. A. & Soskice, D. (Eds.). (2001). *Varieties of capitalism: The institutional foundations of comparative advantage* (1st ed.). Oxford; New York, NY: Oxford University Press.
- Hecht, G. (2009). *The radiance of France: Nuclear power and national identity after World War II*. Cambridge, MA: MIT Press.
- Jamasb, T. & Pollitt, M. (2005). Electricity market reform in the European Union: Review of progress toward liberalization & integration. *The Energy Journal*, 26, 11–41.
- Joskow, P. (2008). Lessons learned from electricity market liberalization. *The Energy Journal*, 29(2), 9–42.
- Karnøe, P. (2010). Material disruptions in electricity systems: Can wind power fit in the existing electricity system? In *Débordements. Mélanges Offerts à Michel Callon* (pp. 223–240). Paris: Presse Des Mines.
- Kroes, N. (2006). The need for a renewed European energy policy, OFGEM seminar on Powering the Energy Debate: Europe Competition and Regulation, London, SPEECH/06/541.
- Lauber, V. & Schenner, E. (2011). The struggle over support schemes for renewable electricity in the European Union: A discursive-institutionalist analysis. *Environmental Politics*, 20(4), 508–527.
- Levy, J. D. (Ed.). (2006). *The state after statism: New state activities in the age of liberalization*. Cambridge, MA: Harvard University Press.
- Levy, J. D. (2008). From the Dirigiste state to the social anaesthesia state: French economic policy in the *Longue Durée*. *Modern & Contemporary France*, 16(4), 417–435.
- MacKenzie, D. A., Muniesa, F. & Siu, L. (2007). *Do economists make markets? On the performativity of economics*. Princeton, NJ: Princeton University Press.
- Marty, F. & Reverdy, T. (2017). *Le marché français de capacité d'électricité [The French market of electricity capacity]*. *Revue de l'OFCE*, 154.
- Menz, G. (2005). *Varieties of capitalism and Europeanization: National response strategies to the single European market*. Oxford: Oxford University Press.
- Montfort, O. (2006). *Les industriels se sont trompés [Industrialists were wrong]*. *Energies News*.
- Pallesen, T. (2016). Valuation struggles over pricing – determining the worth of wind power. *Journal of Cultural Economy*, 9(6), 527–540.
- Prévot, H. (2004). *Rapport d'enquête sur les prix de l'électricité. [Inquiry report on electricity prices]*. Inspection Générale des Finances, Conseil Général des Mines.
- Reverdy, T. (2014). *La construction politique du prix de l'énergie: Sociologie d'une réforme libérale [The political construction of energy prices: Sociology of liberal reform]*. Paris: Presses de Sciences Po.
- Schmidt, V. A. (2017). *Varieties of capitalism: A distinctly French model? In*

R. Elgie, E. Grossman & A. G. Mazur (Eds.), *The Oxford handbook of French politics* (pp. 606–636). Oxford: Oxford University Press.

Scott, R. W. (2001). *Institutions and organizations*, vol. 2nd. (Foundations for Organizational Science). Thousand Oaks, CA: Sage Publications.

Shonfield, A. (1966). *Modern capitalism: The changing balance of public and private power*. London; New York, NY: Oxford

University Press. Silvast, A. (2017).

*Energy, economics, and performativity: Reviewing theoretical advances in social studies of markets and energy*. *Energy Research & Social Science*, 34, 4–12.

Sioshansi, F. P. & Pfaffenberger, W. (2006). *Electricity market reform: An international perspective*. Oxford: Elsevier.

Smith, A. (2016). *The politics of economic activity*. Oxford: Oxford University Press. Spector, D. (2007). *Électricité : faut-il désespérer du marché ?*

[Electricity: Should we despair of the market?] Collection du CEPREMAP, Éditions Rue d'Ulm, Presses de l'École normale supérieure.

Strange, S. (1996). *The retreat of the state: The diffusion of power in the world economy*.

New York, NY: Cambridge University Press.

UNIDEN. (2004). Directive 'quotas d'émission': Comment éviter de désastreuses conséquences? [Emissions Trading Directive: How to avoid disastrous consequences?]. Retrieved from

[www.uniden.fr/document/t40419.pdf](http://www.uniden.fr/document/t40419.pdf)

Thomas Reverdy is Associate Professor of Sociology in the Department of Industrial Engineering in Grenoble Institute of Technology and member of the Social Sciences research lab PACTE (CNRS). His research covers different issues related to organization and market in the industrial and energy sectors. His current work focus on the interplay between energy policies and competition policy in Europe and the way they are interwoven in the design of electricity market and the economic instruments of the energy transition.

Daniel Breslau is Associate Professor in the Department of Science, Technology, and Society at Virginia Tech. He received his PhD, in Sociology, from the University of Chicago. He is the author of many articles and book chapters on the social sciences and their role in political and economic institutions. His current work examines the economics and politics of electricity markets in the United States and Europe. His book *In search of the unequivocal* received the Robert K. Merton Award of the American Sociological Association section on Science, Knowledge and Technology.