

Who captures whom? Regulatory misperceptions and the timing of cognitive capture

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Abstract

To explain cognitive capture, economic sociologists often examine the structure of relationships between regulators and market participants. This paper argues that the nature of regulators' misperception should be subject to analysis as well. Different types of misperceptions develop over timelines of varying lengths. Depending on the misperception, different sets of relationships and parties may therefore be the cause of regulators' capture. The paper illustrates this point with a case study of regulators' failure to detect pervasive market power in California's electricity markets between 1998 and 2001. Existing explanations focus on sellers' short-term attempts to distract regulators from widespread evidence of market power. Using data from three archives and in-depth interviews, I show that the regulators did not fall prey to such "information problems." Instead, their misperception resulted from a more foundational "worldview problem." This error affects regulators' basic conception of the marketplace and can be traced to earlier and more gradual forms of influence exerted by utilities that, ironically, would become the victims of market power.

Keywords: California energy crisis, cognitive capture, economic sociology, regulatory capture, regulatory dialectic.

1. Introduction

Regulatory frameworks are constitutive for markets' functioning and stability. Such frameworks are not static but evolve dynamically. Industry participants react reflexively to rules and regulations. In turn, regulators reflect on the behavior of market participants and amend regulations accordingly. This process is often referred to as "regulatory dialectic" (Funk & Hirschman 2014; Kane 1977, pp. 55–56) because regulation and markets co-evolve in an iterative process of mutual observation and adaptation (Edelman & Stryker 2005, pp. 534–535; Silbey 2013, p. 11). In recent years, sociologists have increasingly studied why regulators fall behind in this process. Studies ask how rule avoidance becomes prevalent and why regulators fail to adjust regulatory frameworks to it (Lounsbury & Hirsch 2010; Wansleben & Walter 2019).

In this paper, I focus on explanations that invoke regulatory capture. These explanations can be contrasted with work that looks at organizational and structural determinants (MacKenzie 2011). Instead, capture explanations examine regulatory interactions to determine specific culprits. They want to know who captured whom. The theory has been applied by journalists (Appelbaum & Nakashima 2008), economists (Dal Bó 2006), and legal scholars (Barkow 2010). Although sociologists and political scientists often prefer systemic explanations, work on regulatory dialectic has also entertained capture hypotheses (Lounsbury & Hirsch 2010; Seabrooke & Tsingou 2021).

The theory has two versions. Material capture is substantially similar to corruption and refers to situations in which regulators "sell" desired policies to special interests to the detriment of the public interest (Carpenter & Moss 2013). Because this imposes a high burden of proof, the more typical form of capture is "cognitive" capture. It refers to situations in which regulators come to adopt the perspective of those they are supposed to regulate. In contrast to material capture, regulators do their best but fail to recognize problematic behavior.¹

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Although there is extant research on the social foundations of such misperceptions (Baker 2010; Fligstein & Goldstein 2010, 2012), the literature has only begun to explore when and how cognitive capture takes place. Most arguments invoke homophily: regulators adopt the perspective of those who are similar – or close – to them in some way (Kwak 2013).

In this paper, I argue that theories of cognitive capture should also pay attention to the temporal dynamics of regulators' epistemic problems. To determine who captured whom, it is crucial to know *when* the decisive influence took place. But not all regulatory misperceptions evolve over the same time horizons. Some evolve over long periods, while others emerge in the short term. To understand the timing of cognitive capture and identify the relevant relationships, it is therefore necessary to analyze the temporal structure of misperceptions that prevent regulators from detecting problematic behavior.

Here, I distinguish two types. Regulators face *information problems* when those in charge do not receive, or fail to notice, crucial evidence of problematic behavior. In contrast, *worldview problems* occur when regulators' background understanding of the market environment is flawed on the level of institutional practices or legal standards. In that case, regulators receive the right information, but they fail to understand its significance.

Drawing on recent studies about the regulatory dialectic (Thiemann & Lepoutre 2017; Wansleben 2018), and the sociology of law (Edelman *et al.* 2011; Gray & Silbey 2014), I show that these two problems correspond to capture mechanisms with different temporal trajectories. While information problems tend to be based on short-term dynamics of deception and secrecy (Gibson 2014; Rilinger 2019), worldview problems tend to result from more gradual influences on the legal (Carruthers 2013) and the institutional structure (Wansleben 2021) that undergird the regulatory dialectic. Because each misperception is associated with different mechanisms of capture, close attention to the nature and origin of the misperception might reveal different culprits.

In the empirical analysis, I illustrate this argument with a case study of regulatory failure during the creation and subsequent collapse of California's electricity markets. Between 1998 and 2001, the Federal Energy Regulatory Commission (FERC) did not detect widespread market-power potential in California. FERC defined market power as a situation “[...] when the seller can significantly influence price in the market by withholding service and excluding competitors for a significant period of time.”² Starting in April 2000, precisely such opportunities emerged constantly and enabled dozens of sellers of wholesale electricity to drive up prices in California's markets. This contributed to the Western Energy Crisis, which lasted for almost a year and pushed the electricity system to the brink of collapse. Until the beginning of 2001, FERC attributed the price spikes in California to genuine supply shortages. Despite repeated and increasingly urgent pleas from California, the agency refused to intervene even as prices skyrocketed (Joskow 2001; Taylor *et al.* 2015). FERC's recalcitrance in the face of crisis poses the empirical question this paper investigates: Why did FERC fail to detect the substantial levels of market power in California despite the escalating crisis?

The literature has described FERC as a classic case of regulatory capture. One camp argues that FERC's decisions reflect material capture. Research in this vein suggests that sellers of energy such as Enron, Dynegy, and Williams exerted influence over the Commission to stay out of the markets. FERC was aware of the market power problems in California, in other words, but was happy to stand by as power marketers lined their pockets (Beder 2003).

The second camp does not go quite as far. It argues that the FERC commissioners did not perceive the problems. Explanations in this vein tend to focus on the period from 1998 to 2001. They point to evidence that power marketers actively tried to repress information and to spread misinformation. Dazzled by these companies' prestige and apparent expertise, the Commission adopted their viewpoint and missed or ignored the available evidence (Duane 2002; Walsh 2004). Even though these explanations identify different root causes for FERC's inaction, *both* point to sellers of energy as the relevant culprits.

In this paper, I evaluate the evidence for each hypothesis, then probe more deeply into the precise nature of FERC's misunderstanding. This leads me to identify a different culprit. I begin by showing that there is insufficient evidence to support material capture. The evidence does suggest a case of cognitive capture, however. In contrast to existing explanations, I argue that FERC's inability to discover market power does not originate with the sellers of energy. The existing explanations assume an information problem. They work with the counterfactual that FERC would have recognized the market power problems had energy marketers not withheld information and spread misinformation between 1998 and 2001. As I show, this counterfactual is not supported by the

evidence. The commissioners did not miss the relevant evidence. Rather, they did not understand its significance because they subscribed to a flawed understanding of market power that did not account for the idiosyncrasies of electricity markets. This misunderstanding originated with an idea of electricity markets as physical marketplaces and was embedded in the legal doctrine of the “contract path.” This doctrine and its attendant worldview go back to the 1980s, when they were introduced to FERC by *utilities*. The temporal logic behind the development of a flawed worldview thus points to a different root cause of FERC’s inability to detect market power. Ironically, those who would later become victims of sellers’ exercise of market power, were centrally responsible for saddling FERC with the perspective that prevented the agency from recognizing it.

