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Whither the Regulatory “War on Coal”? Scapegoats, Saviors, and Stock Market Reactions

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ABSTRACT

Complaints about excessive economic burdens associated with regulation abound in contemporary political and legal rhetoric. In recent years, perhaps nowhere have these complaints been heard as loudly as in the context of U.S. regulations targeting the use of coal to supply power to the nation’s electricity system, as production levels in the coal industry dropped nearly by half between 2008 and 2016. The coal industry and its political supporters, including the President of the United States, have argued that a suite of air pollution regulations imposed by the U.S. Environmental Protection Agency (EPA) during the Obama Administration seriously undermined coal companies’ bottom lines, presenting an existential threat to the industry. Under the Trump Administration, industry players have lobbied hard for (and sometimes received) financial subsidies and regulatory changes, with the President seemingly all too happy to play the role of the industry’s savior.

Stepping back, we consider the extent to which regulations have really led to the decline in demand for coal and how much the coal industry can actually expect to gain from the de-regulatory policies of the current Administration. To illuminate these questions, we statistically analyze stock market reactions to important events in what critics called the regulatory “war on coal” during the Obama Administration. Using an event-study framework that measures abnormal market activity in the immediate wake of these events, we are able to isolate any potential impact of regulatory developments above and beyond market factors, such as secular trends in natural gas prices and market performance as a whole. Surprisingly, we find no systemic evidence consistent with a “war on coal” based on investor assessments of the industry’s financial prospects in the wake of new regulatory developments, even though our methods do find evidence of stock market reactions to other events, such as bankruptcies of other companies. The very actors with financial stakes in understanding the impact of regulation on the coal industry appear to act as if they never bought into the regulatory “war on coal” narrative.

Our findings are consistent with broader evidence about the effects of regulation and with an underlying political economy of regulatory scapegoating, according to which actors in a declining industry prefer to blame regulation rather than competitive factors for their businesses’ decline. By calling attention to the pervasive incentives for scapegoating and cheap talk by politicians seeking to be saviors, we offer an account that can explain the mismatch between our findings and the rhetoric of the “war on coal,” and along the way we also show how important it is for courts, government officials, and the public to demand agencies seek evidence when making regulatory decisions instead of relying on political rhetoric.

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Regulation can improve society by correcting market failures. But in doing so, it can also impose costs on industry. As a result, businesses often have an incentive to mobilize against the imposition of new regulatory obligations and seek the alleviation of existing ones.¹ Corporate managers frequently emphasize the negative ramifications of regulations, claiming that regulations kill jobs² and place an inordinate drag on the economy.³ Such claims about excessive regulatory costs have permeated political discourse. Yet such claims obviously hold strategic value for the business leaders who make them.⁴ Even when specific regulations have little or no perceptible impact on firms’ bottom lines, managers still have incentives to overstate a regulation’s negative consequences. Exaggerating small or nonexistent effects of regulation might be useful in staving off other, more stringent or comprehensive regulations that would be truly onerous. Exaggeration may also help industry leaders build the case for subsidies, tax relief, or forms of tariff protection that would benefit their firms. Blaming regulations also can divert attention from business leaders’ own failings and their inability to maintain profitability during periods of heightened economic competition.

Perhaps nowhere has the rhetoric of excessive regulatory costs emerged as prominently on the political agenda in recent years as it has with environmental regulations imposed on electric utility plants that rely on coal as their source of energy.⁵ During the Obama Administration, the U.S. Environmental Protection Agency (EPA) issued a suite of rules designed to curb power plant emissions of mercury and other toxic chemicals, prevent air pollution from power plants from drifting across state lines, and limit carbon dioxide emissions from power plants in an effort to combat global climate change.⁶ Industry claimed that these rules constituted a veritable regulatory “war on coal.”⁷ According to executives and

¹ JACK L. WALKER, *MOBILIZING INTEREST GROUPS IN AMERICA: PATRONS, PROFESSIONS, AND SOCIAL MOVEMENTS* (1991).

² Anne E. Smith et al., *Estimating the Employment Impacts of Regulations: A Review of EPA’s Methods for its Air Rules*, NERA Econ. Consulting (Feb. 2013).

³ See, e.g., Mark W. Crain & Nicole V. Crain, *The Cost of Federal Regulation to the U.S. Economy, Manufacturing, and Small Business*, Nat’l Ass’n Mfrs. (Sep. 10, 2014), available at <https://dspace.lafayette.edu/bitstream/handle/10385/2103/Crain-CostofFederalRegulationtotheUSEconomyManufacturingandSmallBusiness-2014.pdf?sequence=1>. For a critical review of the Crain and Crain study, see Richard W. Parker, *The Faux Scholarship Foundation of the Regulatory Rollback Movement*, 45 *ECOLOGY L.Q.* 845 (2018).

⁴ See generally James W. Coleman, *How Cheap Is Corporate Talk? Comparing What Companies Tell Regulators With What They Tell Investors*, 40 *HARV. ENVTL. L. REV.* 47 (2016) (showing that industry often engages in “cheap talk” about compliance costs associated with regulation to the regulators versus investors).

⁵ For a concise history of this rhetoric with respect to coal-powered utility plants, see RICHARD L. REVESZ & JACK LIENKE, *STRUGGLING FOR AIR: POWER PLANTS AND THE “WAR ON COAL”* 1-2, 16-19 (2016).

⁶ See *id.* at 1-2 (identifying the mercury rule, cross-state transport rule, and the CPP as the “primary evidence” of the regulatory battle against the coal industry); see also *id.* at 22-23.

⁷ See Hari M. Osofsky & Jacqueline Peel, *Energy Partisanship*, 65 *Emory L.J.* 695 (2015); Richard L. Gordon, *An EPA War on Coal?*, *REGULATION*, Spring 2013, at 16, <https://object.cato.org/sites/cato.org/files/serials/files/regulation/2013/3/v36n1-7.pdf>; Michael Grunwald, *Inside the War on Coal*, *POLITICO* (May 26, 2015, 11:45 PM), <https://www.politico.com/agenda/story/2015/05/inside-war-on-coal-000002>. Coal companies have filed hundreds of official regulatory comments with environmental and natural resources agencies as well as annual

lobbyists in the coal mining industry, these environmental regulations made coal a more costly energy source for electric utilities, prompting a wave of coal-fired plant retirements that decreased overall demand for coal.⁸ Coal production has in fact declined dramatically over the last decade: dropping 38 percent between 2008 and 2016.⁹ At the same time, the coal industry apparently invested millions of dollars in a “strategy ... that urge[d] coal-mining families to join the coal and electric power industry in fighting back against the federal government's so-called ‘war on coal.’”¹⁰ Coal industry executive Robert Murray accused the Obama Administration of creating a “regulatory rampage” aimed at “appeas[ing] his radical environmentalist, liberal elitist . . . constituents” who seek to “destroy” the coal industry.¹¹

Sympathetic politicians have echoed the coal industry’s claims that air pollution regulations have undermined the coal industry. After the Obama Administration announced a plan in 2013 to put in place new climate-related rules, then-Speaker of the House John Boehner criticized the proposed policy initiative as “essentially a national energy tax and a continuation of the war on coal [that] will only make matters worse, putting thousands and thousands of Americans out of work.”¹² Senate Majority Leader Mitch McConnell criticized President Obama for waging a “war on coal,” charging that new EPA rules were just a “back door attempt by President Obama to ... shut down our nation’s coal mines.”¹³ As a presidential candidate in 2016, Donald Trump railed against “unnecessary regulations” and repeatedly pledged to “end the war on coal.”¹⁴ Such assertions have not been limited Republican political leaders either, as “Democrats from coal mining and processing states have opposed EPA regulatory requirements that the politicians claimed would disadvantage U.S. industry.”¹⁵

Just as industry actors have strategic reasons to exaggerate the negative consequences of regulation, so too do certain politicians have an incentive to exaggerate how much their efforts to reduce regulatory burdens will promote industrial activity and job growth. As a candidate and as President, Donald Trump has regularly portrayed himself as the coal industry’s savior. In addition to his general

financial reports with the Securities and Exchange Commission claiming that environmental regulations have had significant effects on the economic viability and competitiveness of their industry.