2. Theories of regulatory capture

The theory of material capture assumes that the interaction between regulators and regulated can be described as a market. Industry participants compete to purchase regulation that is beneficial to them from an oligarchic set of suppliers, the regulators (Stigler 1971, p. 3). Regulators appear as rational actors who pursue their own material interests by selling regulation to the highest bidder. The first studies looked at cases in which special interests got regulators to erect strong entry barriers around “their” industries. Extensive regulation was thus a sign of capture and “buyers” could easily be identified. Today, however, the dominant form of capture is “corrosive,” that is, aims to weaken regulatory oversight and enforcement (Carpenter 2013a). This makes it harder to identify who benefits and how. Over time, the literature has therefore proposed refinements to the original theory in terms of operationalization, alternative mechanisms, and detail (Dal Bó 2006, pp. 206–215). In particular, research has identified various tools of capture, such as bribes, lobbying, and regulators’ reliance on the regulated for external expertise, information, funds, and personnel (Carpenter & Moss 2013, p. 69).

Nonetheless, there is some risk that material capture can be diagnosed whenever someone benefits from a policy. To prevent tautological arguments, Daniel Carpenter has therefore offered a more restrictive definition of material capture: material capture occurs when there is a clear public interest at the time of the alleged capture, an intent to divert the regulators from this interest, the provision of some material advantage, and success in swaying the regulator (Carpenter 2013b, pp. 60–61). That means that the diagnosis of material capture requires demonstration not only of a clear public interest standard that the regulator violated but also of explicit intent to do so on the basis of favors granted. This is a high burden of proof.

Explanations that invoke cognitive capture are less demanding. They also fit better in cases in which regulatory oversight corrodes under the influence of special interests. In contrast to material capture explanations, they assume that regulators are trying their best to regulate the environment in line with the public interest. But the regulators develop misperceptions that prevent them from detecting problematic behavior (Weinkle 2020). For this hypothesis, researchers must demonstrate, first, a misperception on the part of the regulator; second, that this misperception originates in interactions with the regulated. Despite much work that explores the impact and social dynamics of regulatory misperceptions (Abolafia 2010; Baker 2010; Fligstein & Goldstein 2010, 2012), the mechanisms behind cognitive capture are less well-documented. Much of the literature argues that regulators are more likely to listen to those they feel are like them (identification), have a high social or economic status (status), or are in their social networks (social networks) (Kwak 2013, pp. 76–80).

However, such explanations tend to remain indeterminate when regulators interact with a variety of different stakeholders of similar socio-economic backgrounds. Because this is usually the case, empirical studies have begun to examine the interactions between regulators and stakeholders more closely. While some research looks at the structure of the networks that mediate interaction between regulators and regulated (Thiemann & Lepoutre 2017), others look at organizational mechanisms (Gray & Silbey 2014), and institutional (Hutchens 2011) or discursive dynamics that establish the substantive meaning of law and compliance (Edelman *et al.* 1999; Weinkle 2020).

Although these studies have provided us with a detailed picture of the dynamics and interactional constellations that can lead regulators astray, they have rarely considered the *timing* of cognitive capture. Mathematical models (Carruthers & Stinchcombe 2010), cultural beliefs (Abolafia 2010), or interpretations of specific situations (Swedberg 2010) are similar in that they select some information at the expense of other information. Each can

therefore influence the perception of regulators and obscure relevant information. The literature therefore treats such mechanisms as equivalent sources of capture.

However, each of these epistemic problems has a different temporal horizon. For example, cultural beliefs emerge in a slower and more diffuse process than the adoption of mathematical models. By conflating different kinds of epistemic problems into one category, disparate mechanisms of cognitive capture are thus flattened into static models of interactional structures. But depending on *when* an epistemic problem emerges, different players, organizational mechanisms, or network structures may be at fault.

We should therefore distinguish between at least two classes of epistemic problems. I will call them “information problems” and “worldview problems,” respectively. Information problems have to do with sending and receiving signals of problematic behavior (Vaughan 1999, p. 277). They are based on a simple counterfactual: if the relevant information was pointed out to the regulators, they would recognize the problematic behavior. Accordingly, we have to assume that the regulators understand a particular type of problematic behavior, but they do not receive or ignore information about its presence. This happens when market participants influence the information that regulators collect and focus on.

Special interests can, for example, hire experts to advocate for them on the basis of expertise not matched by the regulatory agency (Zald & Lounsbury 2010). In that case, the expert’s reputation may lead regulators to refrain from an independent analysis and fail to collect conflicting information (Kwak 2013). Capture can also operate through companies’ attempts to inundate regulators with complex information. Unable to process it all, the regulators will depend on guidance from market participants (Wagner 2010). Conversely, companies may also block regulators’ access to crucial information through secrecy and deception (Gibson 2014; Rilinger 2019). They might, for example, misfile information or withhold it. With information problems, we are thus looking for ongoing attempts to influence what information regulators receive.

What I call “worldview problems” affect regulators’ basic imagination of the market environment. Worldviews are a set of cultural beliefs about cause and effect, relevant actors, their goals, or important norms. They are intersubjectively shared frames that organize how members of organizations interpret information (Fligstein *et al.* 2017). Incidentally, they also shape how agencies define and articulate their political preferences. These worldviews are embedded in organizational routines, practices, and legal institutions. If regulators’ worldview is flawed in important respects, they may spend time looking at and processing pertinent information on problematic behavior but end up drawing the wrong conclusion from it.

Such errors correspond to more gradual forms of stakeholder influence. For example, studies have shown how gradual lobbying can shape the legal foundations that determine what regulators view as relevant activities for oversight and create systematic blind spots. Here, the regulatory perspective on the market is slowly settled with a myopic view of the market (Carruthers 2013; Funk & Hirschman 2014).

Work on judicial deference provides another set of examples. It shows that industry practices and institutions can slowly influence how judges interpret the meaning of compliance with the law (Edelman *et al.* 1999). Stakeholders might also shape law school curricula, or scientific practices of standard setting and risk assessment, thus leading regulators to adopt standards of evidence that are based on a skewed worldview (Fligstein & Goldstein 2012; Weinkle 2020).

Because such sources of influence entrench problematic beliefs in the foundation of regulators’ approach to the market, they do not just block but disable regulatory dialectic. Interpreting signals of problems as innocuous, regulators have little reason to update their worldview. This leads to path dependencies that entrench errors in the foundation of regulators’ approach.

In sum, then, the theory of cognitive capture should not just consider the interactive relationship between regulators and regulated, but also decipher the temporal dynamics at play. I have distinguished two broad types of epistemic problems that are likely to evolve over different temporal horizons. Because each *may* point to a different culprit, capture explanations should begin by determining the nature of the epistemic problem. In a second step, the analysis can then trace the misperception to its origins. To illustrate this approach, I will now turn to the case study.

3. Case: Market power in California’s electricity markets

This paper examines problems in the regulatory oversight of California’s electricity markets between 1998 and 2001. At the time, California had just restructured the industry around competitive markets. Before that, it had

been dominated by three investor-owned utilities. They acted as vertically integrated monopolies that produced, transmitted, and sold energy to end-users. The California Public Utility Commission regulated these companies and determined what rates they could charge to consumers. In 1996, the government decided to end the period of regulated monopolies. The new market system began operation in 1998 (Joskow 2001; Isser 2015).

The utilities gave up control over the transmission system to the California Independent System Operator (CAISO) and divested most of their generation assets. To serve end-users, they now had to purchase energy from generation companies in new wholesale markets for electricity. The sellers were energy producers such as Duke and AES, as well as power marketers such as Enron and Williams. Most of the transactions took place in the California Power Exchange, an auction market. In these markets, buyers and sellers traded obligations for the future delivery of electricity at particular locations. In real time, the system operator implemented the resulting obligations as closely as possible, using a battery of ancillary service markets to adjust the financial agreements to real-time fluctuations and purchase reliability services (Sweeney 2002).

With the move to competitive markets, certain regulatory responsibilities shifted from the state to the federal level. Traditionally, most transactions occurred within utilities' service territories and the local utility commissions were responsible for regulating them. But because the new wholesale markets transcended state boundaries, transactions now fell under FERC jurisdiction. According to the Federal Power Act of 1935, the agency had to ensure "just and reasonable" rates. In the past, this merely required that they evaluate interstate transmissions, based on the cost structure of utilities. FERC had needed to determine whether utilities managed their systems prudently and proposed rates that represented their costs plus a fair profit. Under competitive markets, the meaning of "just and reasonable" changed. Because markets would now determine the rates that utilities could charge, FERC defined the standard in terms of prices that a perfectly competitive market would generate. Accordingly, it became FERC's central responsibility to prevent market power: if companies were able to raise prices without loss of business, the markets were not competitive (Wolak 2003).

The creation of new market systems thus meant a substantial increase in FERC's workload because the markets became the primary location for energy purchases. In addition, California was not the only state to restructure. Five New England states, New York, and the Pennsylvania, New Jersey, and Maryland region, enacted restructuring legislation in 1996/1997. By the early 2000s, a dozen states had proceeded with the creation of wholesale markets (Isser 2015, p. 205). With the proliferation of wholesale markets, FERC thus turned from an agency that evaluated occasional interstate transmissions to the main guarantor of competitive wholesale markets.

Considering its expanded workload, the agency was relatively small. In 1996, it had only 1,374 employees, with 377 working on electricity (FERC 1998a).³ For comparison, the SEC had more than twice as many employees at that time. This small size meant that most policy decisions were made at the top of the agency. Four commissioners and one "chairman" composed the leadership. They were political appointees from both parties, but only the chair had their own staff. FERC was an agency that reached most decisions by opening proceedings and inviting comments from all stakeholders. Staff would summarize these filings, conduct independent analyses, and present the resulting documents to the leadership.

Below the top, FERC had several different branches of departments that provided input to the proceedings. The most important was the Office of the General Counsel, which vetted any document before it left the agency and provided legal analyses. The Office of Electric Power regulation and the Office of Economic Policy were the other two offices that had to do with electricity markets. While the former was dominated by engineers, the second housed FERC's economic experts, who would conduct independent analyses, assess policy proposals, and evaluate issues of competitiveness. Throughout the period of interest, these two offices were in the process of merging into the more general "office of market tariffs and rates" (FERC 1998a, p. 25). Figure 1 sketches the resulting structure. In general, the commissioners' staff could draw on expertise from these offices to decide cases.

Practically as soon as the California markets opened, energy sellers obtained market power. Initially, its exercise was sporadic and did not affect the system's reliable operation. But starting in April 2000, a combination of factors vastly expanded the market power in the system, which produced persistent price spikes, drove utilities into bankruptcy, and finally undermined system reliability. Economists estimated that at least 59 percent of all price increases during the summer of 2000 could be attributed to the exercise of market power (Borenstein *et al.* 2002). In most other states, utilities continued to buy the bulk of their supply through long-term "vesting" contracts. This reduced possibilities to exercise market power because trading volumes were lower, and more

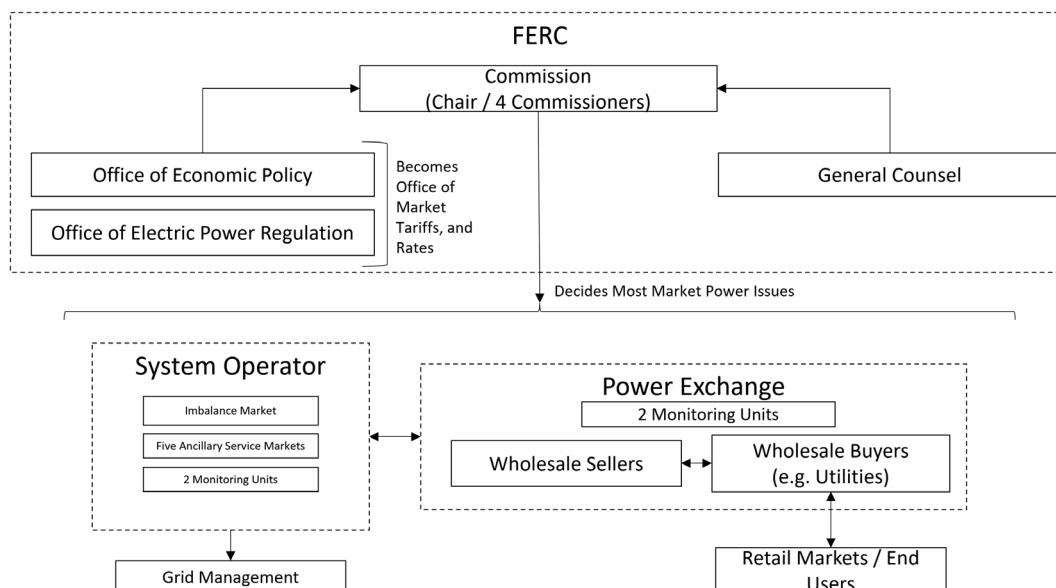


Figure 1 Market and regulatory structure regarding market power issue in California.

suppliers chased less demand (Taylor *et al.* 2015). While the other electricity markets thus experienced some degree of market power, California became the first and definitive testing ground for FERC's market-power methodology.

But the agency persistently argued that California's price spikes were mainly the result of supply shortages. FERC assumed that there simply was not enough generation capacity to serve demand, while sellers of energy actually withheld available supply to drive up prices. The question is: why did the FERC commissioners fail to recognize the presence of market power? Was it material or cognitive capture? And if it was cognitive capture, what was the precise nature of the misperception, and who was responsible for it?