⁸ See Isaac Orr, *Blame Government, not the Market, for Dwindling Coal Industry*, HILL (Dec. 15, 2017, 3: 00 PM), <https://thehill.com/opinion/energy-environment/365137-blame-government-not-markets-for-dwindling-coal-industry>.

⁹ See U.S. ENERGY INFO. ADMIN., DOE/EIA-0035(2018/3), MARCH 2018: MONTHLY ENERGY REVIEW (2018), <https://www.eia.gov/totalenergy/data/monthly/archive/00351803.pdf> [hereinafter “EIA 2018”].

¹⁰ Patrick McGinley, *Collateral Damage: Turning a Blind Eye to Environmental and Social Injustice in the Coalfields*, 19 J. ENVTL. & SUSTAINABILITY L. 304, 308-09 (2013).

¹¹ Robert E. Murray, Remarks at the 37th Annual Coal Marketing Days Conference (Sep. 22, 2014), *available at* <http://www.timesleaderonline.com/opinion/columns/2014/09/murray-energy-s-strategies-for-succeeding-in-transitional-coal-markets/>.

¹² Richard McGregor, *Obama’s ‘War on Coal’ Carries Risks in Battleground States*, FIN. TIMES (June 26, 2013), *available at* <https://www.ft.com/content/cb2a6450-de79-11e2-b990-00144feab7de>.

¹³ Erica Martinson, *Coal in Obama’s Climate Cross Hairs*, POLITICO (Sep. 19, 2013), <https://www.politico.com/story/2013/09/coal-barack-obama-epa-greenhouse-gas-emissions-097104>.

¹⁴ John W. Miller, *Election 2016: Trump Pushes Energy Deregulation*, WALL ST. J. (Sept. 23, 2016), at A4. In debating his Democratic rival in 2016, vice-presidential candidate Mike Pence repeatedly blamed “the war on coal and the stifling avalanche of regulation coming out of this administration” for economic woes. Daniel White, *Read a Transcript of the Vice Presidential Debate*, TIME (Oct. 5, 2016), <https://time.com/4517096/vice-presidential-debate-kaine-pence-transcript/>.

¹⁵ Howard A. Latin, *Climate Change Regulation and EPA Disincentives*, 45 ENVTL. L. 19, 40 (2015).

populist appeals during the campaign—such as his claim that “I alone can fix it”¹⁶—he also specifically made saving the coal industry one of his most prominent policy promises.¹⁷ “I’m coal’s last shot,” he would come to say.¹⁸ And his message of salvation resonated with voters in certain key coal states. In West Virginia and Wyoming, Trump beat Hillary Clinton by a margin of roughly 3 to 1 in the 2016 presidential election.¹⁹ Trump’s electoral victory produced considerable initial optimism in coal states. As a retired miner in Gillette, Wyoming stated, “You saw right after the election ... people with smiles on their faces. They finally felt like the albatross was gone.”²⁰ In the years to follow, the President and his Administration have taken steps aimed at reducing regulatory burdens on coal-powered electricity, including repealing the EPA’s Clean Power Plan (CPP).²¹ President Trump’s first EPA Administrator declared that “[t]he war on coal is over.”²²

The rhetoric of a regulatory “war on coal” has proven itself politically resonant in part because it accords with a certain economic logic. If regulation raises the costs of using a product, then that should make the product less attractive in the marketplace. Yet, regulation is not the only reason that an industry such as coal mining could struggle. During the eight years of the Obama Administration, coal faced other economic challenges, including increased competition from natural gas.²³ Perhaps much if not most of the coal industry’s decline derived from these other factors. If so, political rhetoric about a regulatory war on the coal industry might merely amount to symbolic speech that serves the self-interest of industry leaders and politicians.²⁴ Industry leaders would presumably prefer to make regulators in Washington, D.C., the scapegoat of what ails their industry rather than take the blame for failing to

¹⁶ Donald J. Trump, Republican Nominee for President of the United States, Address at the Republican National Convention (July 21, 2016).

¹⁷ See, e.g., John H. Cushman Jr. & Zahra Hirji, *Trump: America First on Fossil Fuels, Last on Climate Change*, INSIDE CLIMATE NEWS (May 27, 2016), <https://insideclimatenews.org/news/27052016/donald-trump-republican-party-election-fossil-fuels-coal-oil-gas-fracking-climate-change-paris> (quoting candidate Donald Trump as saying that “[w]e are going to save the coal industry, believe me, we are going to save it”).

¹⁸ Bill Weir, *More Coal-Fired Power Plants Have Closed Under Trump Than in Obama’s First Term*, CNN (Jan. 9, 2019), <https://www.cnn.com/2019/01/07/politics/pennsylvania-coal-plants-weir-wxc/index.html>.

¹⁹ In 2016, Trump bested Clinton by 2.6 times as many votes in West Virginia and by 3.1 times as many votes in Wyoming. *West Virginia Results*, N.Y. TIMES, <https://www.nytimes.com/elections/2016/results/west-virginia>; *Wyoming Results*, N.Y. TIMES, <https://www.nytimes.com/elections/2016/results/wyoming>.

²⁰ Meghan Keneally et al., *High Hopes in Coal Country with Trump’s Climate Change Policy*, ABC News (May 18, 2017), <https://abcnews.go.com/Politics/wyoming-coal-miners-high-hopes-trump-amid-national/story?id=47465051>. By July 2019, Revelation Energy had declared bankruptcy and closed two of its mines in Gillette. *Coal Company Files for Bankruptcy*, NAT’L PUB. RADIO (July 4, 2019), <https://www.npr.org/2019/07/04/738724369/coal-company-files-for-bankruptcy>.

²¹ See Repeal of the Clean Power Plan; Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guidelines Implementing Regulations, 84 Fed. Reg. 32,520 (July 8, 2019) (to be codified at 40 C.F.R. pt. 60). See also Juliet Eilperin & Brady Dennis, Trump EPA Finalizes Rollback of Key Obama Climate Rule that Targeted Coal Plants, WASH. POST (Jun. 19, 2019), https://www.washingtonpost.com/climate-environment/trump-epa-finalizes-rollback-of-key-obama-climate-rule-that-targeted-coal-plants/2019/06/19/b8ff1702-8eeb-11e9-8f69-a2795fca3343_story.html?utm_term=.391d86ae4ccb.

²² Adam Beam, *‘The War on Coal is Over’: Trump Administration to Terminate Obama-era Clean Power Plan*, Courier Journal (Oct. 9, 2017), <https://www.courier-journal.com/story/tech/science/environment/2017/10/09/trump-war-coal-over-terminate-clean-power-plan/746397001/>.

²³ Steve Cicala, *Who’s Waging the War on Coal? Not the U.S. Government*, FORBES (Oct. 27, 2016, 9:40 AM), <https://www.forbes.com/sites/ucenergy/2016/10/27/whos-waging-the-war-on-coal-not-the-government/>.

²⁴ See MURRAY EDELMAN, *THE SYMBOLIC USES OF POLITICS* (2d ed. 1985).

ensure that their line of business could remain economically competitive.²⁵ Politicians seeking votes from workers and their families also benefit if they can make themselves appear to be saviors who can simply roll back regulatory burdens and thereby revitalize a struggling industry or economy.

In this paper, we report findings from empirical analysis seeking to shed light on the credibility of the “war on coal” narrative about the role of regulation in the decline of the coal industry in the United States. Were environmental regulations imposed on the utility sector really instrumental to that decline, as the narrative has suggested? Or was regulation essentially just a scapegoat for business leaders and a symbol for self-declared political saviors? Some economic analysis already indicates that the decline in coal production in fact had much more to do with competition from natural gas than from regulation.²⁶ Still, other scholars and analysts continue to suggest that environmental regulation poses an “existential” threat to the coal industry.²⁷

This empirical study seeks insight from the signals provided by private investors in publicly traded coal firms—those with real money at stake—to see what their investment behavior reveals about their expectations of the likely impact of environmental regulations on coal firms’ bottom lines. We specifically analyze the stock prices of publicly traded coal companies to see how they may have responded to news of the relevant regulatory events predominantly associated with the “war on coal.” By analyzing investor responses to discrete events associated with the development and implementation of key environmental regulations, we seek to factor out more secular confounding contributors to coal’s decline, such as falling natural gas prices, and then to assess what the market itself might say about the impact, if any, of environmental regulation.

²⁵ For a discussion of how poor business judgments contributed to bankruptcies among major coal mining companies, see Heather Richards, *Cloud Peak’s \$300 Million Mistake*, CASPER STAR TRIB. (April 29, 2019), https://trib.com/business/energy/cloud-peak-s-million-mistake/article_b86fd711-7e0c-5686-aaf1-e756d517ca14.html (“It’s well understood in Wyoming that the state’s biggest coal companies got into trouble because they’d taken on debt.”); David Roberts, *Coal Left Appalachia Devastated. Now It’s Doing the Same to Wyoming*, VOX (July 9, 2019), <https://www.vox.com/energy-and-environment/2019/7/9/20684815/coal-wyoming-bankruptcy-blackjewel-appalachia> (arguing that “companies made extraordinarily large and ill-advised bets on metallurgical coal ... meant for export abroad ... on the assumption that China would grow at its headlong early-2000s pace forever” and, when China did not continue at that pace, “those companies — or rather, their employees and shareholders—got hosed”).

²⁶ See, e.g., Charles D. Kolstad, *What is Killing the U.S. Coal Industry?*, Stanford Institute for Economic Policy Research Policy Brief (March 2017) (“What is clear...is that environmental regulations did not kill coal.”).

²⁷ See, e.g., Adele C. Morris, Noah Kaufman, and Siddhi Doshi, *The Risk of Fiscal Collapse in Coal-Reliant Communities*, Columbia Center on Global Energy Policy and Brookings Economic Studies Working Paper 6 (July 2019) (arguing that “even a moderately stringent climate policy could create existential risks for the coal industry”); Steven Ferrey, *Presidential Executive Action: Unilaterally Changing the World’s Critical Technology and Infrastructure*, 64 DRAKE L. REV. 43, 105-106, 109 (2016) (“Unilateral executive action to limit various air emissions is transforming fundamental power technology from use of coal as its primary input to natural gas and renewable energy in the United States, particularly during the past five years.... Air regulation is a key wedge on choice of electric technology and infrastructure.”). In addition, various analysts and advocates have continued to claim that the Clean Power Plan and other climate regulations would severely harm the coal industry. See, e.g., *Why President Trump Overhauled Obama’s Coal Emissions Standards* (Aug. 28, 2018), <https://www.heritage.org/coal-oil-natural-gas/heritage-explains/why-president-trump-overhauled-obamas-coal-emissions> (quoting Heritage Foundation economist Nick Loris as claiming that “[t]he Clean Power Plan...really would have hurt our existing coal fire power fleet to force them to prematurely retire [and] was really an attack on our existing coal generation”).

As we detail in the sections that follow, our statistical analysis shows that the stock prices for coal firms responded to certain non-regulatory events, but it reveals no comparable changes in response to news of environmental regulatory events in a manner consistent with the “war on coal” narrative. We find no clear evidence that investors saw key developments in the regulatory “war on coal” as having meaningful implications for profitability in the coal industry. Overall, it would seem as if investors in the stock market perceived something that company executives and certain politicians would not have wanted workers or voters to understand: namely, that environmental regulation of electric utilities has not significantly contributed to the decline in the coal industry. Our research results not only shed additional light on the question of regulation’s role in the decline of the coal industry in the United States, but it also provides an opportunity for a broader reflection on the political economy of regulatory scapegoating and provides reason to question the extent to which dying industries can be reinvigorated through environmental regulatory reforms.

This paper begins, in Part I, with a descriptive account of the coal industry, including its recent decline. We review existing research on the causes of the decline, including other studies that, using other data and methods, have raised questions about whether regulation explains much of the decreased demand for coal as a source of energy. What has remained unexamined in the existing literature, though, has been whether regulation affects the expectations of investors in the coal industry—and, by extension, what private investors’ behavior might imply about the true financial implications of environmental regulations on the coal industry in recent years.

In Part II, we explain our focus on firm-level financial data and outline our methods of analyzing these data—an event-study approach supplemented with a difference-in-differences analysis of coal’s fortunes vis-à-vis its main competitor, natural gas. We explain how we used these widely accepted methods to assess the impact of news of regulatory events on the stock market’s perceptions about the coal industry’s bottom line.

In Part III, we report the results obtained from our analysis of stock price responses to the EPA regulations underlying claims of a regulatory “war on coal.” We also analyze the impacts of other related Obama-era policy initiatives, including the Paris Climate Accord, and we look for possible effects on stock prices from decisions in major litigation concerning EPA air pollution regulations. On the whole, our analysis suggests that news of environmental regulations and policies had no more than highly inconsistent effects on coal companies’ value to investors—with no overall discernible pattern supportive of claims of a regulatory “war” on the industry.

In Part IV, we test the robustness of our methods by considering other types of events, such as more direct operational rules on coal production, bankruptcies within the industry, and the outcomes of presidential elections. We find some of these other events associated with statistically significant changes in coal share prices. The highly discernible stock price reactions we observe in response to news of bankruptcies by other coal firms, for example, show that coal stock prices do react to negative events—a finding that both reinforces the appropriateness of our empirical methods and makes the overall non-response to news of key events in the regulatory “war on coal” narrative all the more noteworthy.

Finally, in Part V, we address implications for regulatory law of the disconnect we find between political rhetoric and market behavior. We offer plausible explanations for the seemingly blasé market reaction to news of what would have seemed, judging from the political rhetoric, to be an existential regulatory threat. Although our analysis of market reactions in this single industry cannot be taken to

imply that regulation never has any negative effects on industry competitiveness or stock market valuation in other contexts, the absence of significant market reactions consistent with claims of a regulatory “war on coal” does shine light on the strategic incentives that business and political leaders have to exaggerate the negative effects of regulation. It is relatively easy for the managers of private firms to make regulation a scapegoat for their own inability to keep their industry competitive, just as it is relatively easy for politicians to make themselves appear to be saviors to struggling workers and their families by offering quick fixes in the form of regulatory rollbacks. Given the gulf we observe between the heated rhetorical claims and the apparent market realities in this highly salient context of energy-related regulation, we urge a degree of caution before accepting claims in other contexts about supposedly dire effects of regulation.

I. AN INDUSTRY IN DECLINE, BUT WHY?

Coal was once nearly the only source fueling the demand for electricity in the United States. For much of the last century, coal has been abundant and cheap compared to its major competitor fuels, including natural gas and renewable energy. Although coal combustion requires a relatively high level of fixed and capital costs relative to its main competitor, natural gas,²⁸ analysts continued to project considerable growth for the coal industry as recently as the early 2010s.²⁹ The CEO of a major coal company told the *Wall Street Journal* in 2011 that he thought “the next decade for coal is going to be one of the best decades we’ve ever had.”³⁰

Between 2008 and 2017, however, the market for coal took an unexpected turn. As Figure 1 shows, actual coal production began to tumble from almost 1.2 billion short tons per year in 2008 to 728 million short tons in 2016.³¹ Although coal had been losing ground to natural gas and renewables in the market for electricity generation since the late 2000s, Figure 1 shows that in 2016 natural gas actually eclipsed coal as America’s primary fuel for electricity,³² driven by a plentiful supply of cheaper natural gas made possible by the hydraulic fracturing (“fracking”) revolution.³³ Policymakers began to view nat-

²⁸ U.S. Energy Information Administration, *Annual Energy Outlook 2010 with Projections to 2035*, at 67 (Apr. 2010), available at [https://www.eia.gov/outlooks/archive/aeo10/pdf/0383\(2010\).pdf](https://www.eia.gov/outlooks/archive/aeo10/pdf/0383(2010).pdf) [hereinafter “*EIA Outlook 2010*”].