4. Data and method

I use archival material and in-depth interviews to reconstruct two periods of regulatory activity. The first ranges from roughly 1989 to 1998. During this time, FERC created the legal foundations to restructure the electricity industry around competitive markets (Hirsh 1999). The second period ranges from about 1998 to 2001. During this period FERC failed to detect market power. In 2001, they changed their assessment and began to fight the exercise of market power explicitly. For both periods, the formal discourse between regulators and stakeholders is preserved in FERC dockets that deal with the creation and regulation of California's electricity markets. These dockets include formal filings, responses to questions, evidence, and transcripts of technical conferences. In particular, the transcripts are useful because they capture how the regulators talked about central elements of market design, including market monitoring standards. Because FERC had to approve almost all elements of the wholesale markets, these dockets give a comprehensive overview of how these markets were first imagined and then created. I also include an early proceeding during which FERC debated revisions to its market power methodology, cases in which FERC developed its early methodology for contract pricing, and proceedings in which FERC articulated its own vision of restructured energy markets. These dockets capture the reasoning of FERC regulators on market power and energy markets during interactions with stakeholders.

After the crisis, FERC became subject to multiple investigations by Congress and the U.S. Government Accounting Office. These investigations produced the available evidence about the informal relations between FERC employees and stakeholders, particularly the Texan power marketer Enron. I include the reports from these investigations, as well as the evidence they collected. In addition, I rely on business documents from the California State Archive in Sacramento in the analysis. These documents chronicle the actions of the Department of Market Monitoring, Operations, the Independent Governance Board, as well as the Independent Market

Table 1 Archival material

California Independent System Operator (CAISO)	Archival material	Description
Market Surveillance Committee, Reports (1998–2001)	California State Archive, R400.007, Box 12, folder 18 – Box 13, folder 14	Material (academic papers, analyses, data charts, etc.) related to market power standard at FERC.
ISO Market Surveillance Committee and Board of Governor Meeting Files (1998–2000)	California State Archive, R400.006, Box 6, folder 1 – Box 8, folder 16	All materials used during board meetings, including all material presented to the sub-committees, here: Committee on Market Issues. Contains memos, memoranda and status reports on problems with ancillary markets.
Power exchange		
Electricity Oversight Board, Subject Files	California State Archive, R400.005, Box 5, folders 10–25, R400.010, Box 18, folder 1 – Box 19, folder 14	Background material related to market power analysis at PX, 1997–2001.
Federal Energy Regulatory Commission		
Contract Path Methodology	Docket Number (accessible via ebrary) ER93-706-000	Description Docket that first develops the contract path methodology in a case against Indiana MI Power Co.
Merger Applications and Technical Conferences regarding market power methodology	PL98-6 RM98-4 RM98-6	FERC's early, fruitless attempts to revise their market power standard in the context of mergers (1998).
California Parties' Application for establishment of ISO/PX	ER96-1663 EC96-19	WEPEX hearings that debate the correct approach to measuring market power in California (1996–1999), as well as all formal filings pertaining to the design and implementation of California markets.
Development of orders concerning deregulation and market power analysis (592, 888, 2000)	RM96-6 RM95-8 RM99-2	Landmark decisions to open the transmission system in order to prepare the ground for deregulation (Order 888 in 1996) and the subsequent development of Regional Transmission Organizations (Order 2000 in 1999). Contains transcripts that debate market power and methodology in energy markets.
Ancillary Market Crisis	ER98-2843	Crisis in Ancillary Markets at CAISO, consolidated docket. Contains all filings relevant to crisis and redesign of these markets, including debates about market power in California.
Congressional hearings		
Electricity Markets: Lessons Learned from California	Gov. Body/date Committee on Energy and Commerce, House of Representatives, One Hundred and Seventh Congress, First Session, 15 February 2001	
FERC: Regulators in Deregulated Electricity Markets	Committee on Government Reform, House of Representatives, One Hundred and Seventh Congress, First Session, 2 August 2001	
Examining Enron: Electricity Market Manipulation and the Effect on the Western States	Committee on Commerce, Science, and Transportation, House of Representatives, One Hundred and Seventh Congress, Second Session, 11 April 2002	

(Continues)

Table 1 Continued

	Archival material	Description
California Independent System Operator (CAISO)		
Examining Enron: Developments Regarding Electricity Price Manipulation in California; Energy Market Manipulation	Committee on Commerce, Science, and Transportation, House of Representatives, One Hundred and Seventh Congress, Second Session, 15 May 2002	
Asleep at the Switch: FERC's Oversight of Enron Corporation Vol. I–IV	Committee on Governmental Affairs, United States Senate, One Hundred and Seventh Congress, Second Session, 12 November 2002	

Surveillance Committee at CAISO and the corresponding institutions at PX. Available material includes memoranda on market operations and monitoring problems, analyses, and minutes of business meetings. These data chronicle California's attempts to influence FERC's regulatory approach in the period between 1998 and 2001, efforts to convey worries about market power, and information about relations between FERC employees and electricity sellers. (See Table 1 for a summary of the archival sources used.)

Because archives collect primary sources for their own purposes, they introduce a selection bias into the data. Besides relying on more than one archive, the best strategy is to triangulate archival data with semi-structured, in-depth interviews. I therefore interviewed 36 officials engaged in market monitoring at the federal and state levels. I talked to members of FERC's staff and former commissioners who worked on electricity deregulation, and particularly the creation of California electricity markets. I also interviewed personnel at CAISO and PX who were involved in market design, operation, and monitoring during the period. The interviews lasted, on average, between 60 and 90 minutes and were conducted over the phone, or in person when feasible. They were organized around a consistent set of questions but also tailored to respondents' expertise. The selection of participants followed a mix of quota and snowball sampling, based on the different departments involved in the market power controversy. I transcribed the interviews and noted down additional observations upon completion. The analysis followed the guidelines for historical and qualitative case studies (Yin 2017). To minimize the risk of hindsight and rationalization biases, I used the interviews only to confirm and supplement information that I previously established in the archival material.

5. Findings

I first show that there is insufficient evidence to sustain a material capture explanation. Concluding that FERC's inaction resulted from cognitive capture, I then analyze what *kind* of misperception the commissioners experienced. Here, I first consider and then reject the hypothesis of an information problem. I then show that FERC suffered from a worldview problem and trace it back to legal dogma that originated in the 1980s, when utilities pushed for its adoption.

5.1. Material capture

Although some economists have defended the argument that FERC suffered from material capture (Navarro & Shames 2003), the explanation shows up mainly in journalistic, legal, and political analyses (Beder 2003). California governor Gray Davis summarized this view well: "I did not ever feel that [FERC] believed their job was to act in the public interest. [...] They operated as if they were a wholly owned subsidiary of the energy companies" (Leopold 2007).⁴

The argument is inseparable from the Enron scandal. Enron was a large, highly successful energy company from Texas. For six years running, from 1995 through 2000, Fortune Magazine celebrated Enron as the "most innovative company in corporate America" (McLean & Elkind 2006). Given that Enron was the poster child of the New Economy, the country was shocked when it suddenly declared bankruptcy in December 2001.

Amid daily revelations about a culture of greed and corruption, a series of memos surfaced. They pertained to Enron's activities in California's energy markets and revealed a variety of "games" that Enron's traders had

designed to manipulate them. Putting the litigation of the crisis onto a new trajectory, it turned out that many energy sellers had engaged in similar tactics, often in conjunction with exercising market power (Taylor *et al.* 2015).