²⁹ Trevor Houser et al., *Can Coal Make A Comeback?*, Center on Global Energy Policy, at 7 (Apr. 2017), available at https://energypolicy.columbia.edu/sites/default/files/Center_on_Global_Energy_Policy_Can_Coal_Make_Comeback_April_2017.pdf; *EIA Outlook 2010*, *supra* note 28, at 94-95; U.S. Energy Information Administration, *Annual Energy Outlook 2012 with Projections to 2035*, at 88 Fig. 96 (June 2012), available at [https://www.eia.gov/outlooks/archive/aeo12/pdf/0383\(2012\).pdf](https://www.eia.gov/outlooks/archive/aeo12/pdf/0383(2012).pdf) [hereinafter “*EIA Annual Outlook 2012*”].

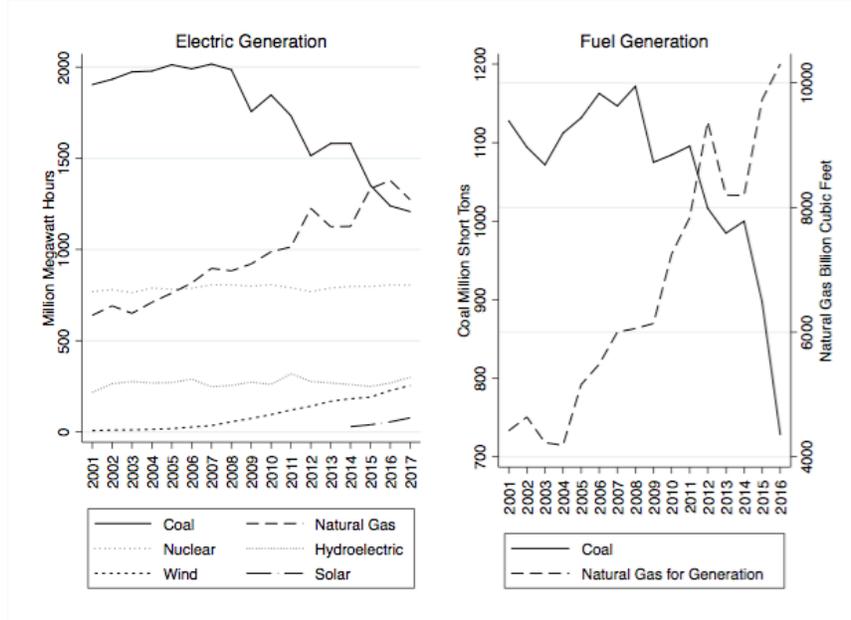
³⁰ Joel Millman & Kris Maher, Coal Foes Play China Card, *Wall Street Journal* (Feb. 4, 2011), <https://www.wsj.com/articles/SB10001424052748703399204576108640399166816>.

³¹ John Coglianese et al., *The Effects of Fuel Prices, Regulations, and Other Factors on U.S. Coal Production, 2008-2016*, Harvard Project on Climate Agreements Discussion Paper 17-90, at 1 (Oct. 2017), available at http://heep.hks.harvard.edu/files/heep/files/dp90_stock.pdf; Devashree Saha, *Trends and Market Forces Shaping the Future of U.S. Coal Industry*, Council of State Governments, at 2 (Sep. 11, 2017), available at http://knowledgecenter.csg.org/kc/system/files/CR_coal.pdf. It appears that the pivotal drop off in coal production occurred after 2011. Houser et al., *supra* note 29, at 12 (pointing out that, after 2011, “the bottom fell out” in coal production, leading to “the biggest 5-year decline in postwar US history”). See also *id.* at 7 (describing the decline in demand for coal as “one of the most spectacular market collapses in history”).

³² See U.S. ENERGY INFO. ADMIN., COAL PLANTS INSTALLED MERCURY CONTROLS TO MEET COMPLIANCE DEADLINES (2017), available at <https://www.eia.gov/todayinenergy/detail.php?id=32952> [hereinafter “*EIA 2017*”].

³³ DANIEL RAIMI, THE FRACKING DEBATE: THE RISKS, BENEFITS, AND UNCERTAINTIES OF THE SHALE REVOLUTION (2017); Karen Palmer et al., *The Effect of Natural Gas Supply on Retail Electricity Prices*, Resources for

FIGURE 1: CHANGING FORTUNES IN THE COAL INDUSTRY



Source: Energy Information Administration (EIA)

atural gas as a potential bridge fuel to shift from coal-fired electricity generation to an eventual system based on renewable sources of energy.³⁴ (By mid-2019, even renewable energy had eclipsed coal as a source of electricity.³⁵)

Around 2008, utilities began increasing the rate of coal-fired power plant retirements, and construction of new coal plants virtually ceased even as utilities added more capacity.³⁶ In many cases, older coal-fired generation units were running at a loss and were “over-ripe” for retirement even before the imposition of any additional pollution controls.³⁷ With the changing market trends, coal producers found

the Future, Issue Brief 12-05 (Aug. 2012), available at <http://www.ourenergypolicy.org/wp-content/uploads/2012/08/RFF-IB-12-05.pdf>.

³⁴ See Alexander Q. Gilbert & Benjamin K. Sovacool, *Benchmarking Natural Gas and Coal-Fired Electricity Generation in the United States*, 134 ENERGY 622 (2017); Roger Lueken et al., *The Climate and Health Effects of a USA Switch from Coal to Gas Electricity Generation*, 109 ENERGY 1160 (2016).

³⁵ See Irina Ivanova, *For the First Time, the U.S. Got More Electricity from Renewables than Coal*, CBS NEWS (June 27, 2019), <https://www.cbsnews.com/news/renewable-energy-electricity-surpasses-coal-in-us-for-the-first-time/>. The overtaking of renewables has occurred more quickly than anticipated. *EIA 2017*, *supra* note 32 (forecasting renewables outpacing coal by 2020).

³⁶ See Lesley Fleischman et al., *Ripe for Retirement: An Economic Analysis of the U.S. Coal Fleet*, ELECTRICITY J., Dec. 2013, at 51; Joshua Linn & Kristen McCormack, *The Roles of Energy Markets and Environmental Regulation in Reducing Coal-Fired Plant Profits and Electricity Sector Emissions*, Working Paper (March 2018), available at <http://ei.haas.berkeley.edu/events/docs/Final%20Papers%20for%20Conference/J.%20Linn.pdf>.

³⁷ See Fleischman et al., *supra* note 36; William Nelson & Sophia Liu, *Half of U.S. Coal Fleet on Shaky Economic Footing: Coal Plant Operating Margins Nationwide*, BLOOMBERG NEW ENERGY FINANCE (March 26, 2018) (on file with authors).

themselves with an overcapacity problem and “crippling” debt and other liabilities.³⁸ Reflecting the hard times, three of the biggest and most established coal producers—Peabody, Arch, and Alpha—filed for bankruptcy in 2015 and 2016.³⁹

Some of these market dynamics pre-dated the Obama Administration, but a steeper decline in coal output coincided with President Obama’s term in office. As Figure 1 suggests, as late as 2007 the coal market looked relatively stable. Prior to mid-decade, few foresaw just how fundamentally different the coal industry—and the larger energy sector—would look by the end of the Obama Administration.