The scandal led journalists, members of Congress, and lawyers to focus on relations between power merchants, and the administrative structure of the Federal Government. The connections were truly astounding. In a *New York Times* editorial, Senator Ernest Hollings put it bluntly: “In my 35 years in the Senate, I have never witnessed a corporation so extraordinarily committed to buying government” (Hollings 2002).⁵ Apart from its Washington connections, Enron also exercised direct influence over FERC. Of the chairpersons who headed the agency between 1993 and 2001 – Elizabeth Moler, James Hoecker, William Massey, Curt Hebert, and Pat Wood – the first two were Clinton appointees, while Bush appointed the others. But party affiliation did not matter much. Hoecker, Hebert, and Wood had been vetted and explicitly recommended by Enron. Moler even worked for Enron as a registered lobbyist. The company’s management therefore enjoyed privileged access to the commissioners and, as email and phone records indicate, used it to further their agenda (Beder 2003).

While this establishes *prima facie* plausibility for material capture, stronger evidence is required. We would need to show that FERC’s denial of market power between 1998 and 2001 resulted from influence from Enron and its peers, who conferred material advantages on the regulators. But there is little to support this contention. The problematic relationship between FERC’s commissioners, Enron and other energy sellers became the subject of several Congressional hearings. Only three principal pieces of evidence have surfaced to date. The first is a PowerPoint presentation made by Enron employee Mary Hain on 24 August 2000, to FERC staffers investigating the crisis in California. She argued that FERC should not take any action because the high prices simply indicated a supply shortage. High prices would attract new entrants, so no action would be necessary. Enron’s Tim Belden, head of the trading desk, reiterated this in another presentation the next day. The second piece of evidence is the attempt by Ken Lay, Enron’s CEO, to influence the perception of the crisis in Washington at a summit that the White House organized in 2000 to address the energy crisis. FERC chairman Hoecker was present at this summit and talked to Ken Lay. The third piece of evidence is calls between Enron’s management and FERC commissioners, as well as their staff between 2000 and 2001. None of these calls establishes that Enron tried to buy the commissioners’ consent, nor that the commissioners were inclined to provide it. As an independent analysis by the Government Accountability Office concluded in 2001: “There is no evidence that the Chairman attempted to use his public office for private gain, acted other than impartially, or offered preferential treatment to Mr. Lay and Enron” (U.S. General Accounting Office 2001).⁶ The other investigations reached similar conclusions.

While the evidence shows that Enron pushed for a particular interpretation of the crisis, it does not suggest that FERC employees received advantages to adopt this interpretation. In addition, there are multiple instances in which FERC acted against the power marketers’ explicit interests. Throughout the energy crisis, but as early as 1999, Enron and other energy sellers objected to price caps that would limit their profits. But FERC imposed them nonetheless, repeatedly siding with utilities and California’s market organizations CAISO and PX. Indeed, it would have been in FERC’s interest to identify and limit market power in California. The debacle of the energy crisis did not just tarnish the agency’s political project to create competitive electricity market, but it also put the commissioners’ political careers on the line. The energy crisis would lead to an overhaul of FERC’s leadership. Accordingly, we are not dealing with a case of material capture. But the evidence *does* suggest a case of cognitive capture.

5.2. Cognitive capture

Cognitive capture requires that regulators adopt the perspective of those they are supposed to regulate. Having ruled out that the commissioners acted out of political or material preferences that were in tension with their understanding of the situation, we are now moving to theories where the political and personal preferences are a function of the information that regulators receive or the worldviews they hold. Starting in 1998, companies such as AES, Williams, Dynergy, Mirant, and Duke repeatedly submitted evidence to FERC suggesting that occasional price spikes were a consequence of supply shortages rather than market power. As outlined in the last section, Tim Belden and his employees also tried to push this point in presentations to commissioners at the height of the crisis. There is also evidence of more general attempts to “shape the narrative.” In 2001, Enron hired a New

York lobbying firm to run a national public relations campaign. The explicit goal was to “isolate California and communicate a marked based message” (Committee on Governmental Affairs 2002).⁷ The campaign pushed a supply-based explanation on all levels of governments.

In their decisions and opinions until February 2001, FERC commissioners largely follow this interpretation. Repeatedly the commissioners argue that the price spikes in California are the consequence of supply shortages and flawed rules in the tariffs that governed California’s auction markets, rather than the exercise of market power. Chairman Curt Hebert put it succinctly when he stated in 2000 that “prices above marginal costs create more efficiency. With no evidence of collusion, we should allow the market to work” (FERC 1999).⁸ It is thus clear that FERC adopted the same interpretation as the power marketers – even if they did not always decide in their favor. They mistook the presence of market power for supply shortages.

The question is *why* the commissioners assumed this perspective. The existing literature has argued largely that interactions with the power marketers seduced the commissioners. Intimately connected with Enron and other sellers of energy, the commissioners missed or ignored the available evidence and bought into the narrative of power marketers and independent power producers, whose voices were louder and more familiar than those of other parties. Most of the existing literature on the topic argues along these lines (Duane 2002; Sweeney 2002; Walsh 2004; Taylor *et al.* 2015).

These studies implicitly assume an information problem. That is, they rely on the idea that the commissioners would have recognized the market power potential absent power marketers’ influence. FERC commissioners understood how market power works in electricity markets, but either did not receive, or ignored the evidence due to sellers’ interventions. But it is also possible that the commissioners’ agreement with Enron resulted from a misunderstanding of how market power in energy markets works. In that case, they would have suffered from a worldview problem. Depending on where this problem originated, they *may* already have been prone to agree with the power marketers. The reason for FERC’s myopia may then lie elsewhere. To determine who captured FERC, we therefore need to analyze the nature of the commissioners’ misperception.

5.3. The nature of FERC’s misperception

There are two ways in which commissioners may have missed the presence of market power in California. Either they faced an information problem, and did not receive, or were led to ignore, existing evidence of market power. Or they interpreted the evidence according to institutional rules and practices that misled them about its significance. In that case, they faced a worldview problem. I consider the possibility of an information problem first.

Prior to the energy crisis, FERC conducted few independent analyses. Instead, the agency’s basic approach was to collect and summarize stakeholder comments. For issues that had to do with electricity market regulation, the commission could ask for additional analyses from the Office of Economic Policy or the General Counsel’s Office. But even these branches did not usually collect data independently. The four commissioners and the chair would therefore reach a majority decision based on the summary of filings and evidence submitted by the parties.

This dependence on voluntary submissions affected their ability to detect market power as well. As Loretta Lynch, president of the California Public Utility Commission, pointed out during a Congressional investigation, FERC never collected the transaction data that contained the evidence for the exercise of market power: “FERC does not even require the same data to be filed in its quarterly reports, allowing companies like Enron to hide the true nature and extent of activities through skeletal public reporting and not be called to account by FERC” (Lynch 2002).⁹ In 2003, FERC admitted as much when it concluded that none of the data it had collected between 1998 and 2002 enabled the staff to determine whether sellers had manipulated the markets. The late admission simultaneously revealed that the staff had not screened any of this data until after the crisis.

In addition to FERC’s lax reporting standards and lack of internal processing, sellers of energy made concerted efforts to inundate staff with misleading information. Early in 2001, FERC imposed a “soft price cap” on California’s wholesale markets. This meant that the price could move above the cap, but sellers had to justify higher rates. Rather than staying below the cap, the power marketers began to submit all transaction records to FERC. Every day, the Commission received thousands of pages of printouts. Not only would it have been impossible to review all this material in the counsel’s office, but, it later turned out, the staff did not even try. This suggests an information problem, sustained by the deceptive activities of the power marketers.