A. Explaining Coal’s Decline

Several research studies have sought to explain coal’s slide. Simplifying greatly, at least six general factors have been examined for their possible role in explaining coal’s decline since 2008:

- Declining productivity in mining operations, which in turn affects the price of coal and its competitiveness with natural gas prices;⁴⁰
- Declining coal exports due to a reduction in Chinese demand;⁴¹
- Unexpectedly low demand for electricity in several recent winters, compounded or caused by the Great Recession;⁴²
- Rapidly falling natural gas prices, spurred by the development of shale gas through hydraulic fracturing, or “fracking”;⁴³
- Growing consumer demand for clean energy driving utilities to increase natural gas and renewable generation capacity;⁴⁴ and
- Environmental regulations which raised the cost of coal and drove utilities to shift generation capacity to cheaper inputs.⁴⁵

Among these various factors, existing research provides ample support for falling natural gas prices (due to innovation in shale gas extraction) as a major, if not the primary, factor leading to the decline in demand for coal.⁴⁶ The relationship between the coal industry’s stock prices and natural gas energy prices is strong, as shown in Figure 2. In a widely cited study, energy analysts Trevor Houser, Jason Bordoff, and Peter Marsters estimated that displacement by “natural gas is responsible for 48.9 percent of the decline in coal production nationwide, [with] renewables (including hydro and biomass) ... responsible for 17.8 percent, and nuclear ... responsible for 7.7 percent.”⁴⁷ In another study, economists

³⁸ Stefan Rehbach & R. Samek, *Downsizing the U.S. Coal Industry: Can a Slow-Motion Train Wreck Be Avoided?*, McKinsey & Co. (Nov. 2015), available at <http://www.mining.com/wp-content/uploads/2015/12/Downsizing-the-US-coal-industry.pdf>.

³⁹ Houser et al., *supra* note 29, at 7.

⁴⁰ Sanya Carley et al., *Adaptation, Culture, and the Energy Transition in American Coal Country*, 37 *Energy Res. & Soc. Sci.* 133 (2018).

⁴¹ Houser et al., *supra* note 29.

⁴² Coglianese et al., *supra* note 31; Houser et al., *supra* note 29; Catherine Hausman & Ryan Kellogg, *Welfare and Distributional Implications of Shale Gas*, Nat’l Bureau Econ. Res. Working Paper 21115 (Apr. 2015), available at <https://www.nber.org/papers/w21115.pdf>.

⁴³ Coglianese et al., *supra* note 31; Houser et al., *supra* note 29; Hausman & Kellogg, *supra* note 42.

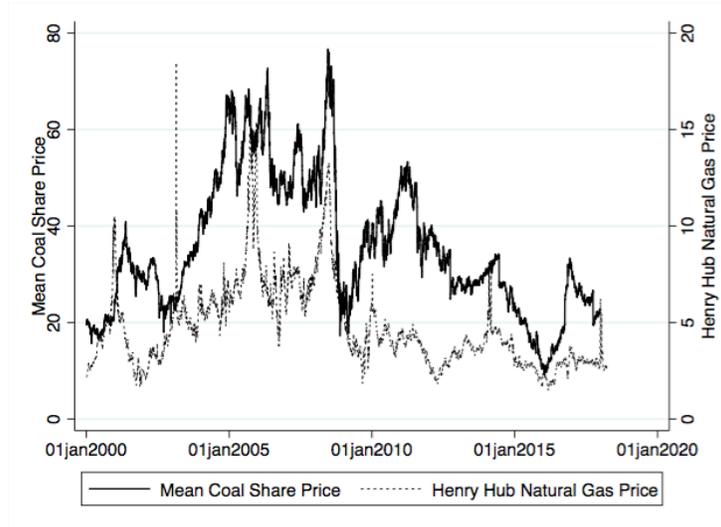
⁴⁴ Saha, *supra* note 31; Houser et al., *supra* note 29.

⁴⁵ Coglianese et al., *supra* note 31; Houser et al., *supra* note 29.

⁴⁶ Coglianese et al., *supra* note 31, at 3.

⁴⁷ Houser et al., *supra* note 29, at 19. The remaining 25.6 percent drop in demand for coal-powered energy derived simply from overall reductions in demand for electricity. *Id.*

FIGURE 2: COAL PRICE AND NATURAL GAS PRICE, 2000-2017



Source: EIA

John Coglianese, Todd Gerarden, and Jim Stock found a strong relationship between natural gas prices and declining coal production, with more than ninety percent of coal production’s decline attributable to cheaper natural gas.⁴⁸ These findings accord with more general research modeling the relationship between natural gas prices and coal generation.⁴⁹

Unlike prior studies, our purpose in this paper is not to test for all of the possible causes of the coal industry’s decline. Instead, our purpose here is to use market behavior to assess the plausibility of a more straightforward but widely held claim—the one central to “war on coal” rhetoric—namely, that environmental regulations had substantial negative effects on coal companies’ profitability.⁵⁰

B. The Regulatory “War on Coal”

Political rhetoric about the regulatory “war on coal” has generally centered on federal environmental regulation and specifically on three EPA rules: the Cross-State Air Pollution Rule

⁴⁸ Coglianese et al., *supra* note 31.

⁴⁹ Christopher R. Knittel et al., *Natural Gas Prices and Coal Displacement: Evidence from Electricity Markets*, Nat’l Bureau of Econ. Res., Working Paper No. 21627 (Oct. 8, 2015), available at <https://www.nber.org/papers/w21627>; Joseph A. Cullen & Erin T. Mansur, *Inferring Carbon Abatement Costs in Electricity Markets: A Revealed Preference Approach Using the Shale Revolution*, 9 AM. ECON. J. ECON. POL’Y. 106 (2017); Harrison Fell & Daniel T. Kaffine, *The Fall of Coal: Joint Impacts of Fuel Prices and Renewables on Generation and Emissions*, 10 AM. ECON. J. ECON. POL’Y. 90 (2018); Joshua Linn & Lucija Muehlenbachs, *The Heterogenous Impacts of Low Natural Gas Prices on Consumers and the Environment*, 89 J. ENVTL. ECON. & MGMT. 1 (2018); Scott J. Holladay & Jacob LaRiviere, *The Impact of Cheap Natural Gas on Marginal Emissions from Electricity Generation and Implications for Energy Policy*, 85 J. ENVTL. ECON. & MGMT. 205 (2017); Reid Johnsen et al., *Estimating Indirect Benefits: Fracking, Coal, and Air Pollution*, IZA Discussion Paper No. 10170 (Sep. 6, 2016), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2834220; Linn & McCormack, *supra* note 36.

⁵⁰ See Gordon, *supra* note 7.

(CSAPR); the Mercury and Air Toxics Standards (MATS); and the CPP.⁵¹ Unlike other earlier environmental regulations, these three rules are thought to have disproportionately affected the demand for coal because they were explicitly designed to address pollution from old utility plants—largely coal-fired plants—that had been “grandfathered” under the original Clean Air Act.⁵² Although *new* coal-fired power plants had been subject to environmental regulations since passage of the Clean Air Act of 1970, the statutory grandfathering of existing coal-fired power plants meant that these old plants were shielded from the brunt of regulatory limitations so long as utility companies were able to find innovative ways to keep them operating.⁵³ By 2012, over 75 percent of coal-fired power plants had been operating for over 30 years, and 20 percent had been operating for over 50 years.⁵⁴ This “distortion of retirement decisions” created what some scholars have called the “old plant effect”—that is, the operation of power plants longer than normal.⁵⁵ For decades, administrations from both parties had sought to address this distorting, environmentally undesirable effect.⁵⁶

Although the CSAPR, MATS, and CPP rules were in some ways building on previous attempts to address the old plant effect,⁵⁷ these three regulations are thought to be the most pointed efforts to bring the largely unregulated existing coal plants under some kind of emissions control regime.⁵⁸ In fact, they were part of a concerted “Climate Action Plan” announced by President Obama in 2013 acknowledging the role of an aging coal-fired power plant fleet in preventing realization of carbon dioxide emissions reductions goals.⁵⁹ Together, the three rules essentially forced electric utilities to factor new, and potentially steep, compliance costs into their decisions about whether to continue relying on an aging fleet of coal-fired plants or to shift generation to newer plants that could use other types of fuel, such as natural gas.