However, the commissioners and their staff did receive evidence of market power from another source. California's local monitoring units repeatedly submitted reports and evidence of market power between 1998 and 2001. As they recalled in an interview, a member of one local monitoring unit traveled to Washington and spoke with the FERC commissioners on at least two occasions. They tried in vain to convince the commissioners of the market power problems. The external monitoring committee also submitted extensive analyses of market power to FERC. On 18 August and 18 October 1998, two years before the crisis, the committee submitted two reports that traced episodes of sudden price spikes in small markets for reliability services ("Ancillary Markets") to substantial market power and provided all data to derive this conclusion. The reports include detailed graphs of price and cost developments, describe bidding behavior, and point to market power as the underlying cause. The first report concludes: "The Committee finds that the ISO's ancillary services markets do not yet operate in a manner consistent with workable competition" (Wolak *et al.* 1998).¹⁰ The submissions are found in dockets that required responses from the commissioners, who concluded that the accused companies "meet the Commission's generation market power standard" (FERC 1998b).¹¹

Given that the commissioners received and considered pertinent evidence, they must have misinterpreted it. That is, they suffered from a worldview problem. To reconstruct this problem and identify its origin, we need to consider the institutional practices that guided the commissioners' interpretation. FERC used the so-called Hub-and-Spoke test to diagnose (horizontal) market power in competitive wholesale markets. Adapted from Department of Justice and Federal Trade Commission guidelines for merger analyses, the test relies on concentration measures, in particular the Herfindahl–Hirschman Index (HHI) (Blumsack *et al.* 2002, pp. 12–14).

The HHI computes the sum of the squared market shares of all the suppliers in the market, multiplied by 10,000.¹² This provides a measure of how many competitors of similar size are facing each other in a market. The higher the index, the fewer competitors of similar size are competing. The fewer competing suppliers, the more market power an individual company has.¹³ Concentration measures thus assume that market power is a function of how many suppliers of similar size there are in an adequately defined, geographic market. FERC evaluated this question when a company applied to enter a market and charge "market-based" rather than regulated rates. It used the test as a *structural* measure that viewed market power as a relatively static property of large geographic markets.

This test did not account for crucial features of electricity markets. On the transmission grid, all energy flows interact with each other. Because even minor imbalances between production and consumption can lead to escalating blackouts, a system operator is necessary that balances the inputs to the grid with fluctuating demand. Consumers of the 1990s had no way of knowing the cost of the energy that they were presently using. Accordingly, they did not adjust their usage to price fluctuations. The system operator therefore had to adjust the output of generators to follow changes in demand. In such a system, market power emerges dynamically and in relation to the role of the system operator.

As aggregate demand in the system increases, more and more generators have to run to meet it. Accordingly, there is less and less competition at the margin. As soon as a seller becomes necessary to meet the remaining demand because there are no substitutes, they gain nearly unlimited market power; they can ask for a higher price without fear of losing any business. Regardless of how many buyers and sellers there are in the market, the system operator ultimately has to buy the energy that is necessary to serve demand. Accordingly, a seller whose capacity is necessary can take the system operator hostage and ask arbitrary prices.

This dynamic is exacerbated by the fact that all inputs to the grid interact dynamically with each other. Depending on the balance of flows, parts of the transmission grid can be blocked off from each other. This segments the market because sellers can no longer reach buyers. Because this can happen in a matter of minutes, the number of competitors can drastically increase or decrease in short periods of time, and with it the market power of the remaining sellers.

In sum, in electricity markets companies' market share is not decisive for the presence of market power. Small generators can gain market power in some periods and lose it in others. In electricity markets, market power is dynamic, relational, and emerges in relation to the system operator.

The Hub-and-Spoke test was unable to detect this type of market power. But the test made sense against a highly generic understanding of markets as relatively static and physical places (1) in which decentralized parties trade on the basis of private negotiations (2), independently of the activities of a system operator (2). Indeed,

FERC's commissioners subscribed to this view of markets. Table 2 contains quotes from the archival material, documenting these three beliefs at work in statements by FERC commissioners in the period between 1998 and 2000.

The first idea – that electricity markets are physical or “geographic” markets – is based on the fact that the industry consists of a largely fixed number of generators that serve customers at specific locations. This static perception of the industry makes the application of structural measures plausible and obscures the temporal fluctuations of market power. The idea that markets consist of decentralized buyers and sellers supports the use of concentration measures like the HHI. If markets contain only buyers and sellers, the system operator appears as little more than an “air traffic controller” (CPUC 1994).¹⁴ This suggests a strong separation between the physical operation of the grid and the activities of market participants, the third belief. The markets generate financial obligations and the system operator balances the grid, but the two sides are independent of each other. This idea obscures the connection between physical energy flows and market incentives. If markets appear to be nothing

Table 2 FERC's conception of markets

Markets as physical and static places	Examples from transcripts and formal filings (1989–1998)
The market is a stable, geographic location that determines the paths in which energy will flow	<p>“How do we attract more generation in strategic locations in the marketplace?”</p> <p>“I find I could think of market size as being as small as San Diego or as large as the whole West, and unless I know what the right market area is to look at as a first step, the market share numbers for the HHI indices to follow don't have a lot of meaning unless I have the geographic market to try to correct in.”</p> <p>“People in a marketplace will price congestion. They will price higher across constrained paths than across unconstrained paths.”</p> <p>“The analysis examined three years of data on transmission data and constraints, as well as data on energy trading patterns in the WSCC to define three relevant geographic markets.”</p>
The market consists of decentralized buyers and sellers who develop efficient schedules	<p>“The California markets are designed to let the generation providers themselves determine their own schedules.”</p> <p>“This new [market] process relies on iterative market clearing and arbitrage by market participants among the various energy and ancillary service markets.”</p> <p>“[The market] replaces inefficient, regulated pricing of generation with [...] good old-fashioned supplier-customer bartering on prices.”</p> <p>“[The market design] abolishes ineffective, centralized planning and new generation, and replaces it with an open market structure that will lead to greater efficiencies.”</p> <p>“These filings propose a market structure that promotes unbundled sales of electric energy by a multiplicity of sellers to retail distributors and end-users at rates set by competitive markets.”</p>
The system operator merely executes schedules	<p>“The fact is, the vast majority of stakeholders, including both buyers and sellers, concluded that the ISO's operating function should be kept separate from the power exchange's market functions.”</p> <p>“I think that the compromise that was reached and sort of hard-fought in California over the separation of the power exchange and the ISO was based on the need to keep any kind of market-making function separate from the transmission operation function.”</p> <p>“I think the ISO should have, as I think all the participants in the debate have acknowledged, the access to the resources they need to maintain system balance and physical reliability, but they don't need to be running a market.”</p>

but bilateral negotiations, the only question that seems relevant for market power is how many alternative sellers a buyer could turn to, and that is what the Hub-and-Spoke measure captures.