We provide additional details about each of these three key rules in Part III, where we analyze the stock market’s reactions to each. For now, we note that these three rules have received outsized blame on the campaign trail and political debate for the coal industry’s changing fortunes.⁶⁰ Such distinctive attention appears to have had meaningful policy consequences because implicit in assigning blame to these regulations has been the assumption that weakening or removing them could reverse the trends that the coal industry had experienced. As a presidential candidate, Donald Trump promised to

⁵¹ Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals (Cross-State Air Pollution Rule), 76 Fed. Reg. 48,208 (Aug. 8, 2011) (codified at 40 C.F.R. pts. 51, 52, 72, 78, 97); National Emission Standards for Hazardous Air Pollutants, 77 Fed. Reg. 9,304 (Feb. 16, 2012) (codified at 40 C.F.R. pts. 60, 63) (MATS); Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662 (Oct. 23, 2015) (codified at 40 C.F.R. pt. 60) (CPP).

⁵² REVESZ & LIENKE, *supra* note 5.

⁵³ See Gordon, *supra* note 7; REVESZ & LIENKE, *supra* note 5.

⁵⁴ REVESZ & LIENKE, *supra* note 5, at 33.

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ One of the previous efforts was the attempt during the George W. Bush administration to ratchet down New Source Review in order to make it easier to construct new coal-fired power plants. This approach to the old plant effect has typically been strongly supported by the coal industry and utilities. REVESZ & LIENKE, *supra* note 5.

⁵⁸ *Id.*, at 1-2 (noting that “[a]s the primary evidence of this undeclared war [on coal], its opponents point to three regulations issued pursuant to the Clean Air Act that aim to reduce pollution from the nation’s aging power plants”: namely, CSAPR, MATS, and the CPP).

⁵⁹ EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES, THE PRESIDENT’S CLIMATE ACTION PLAN (hereinafter CAP) (June 2013), <https://obamawhitehouse.archives.gov/sites/default/files/image/president27climateactionplan.pdf>.

⁶⁰ *Id.*

rescind the Obama-era climate regulations in an effort to augur a return to greatness for the coal industry.⁶¹ As President, he directed the EPA to consider repealing the CPP,⁶² and his EPA has since done exactly that.⁶³ His EPA has also proposed a substantial rollback of the MATS.⁶⁴

Despite the attention paid to climate regulation as the source of the coal industry's decline, researchers who have sought to investigate the substantive effects of these regulations have failed to find much support. One study estimated that EPA regulations may have been associated with about a 3.9 percent decline in domestic coal production (about 10 percent of the total decline from 2011 to 2016) and a 5 percent decline in coal-fired generation (about 17 percent of the total decline in generation from 2011 to 2016).⁶⁵ Another study estimated that environmental regulations, primarily the CSAPR and MATS rules, accounted for no more than about 10 percent of the decline in demand for domestic coal.⁶⁶ As these studies indicate, existing research has focused on demand for coal and industry production levels. Although some have speculated about how investors might react to changing dynamics in the energy market and in energy regulation, the financial market's assessment of the so-called regulatory "war on coal" has remained unexamined.⁶⁷ In the next two parts of this paper, we describe our empirical research to fill that gap.

II. INVESTIGATING THE MARKET EFFECTS OF THE "WAR ON COAL"

Our point of departure from previous research into regulation's effect on coal comes from our use of financial data—namely, the daily share prices of publicly traded securities issued by coal firms. The main data we use come from the U.S. Stock Database from the Center for Research in Security Prices (CRSP). Stock prices are widely considered an important measure of the health and profitability of businesses, and we exploit this measure to analyze the impact of regulation on market evaluations of coal firms. We analyze these financial data using two approaches: event studies, and difference-in-differences analyses.⁶⁸

⁶¹ See, e.g., *Presidential Candidate Donald Trump Indiana Primary Night Speech*, C-SPAN (May 3, 2016), <https://www.c-span.org/video/?409020-1/donald-trump-delivers-remarks-indiana-victory> ("The miners in West Virginia and Pennsylvania, Ohio, all over, they are going to start to work again. You're going to be proud to be miners."); Donald Trump, *An America First Energy Plan*, Trump Pence 2016 (May 26, 2016), <https://www.donaldjtrump.com/press-releases/an-america-first-energy-plan> [<https://web.archive.org/web/20161122001345/https://www.donaldjtrump.com/press-releases/an-america-first-energy-plan>] (outlining a 100-day action plan that begins by rescinding climate regulations in order to "save the coal industry").

⁶² Exec. Order No. 13,783, 82 Fed. Reg. 16,093 (March 28, 2017).

⁶³ Repeal of the Clean Power Plan, 84 Fed. Reg. 32,520 (July 8, 2019) (to be codified at 40 CFR pt. 60).

⁶⁴ National Emission Standards for HAPs: Coal- and Oil-Fired Electric Utility Steam Generating Units—Reconsideration of Supplemental Finding and Residual Risk and Technology Review, 84 Fed. Reg. 2,670 (Feb. 7, 2019) (to be codified at 40 CFR pt. 63).

⁶⁵ Houser et al., *supra* note 29, at 22.

⁶⁶ Coglianese et al., *supra* note 31, at 2.

⁶⁷ See Nico Bauer et al., *Divestment Prevails Over the Green Paradox When Anticipating Strong Future Climate Policies*, 8 NATURE CLIMATE CHANGE 130 (2018).

⁶⁸ We conducted our event study analysis using the software Eventus made available through the Wharton School's research data services. This software requires the researcher to select the event date, the sample firms, and other parameters and then automatically extracts data from CRSP and computes abnormal returns and statistical significance tests. For our difference-in-differences analysis, we worked directly with raw daily return data using the statistical analysis software Stata.

A. Event-Study Analysis

Event-study analysis is a statistical strategy used widely to capture the impact of an event on a company's share price by estimating a normal model of a stock's performance and measuring the departure from that normal model in the immediate wake of news of a decision or event.⁶⁹ Event studies rely on a "semi-strong form of the efficient market hypothesis," which posits that stock prices are reflective of the information that is publicly available to investors and they respond quickly to the introduction of new information to the market.⁷⁰ Under this widely accepted assumption, any abnormal return in the "event window" after the introduction of information about an intervening event can essentially be understood as the market's valuation of the impact of the news associated with that event.

We forgo here a detailed account of the econometrics of event studies, as others have provided a sufficient account of the established methods we implement in our analysis.⁷¹ For present purposes, we simply highlight the essential steps that any event study analysis undertakes:

- (1) identify one or more appropriate event dates,
- (2) calculate the stock's return on each event date,
- (3) determine the stock's expected return for each event date,
- (4) subtract the actual return from the expected return to compute the excess or abnormal return for each event date, and
- (5) evaluate whether the resulting excess or abnormal return is statistically significant.⁷²

As long as another confounding event did not occur at the same time as the event of interest, the observed excess or abnormal return in the event window can be taken as the market's short-term response to the information conveyed by or with the event under study. Researchers typically use varying estimation and event windows to assess the market reaction to events of interest. Following convention, we report event windows of one-, two-, and three-day durations. As a general rule, reactions observed in the shorter windows will merit greater confidence because less time has elapsed for other factors or events to influence observed changes in stock prices.

Event-study analysis has been used widely to interpret the impact of financial events, such as mergers or earnings announcements.⁷³ The approach has also been used to investigate the market impact

⁶⁹ See, e.g., Charles J. Corrado, *Event Studies: A Methodology Review*, 51 ACCT. & FIN. 207 (2011); S.P. Khotari & Jerold B. Warner, *Econometrics of Event Studies*, in HANDBOOK OF CORPORATE FINANCE: EMPIRICAL CORPORATE FINANCE (B. Espen Eckbo ed., 2007); A. Craig MacKinlay, *Event Studies in Economics and Finance*, 35 J. ECON. LIT. 13 (1997); Jonah B. Gelbach et al., *Valid Inference in Single-Firm, Single-Event Studies*, 15 AM. L. & ECON. REV. 495 (2013); Jill E. Fisch et al., *The Logic and Limits of Event Studies in Securities Fraud Litigation*, 96 TEX. L. REV. 553 (2017).

⁷⁰ Fisch et al., *supra* note 69, at 19. For further discussion of efficient market theory, see Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383 (1970); Eugene F. Fama, *Two Pillars of Asset Pricing*, 104 AM. ECON. REV. 1467 (2014).

⁷¹ See, e.g., John J. Binder, *The Event-Study Methodology Since 1969*, 11 REV. QUANTITATIVE FIN. & ACCT. 111 (1998); Corrado, *supra* note 69; Khotari & Warner, *supra* note 69; MacKinlay, *supra* note 69.

⁷² Fisch et al., *supra* note 69, at 20.

⁷³ See Paul Asquith, *Merger Bids, Uncertainty, and Stockholder Returns*, 11 J. FIN. ECON. 51 (1983); Sanjai Bhagat & Roberta Romano, *Empirical Studies of Corporate Law*, in 2 HANDBOOK OF LAW AND ECONOMICS. 945 (2007); John J. Binder, *Measuring the Effects of Regulation with Stock Price Data*, 16 RAND J. ECON. 167 (1985).

of laws and regulations imposed on business.⁷⁴ Other studies have found that investors react negatively to developments in the regulatory or legislative process. For example, events leading up to the passage of the Sarbanes-Oxley financial accounting reform legislation in 2002 were found to lead to a loss in stock market value as high as \$1.4 trillion.⁷⁵ When the Food and Drug Administration announced its regulation of cigarettes in the 1990s, the stock prices of the major tobacco companies experienced a statistically significant loss.⁷⁶ On occasion, when regulation serves to create barriers to entry for competition, event studies have even shown that stock prices can respond positively to news of regulatory developments, as one study found in connection with the development of the Occupational Safety and Health Administration's cotton dust standard and EPA's prevention of significant deterioration rules.⁷⁷

Event-study methods have also been used to evaluate the impact of court decisions on stock prices. One study of over two-hundred Supreme Court cases showing statistically detectable abnormal returns in about 37 percent of cases.⁷⁸ Studies specifically about court decisions in regulatory cases have found such decisions to be associated with abnormal returns. When the district court upheld the FDA's regulation of cigarettes, for example, major tobacco company stocks experienced statistically significant losses.⁷⁹ In contrast, a study of the D.C. Circuit's rejection of the Securities and Exchange Commission's proxy access rule found firms that would have been most affected by the rule lost stock value in the wake of the court's rejection of the rule, implying that the market as a placed value on proxy-access securities regulation.⁸⁰

For each of the three EPA rules at the center of the regulatory “war on coal” narrative (CSAPR, MATS, and CPP), our analysis focuses on two major events, specifically the release of the proposed rule and the final rule. We also analyze subsequent Supreme Court decisions concerning each of these rules. Although prospects for the development of each regulation will likely have been known to the market in advance, the issuance of a proposed rule will be the first time that the public (including investors) will have been able to see concretely what the agency plans to do. Similarly, although the prospect of a final rule will also obviously be known—because the agency has, after all, issued a proposal—the final release brings new information to the market. Not only does it bring certainty, as some proposed rules never result in a final rule, but it also provides the market with information about exactly what that regulation

⁷⁴ For an early discussion of the use of event studies to analyze regulation, see G. William Schwert, *Using Financial Data to Measure Effects of Regulation*, 24 J. L. & ECON. 121 (1981). For more recent research, in addition to the studies discussed in the body of this paragraph, see, e.g., Istemi Berk & Jannes Rauch, *Regulatory Interventions in the US Oil and Gas Sector: How Do the Stock Markets Perceive the CFTC's Announcements During the 2008 Financial Crisis?*, 54 ENERGY ECON. 337 (2016) (finding significant positive returns associated with Commodity Futures Trading Commission regulatory interventions on oil and gas stocks at the height of the Great Recession); Brian Libgober & Daniel Carpenter, *Lobbying with Lawyers: Financial Market Evidence for Banks' Influence on Rulemaking* (Jan. 18, 2018), available at <https://equitablegrowth.org/working-papers/lobbying-with-lawyers-financial-market-evidence-for-banks-influence-on-rulemaking/> (reporting an association between market reactions and agency rulemaking comments in the implementation of the Dodd-Frank Financial Reform Act of 2010).

⁷⁵ Ivy Xiyang Zhang, *Economic Consequences of the Sarbanes-Oxley Act of 2002*, 44 J. ACCT. & ECON. 75 (2007).

⁷⁶ Jeffrey R. Lax & Mathew D. McCubbins, *Courts, Congress, and Public Policy, Part I: The FDA, the Courts, and the Regulation of Tobacco*, 15 J. CONTEMP. L. ISSUES 163 (2006).

⁷⁷ Michael T. Maloney & Robert E. McCormick, *A Positive Theory of Environmental Quality Regulation*, 25 J. L. & ECON. 99 (1982).

⁷⁸ Daniel Martin Katz et al., *Law on the Market? Evaluating the Securities Market Impact of Supreme Court Decisions* (2017), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2649726.

⁷⁹ See Lax & McCubbins, *supra* note 76.

⁸⁰ Bo Becker et al., *Does Shareholder Proxy Access Improve Firm Value? Evidence from the Business Roundtable's Challenge*, 56 J. L. & ECON. 127 (2013).

will say. Not infrequently, a final rule will differ from a proposed rule. In addition, at the same time the EPA released its rule language—whether proposed or final—it also released a separate regulator “preamble” that contained additional information about each regulatory action, including the results of the agency’s benefit-cost analysis of, respectively, the proposed or final rule. In using event-study analysis, we seek to assess the extent to which these key events in EPA’s rulemaking processes, and the information they bring to the market, affect investors’ expectations about the coal industry’s future profitability. In light of the highly salient claims about a regulatory “war on coal,” narrative, our expectation is that the market will respond negatively to these pivotal events in the development of the three regulations.⁸¹

We do much the same for Supreme Court decisions related to each rulemaking. As we explain further below, the Supreme Court issued some surprising and significant decisions with respect to the “war on coal” regulations. In CSAPR, the Supreme Court upheld EPA’s rule, while in MATS the Court rejected it. We thus expect the market to have responded negatively to the news of the Court’s decision with respect to CSAPR but positively to the MATS decision.⁸² The Supreme Court never passed final judgment on the CPP, but it did step in to keep the rule from taking effect pending the resolution of litigation in the lower courts. Never before had the Court acted to block an agency rule like this, making the occurrence of this event a complete surprise to everyone, even the lawyers involved. By staying the CPP in this way, the Court not only bought industry more time, but it also signaled clearly to everyone that a majority of the justices had legal concerns about EPA’s regulation. For this reason, we expect investors in the coal industry will respond positively to the news of the Supreme Court’s stay.

In addition to these main event-study analyses of each of the “war on coal” regulations and their associated Supreme Court decisions, we report the results of a variety of additional events related to claims of a “war on coal,” including the adoption of the Paris Accord and President Trump’s announcement of the U.S. withdrawal from the Accord. We also conduct a variety of additional event-study analyses of non-regulatory events for comparison purposes.

B. Difference-in-Differences Analysis

Although the event-study approach constitutes our principal empirical strategy, we also adapt a differences-in-differences technique to compare stock market reactions between coal firms and natural gas firms. Whereas an event-study approach seeks to measure the impact of an event (or decision) by comparing a single firm’s stock performance immediately after the event or decision to its normal performance as measured before the event (or decision), a difference-in-differences approach considers an event to be a form of what in other contexts would be called the treatment or intervention. Difference-in-differences analysis has frequently been used to study the effects of regulatory interventions.⁸³ Here

⁸¹ As a general matter, our expectation of negative results would be strongest for the proposed rule event for each regulation, as this is the first time that the market has clear information about what the EPA plans to do. Of course, especially with respect to the final rule, positive reactions from the market are also conceivable, such as if the final rule turns out to be less onerous to the industry than the proposed rule. In either case, the magnitude and the volume associated with the “war on coal” rhetoric—our main interest—would lead us to expect some statistically perceptible market reaction to these pivotal regulatory developments.