Based on the generic image of markets as places, the commissioners were unable to recognize these problems and failed to discover market power in California. Indeed, a member of California's market monitoring unit recalls that the commissioners were unable to understand the problem with the Hub-and-Spoke test. They recalled that the commissioners "had drunk the Kool-Aid. They thought that in every other market these supplier concentration ratios, HHI index, pivotal supplier all worked, what are you talking about, why shouldn't they work in power?"¹⁵ The question now is where this generic understanding came from. Did FERC adopt this view because power marketers pushed them to adopt it in 1998 or did it result from other influences?

5.4. Tracing the culprit: The origin of the misperception

There is one overriding reason why the problematic worldview may indeed have been the product of power marketers' influence after all. Members of FERC's Office of Economic Policy were aware of the Hub-and-Spoke test's flaws. There are several transcripts from 1995 and 1996 in which members discuss how market power relates to the physical characteristics of energy flows. As already outlined, market power emerges in energy markets when suppliers are necessary to meet the aggregate demand in a given hour. Two employees in the Office of Economic Policy published an article in 1999 that explicitly states that market power can be exercised by small generators if they manage to create a situation in which there is no suitable substitute: "The presence of transmission constraints presents further opportunities for exercising market power. For example, such constraints may isolate markets, giving even small producers local market power" (Berry *et al.* 1999, p. 140). If there was indeed widespread awareness of this issue inside FERC, we might conclude that active influence on the part of power marketers prevented the commissioners from adopting the perspective from the Office of Economic Policy. Otherwise, they would probably have adopted the insights from the economic advisers.

This assumption turns out to be incorrect, however. The evidence suggests that the commissioners were far more oriented toward legal reasoning than economic arguments and it is here that we can find the generic view of markets as places. Recall that California was the first state to restructure its industry. Under the old regime, negotiations between regulatory agencies and utilities had been far more important than economic models of market dynamics. Practically all price-regulation came down to the evaluation of costs and negotiations about what constituted a "fair" profit. Because this was primarily an issue of negotiation, FERC was not well staffed with economists, and those that did have economics training had been educated in cost-of-service economics, not that of industrial organizations, which was concerned with the issue of market power. Throughout the 1980s and 1990s, the commissioners and their staff were therefore usually lawyers who had little to no understanding of economics or the logic of electricity markets. In a survey from 2001, 80 percent of the employees in the new Office of Market Tariffs and Rates stated that they needed more training to understand how markets functioned.

FERC was also extremely top-heavy. In 1998, they projected that more than one quarter of all employees would become eligible to retire by 2005. That means that the top people in the different departments had generally spent most of their careers under the cost-of-service regulation. In 2002, the General Accountability Office concluded in an independent investigation that most of the agency's staff were unable to explain how electricity markets worked. They write: "FERC does not currently have enough staff with the skills and knowledge of competitive energy markets to effectively regulate and oversee" the deregulated markets (General Accounting Office 2002).¹⁶

When FERC moved into the new era of restructured markets, there was thus much enthusiasm for markets, but not much appreciation of technical analysis from the Office of Economic Policy. A FERC employee recalled the following:

E: The other offices were not quite as sanguine [about problems in electricity markets]. I would essentially attribute it for the most part to the fact that they didn't understand the economics or even the physics to a certain extent. As I said before, the top of this thing was a commission, which was all lawyers, so ...

I: The staff would be mostly lawyers as well?

*E: Yes, the staff was mostly lawyers. There're other economists, and there are some electrical engineers. [...] [But] at that time, the electrical engineers were not very prominent either. They were electrical engineers and not really familiar with how the market would interact with the physics of the system.*¹⁷

The archival record confirms this recollection. The Office of Economic Policy was relatively small. Only about 10 people worked on electric policy in 1998. The Office was also somewhat isolated within FERC during the early years of restructuring, which was one reason it was merged with the Office of Electric Power Regulation during the “FERC First” initiative. As one employee told me, the Commission simply “did not care about the market power concerns” from the Office.¹⁸

Given their background and staff orientation, the commissioners drew their understanding from the legal dogma that had developed over the previous two decades. Central to their approach was the doctrine of the “contract path.” This doctrine evolved in a world in which vertically integrated utilities charged regulated rates to customers in fixed service territories. Sometimes, these utilities would trade small amounts of electricity with utilities or independent power producers in adjacent service territories. The utilities organized these transactions on the basis of bilateral contracts that were subject to review by FERC.

The “contract path” was a legal tool to deal with transmission cost. This doctrine assumed that you could draw a straight path that captured how the energy traveled from seller to customer. This was a legal fiction because real electricity flows do not follow predefined paths. But the *assumption* made it possible for parties to negotiate transmission prices prior to delivery and factor them into proposed rates. It was effectively an accounting tool. First adopted in a series of decisions about disputes about transmission costs of the 1980s, the doctrine continued to guide FERC until after the Western Energy Crisis. In a landmark order, the commission writes: “we recognize that there may be difficulties in using a traditional contract path approach [...]. At the same time, however, contract path pricing and contracting is the longstanding approach used in the electric industry and it is the approach familiar to all participants in the industry” (FERC 1996).¹⁹

This doctrine provides the idea of markets as generic physical places. By ignoring issues surrounding actual energy flows on the grid, the activities of the system operator no longer factor into the market. This obscures the role of demand fluctuations and suggests that the market can be understood as a geographic reality: generators and consumers who reside at specific, static locations. Likewise, by ignoring the potential interactions between flows, interdependencies disappear, and the market appears as a set of decentralized buyers and sellers who strike bilateral deals; the deliveries are independent from each other. The doctrine made it possible to treat contracts between utilities as analogous to those about any other commodity.

What made the contract path doctrine so powerful is that it *inoculated* legal reasoning about pricing issues from engineering concerns. As one of the most prominent critics, Harvard professor William Hogan, put it in testimony to congress: “in the old world of vertically integrated utilities [...] the contract-path was a workable fiction for commercial purposes, and the engineers could deal separately with the physical reality” (Hogan 2001).²⁰ Because the legal construct simply assumed that energy could be transported via a straight path, it also assumed that the engineering reality was irrelevant for the legal assessment of these contracts. As soon as the commissioners bought into the contract-path and its attendant imagination of markets as places, they also assumed that the “just and reasonableness” of rates could be assessed independently of the underlying engineering reality. But precisely those aspects were relevant for the arguments about market power. Accordingly, the doctrine provided a powerful rationale for ignoring the growing concerns in the other part of the agency. Once adopted, the doctrine therefore sustained itself from decision to decision.

Because the doctrine was already in place long before the power marketers entered the scene, we must look elsewhere for the origin of FERC’s confusion. The archival material quickly provides this origin. The passing of the Energy Policy Act of 1992 prompted a review of FERC’s transmission pricing policies. In an internal report from 1993, FERC staff notes: “The industry’s contract path approach has been incorporated into the Commission’s traditional transmission ratemaking. In effect, the industry has adopted, and the Commission has accepted a convenient fiction that power travels along a contract path that differs from the real physical paths” (FERC 1993).²¹

The utilities first invented the concept in the 1960s for internal accounting purposes. In the 1980s, FERC adopted the doctrine of the contract path as its own preferred methodology to evaluate these contracts. At the

time, the utilities lobbied for FERC to adopt this standard because it gave them advantages in negotiations with independent power producers, who needed to use the utilities' transmission grid to sell their output. By obscuring the actual power flows, utilities could draw contract paths that made transport from their own generation assets cheaper and thus discriminated against competitors. FERC accepted the methodology because revoking it would have made things exceedingly complicated and the methodology had already "accommodated substantial amounts of efficient trading in the industry, all at a reasonable administrative cost" (FERC 1993). In other words, contract path pricing was established, convenient, and easy to assess. In the early 1980s, complaints from independent power producers were still a relatively minor issue and the utilities themselves rarely got into disputes over the discrepancies between real and contractual power flows. The utilities handled transmission and often shared the costs of upgrades. Accordingly, "the industry believed that the overall costs and benefits were roughly balanced—others carried your power as much as you carried their power" (FERC 1993). Weighing a relatively frictionless administrative system against an undefined alternative, FERC decided to go with the established model. By the 1990s, when questions about access to the transmission system became exceedingly controversial, the contract path methodology was already deeply embedded in FERC's dogma. Even regulatory capture, it turns out, is not without its ironic moments. The fundamental error in the commissioners' perception goes back to interactions with those who would later become the primary victims of this influence.

6. Conclusion

A variety of modern scandals can be traced to regulatory capture. The Wirecard fraud or the Deepwater Horizon oil spill is recent examples. Despite the explanatory importance of cognitive capture theories, not much attention has been paid to the temporal dynamics behind different epistemic problems regulators may be facing. Drawing on research about the "regulatory dialectic" (Thiemann & Lepoutre 2017), I have therefore argued that the theory of cognitive capture should become triadic. Rather than just focus on the interaction between regulators and regulated, capture analyses should begin by specifying the precise nature of regulators' epistemic problem. While information problems go back to short-term dynamics of secrecy and deception (Gibson 2014), worldview problems are associated with more gradual and long-term influences on regulatory agencies' legal and institutional infrastructure (Wansleben 2021). Depending on the kind of problem affecting regulators, different capture mechanisms may point to different culprits.

The empirical analysis has illustrated this argument. While power marketers did their best to influence commissioners' perception in the short run, we have seen that the agency was already predisposed to agree with them. It had adopted a flawed worldview of electricity markets as places. This worldview suggested that the Hub-and-Spoke test was adequate and offered an alternative explanation for the evidence of market power, supply shortages. As I have shown, this worldview was embedded in the legal dogma of the contract-path, which dominated decision making in the commission and provided reasons to ignore economic expertise at the agency. It was thus the utilities that caused FERC's inability to detect market power by convincing it to adopt this doctrine in the 1980s. A capture explanation that carefully analyzes the nature of regulators' misperception thus arrives at a different finding than most of the existing research: it was the later victims of market power who saddled FERC with a perspective on electricity markets that obscured its presence.

One implication of this argument is that research on cognitive capture should be more tightly integrated with research on the regulatory dialectic. The latter research carefully explores the interactive dynamics between regulators and regulated. This reveals structural, organizational, and cultural avenues through which influence may be exerted over different periods of time. Future research should therefore explore whether the simple distinction between information and worldview problems should be differentiated further to accommodate these additional pathways. This paper has merely tried to take the first step toward an expanded theory of cognitive capture.

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Data availability statement

Research data are not shared.

Endnotes

- ¹ I will refer to this family of theories as “cognitive” rather than “cultural” capture. “Culture” typically refers to a set of unstated and implicit understandings of the world, thus excluding more conscious elements of regulatory perception. Cognitive capture refers to influences on regulatory perception more generally.
- ² This definition diverges from that of economics, which defines market power as a company’s ability to profitably alter prices away from the competitive level. By adding “significance” as a criterion, FERC created room for interpretation to expand or restrict its enforcement.
- ³ FERC (1998) Annual Report 1997. U.S. Government Printing Office, Washington, DC, p. 2.
- ⁴ Jason Leopold (2007) Cheney Suppressed Evidence in Energy Crisis, *Scoop Independent News* (24 July).
- ⁵ E. Hollings (2002) Time for a Special Counsel. *The New York Times*, A27 (9 February).
- ⁶ U.S. General Accounting Office (2001) Communications Between FERC and Enron. (GAO Publication No. 01-1020R). Washington, DC: U.S. Government Printing Office, p. 3.
- ⁷ Committee on Governmental Affairs (2002) Committee Staff Investigation of the Federal Energy Regulatory Commission’s Oversight of Enron Corp (12 November), pp. 41–42. Submitted in: *Asleep at the Switch: FERC’s Oversight of Enron Corporation*, Vol. 1.
- ⁸ FERC (1999) Order Accepting Tariff Revisions and Granting Waiver of Notice, FERC Docket ER99-4462 (12 November), p. 4.
- ⁹ Loretta Lynch (2002) Prepared Statement of Loretta Lynch, in: U.S. Congress (11 April 11). *Examining Enron: Electricity Market Manipulation and the Effect on the Western States*, p. 49.
- ¹⁰ Frank Wolak, Robert Nordhaus, Carl Shapiro (1998) Preliminary Report on the Operation of the Ancillary Services Markets of the California Independent System Operator (ISO). Market Surveillance Committee of the California ISO, Box 6, Folder 6/9, ISO Board of Gov. and Committee Meeting Files, California State Archive, Sacramento, p. 2.
- ¹¹ FERC (1998) Order Accepting for Filing Proposed Market-Based Rates for Certain Ancillary Services, FERC Docket ER98-2843 (June 30), p. 11.
- ¹² The convention is to multiply the resulting sum by 10,000. Thus, for example, a market with four equal-sized producers would yield an HHI of $4 * 0.252^2 * 10,000 = 2,540$.
- ¹³ If the applicant controlled more than 20 percent of the market share, which corresponds to an HHI of 2,000, it was considered to have market power. It also measures the ratio of “uncommitted” capacity, where the load obligations of both the applicant and other firms are subtracted from installed capacity.
- ¹⁴ CPUC (1994) Reporter’s Transcript of Hearing. R.94-04-032, Box 69, Vol. 4 (4 August). CPUC Archive, San Francisco, p. 1181.
- ¹⁵ Interview with CAISO Market Monitoring Employee, 13 December 2017.
- ¹⁶ General Accounting Office (2002) Energy Markets – Concerted Actions Needed by FERC to Confront Challenges that Impede Effective Oversight. (GAO Publication No. 02-656). Washington, DC: U.S. Government Printing Office, p. 8.
- ¹⁷ Interview with FERC Economist, 9 February 2018.
- ¹⁸ Interview with FERC Economist #2, 12 January 2018.
- ¹⁹ FERC (1996) Order No. 888. RM95-8-000 (24 April).
- ²⁰ William Hogan (2001) Electricity Market Restructuring: Reforms of Reforms. Submitted in: U.S. Congress (2 August) FERC: Regulators in Deregulated Electricity Markets, p. 8.
- ²¹ FERC (1993) Staff Discussion Paper – Transmission Pricing Issues, in: FERC (30 June). Inquiry Concerning the Commission’s Pricing Policy for Transmission Services Provided by Public Utilities Under the Federal Power Act. Docket RM93-19-000.

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