⁸² Although our principal analyses center on the Supreme Court decisions passing on the legality of both of these rulemakings, we also report in footnotes in the relevant sections below the results of event-study analyses of the lower court decisions and the Supreme Court’s grants of certiorari agreeing to hear an appeal.

⁸³ See, e.g., Lori Snyder Benneer, *Are Management-Based Regulations Effective? Evidence from State Pollution Prevention Programs*, 26 J. POL’Y ANALYSIS & MGMT. 327 (2007).

we use this analysis to compare the post-event outcomes for one group (or panel) that is thought to be affected by the event to the post-event outcomes for another group (or panel) that is not thought to be affected.⁸⁴ This allows for estimation of the difference between the former “treated” firms’ outcomes and those of the counterfactual with no “treatment.”⁸⁵

The difference-in-differences approach we use here does not compare coal firms that might have been affected by regulations to other coal firms that were not thought to be affected by regulations, since the EPA regulations at the center of our analysis were national in scope and could have affected all coal firms. Instead, we use the differences-in-differences approach here to compare coal firms to their most serious competition: natural gas firms. This effectively controls for any unobserved variables that might equally affect both coal and gas firms. Moreover, because of the direct competition between coal and natural gas, we assume that a regulation that was detrimental to the coal industry would be, by extension, advantageous to natural gas—and vice versa. We do not claim to use differences-in-differences to draw any causal inferences about the effects of regulation on stock prices but instead use it as an additional test to see whether stock market behavior supports the political claims that environmental regulations disadvantaged the coal industry. Effectively, our difference-in-differences application here provides an important robustness check because it might be thought to be even more likely than the event-study approach to find an effect on share prices following key regulatory events that disadvantage one sector but not the other, given that a rule that disadvantages coal firms would be expected, by extension, to advantage natural gas firms.

C. Data and Sample

With our unit of analysis being daily stock price, we focus on publicly traded coal firms.⁸⁶ During the period under study, ten U.S. publicly traded coal companies existed that, taken together, constituted nearly two-thirds of the total coal market. Table 1, which is drawn from a ranking of major coal producers in the United States in the Energy Information Administration’s (EIA) Annual Coal Report 2016, shows available data for U.S. market share in coal production for the publicly traded companies in our sample (bolded) along with other major private coal producers.

In 2016, our sample firms comprised 63.2 percent of the total U.S. coal production. Within the sample, however, there is wide variation in market share. Peabody is the dominant player in the industry, with Arch and Cloud Peak having typically vied for second place. A number of our sample firms cluster together in a second tier ranging from 1.7 percent to 5.0 percent of production. As a general matter, it appears that publicly traded firms have greater market share than private firms. Only Murray Energy, Contura Energy, and, to some extent, Vistra Energy are major competitors to the bulk of the publicly traded firms in our sample. Overall, Table 1 reveals a long tail on the low end of the distribution—with many firms in the coal mining industry that have an extremely small slice of the pie (with most of these small firms being privately owned and operated). Focusing on the ten publicly traded firms, as we do,

⁸⁴ For accessible discussions of difference-in-differences approaches, see JOSHUA D. ANGRIST & JÖRN-STEFFEN PISCHKE, *MOSTLY HARMLESS ECONOMETRICS: AN EMPIRICIST’S COMPANION* 227-242 (2009); Lori Snyder Benneer & Cary Coglianese, *Measuring Progress: Program Evaluation of Environmental Policies*, 47 ENV’T.: SCI. & POL’Y FOR SUSTAINABLE DEV. 22 (2005); Cary Coglianese, *Measuring Regulatory Performance: Evaluating the Impact of Regulation and Regulatory Policy*, OECD Expert Paper No. 1 (Aug. 2012), available at http://www.oecd.org/regreform/regulatory-policy/1_coglianese%20web.pdf.

⁸⁵ ANGRIST & PISCHKE, *supra* note 84.

⁸⁶ Privately owned coal companies, such as Murray Energy and Contura Energy, are obviously not included in our analysis.

captures the bulk of production and hence the bulk of exposure to any competitive effects from regulation.

One important note about our sample: for some events in our analysis below, data for particular firms were unavailable. As discussed above, the event-study methodology extrapolates a “normal” trend through an event window based on stock price data from before the event. In our case, we use an estimation window of 250 days. If a firm did not have publicly traded stocks on the market for any reason during that period (for instance, because of a bankruptcy at that firm or because that firm’s stock offering had not yet occurred), then the firm is not included in that particular analysis. Thus, in some of our results, the industry-wide estimates are based on a subset of our sample of ten publicly traded firms. Arch, in particular, is sometimes absent in our results because it was in bankruptcy proceedings during a critical stretch of time overlapping with our events and estimation windows. Likewise, when we estimate single-firm event studies below, we omit analyses

TABLE 1: TOP PRODUCING COAL MINING FIRMS AS OF 2016⁸⁷

Firm	Production (thousand short tons)	Percent of Total U.S. Production
PEABODY ENERGY CORP.	143,024	19.6
ARCH COAL INC.	96,483	13.2
CLOUD PEAK ENERGY	58,370	8.0
MURRAY ENERGY CORP.	46,033	6.3
CONTURA ENERGY INC.	44,231	6.1
NACCO INDUSTRIES INC.	36,373	5.0
ALLIANCE RESOURCE PARTNERS LP	35,243	4.8
WESTMORELAND COAL CO.	29,594	4.1
CONSOL ENERGY INC.	24,666	3.4
VISTRA ENERGY	24,247	3.3
FORESIGHT ENERGY LP	19,040	2.6
ALPHA NATURAL RESOURCES INC.	12,396	1.7
KIEWIT PETER SONS' INC.	12,031	1.7
BLACKHAWK MINING LLC	11,842	1.6
BOWIE RESOURCES PARTNERS LLC	10,853	1.5
CORONADO COAL LLC	7,175	1.0
WESTERN FUELS ASSOC INC.	6,141	0.8
HALLADOR (AKA SUNRISE COAL LLC)	6,113	0.8
PRAIRIE STATE ENERGY CAMPUS	5,913	0.8
ARMSTRONG ENERGY INC.	5,889	0.8
GLOBAL MINING GROUP LLC	5,609	0.8
ALL OTHERS (e.g., PATRIOT, WALTER)	87,099	12.0

Notes: Bolded entries are publicly traded and included in the sample used for our analysis. Non-bolded entries are private companies and partnerships for which no securities market data exist.

⁸⁷ U.S. Energy Information Administration, *Annual Coal Report 2016* (Nov. 2017), available at <https://www.eia.gov/coal/annual/archive/05842016.pdf>.

when there are no usable data for the particular firm-event combination. Any missing estimate is not due to a choice on our part, but rather due to the fact that the firms in our sample sometimes were in and out of the category of publicly traded firms due to factors outside our control, making analysis of stock prices impossible for those firms at particular times.

III. STOCK MARKET REACTIONS AND THE REGULATORY “WAR ON COAL”

As previously mentioned, our main analysis focuses on the three environmental regulations most often singled out in the “war on coal” narrative: CSAPR, MATS, and CPP. We later also analyze other, more general policies designed to address climate change as well as direct environmental effects of coal mining operations. But we begin with the three principal environmental regulations that have figured centrally in the narrative of a regulatory “war on coal.” Taking each in turn, we apply event-study and difference-in-difference methods to critical events in each regulation’s development, promulgation, and post-promulgation histories.

A. The Cross-State Air Pollution Rule (CSAPR)

CSAPR is the EPA’s latest attempt under the authority of the Clean Air Act’s so-called “Good Neighbor Provision” to deal with the wafting of sulfur dioxide and nitrogen oxides across state lines. Sulfur dioxide and nitrogen dioxides can “react in the atmosphere and contribute to the formation of fine particle (soot) pollution” and to “ground-level ozone (smog) formation.”⁸⁸ For decades, utilities in the U.S. Rust Belt had built increasingly taller smokestacks that dispersed these pollutants into the atmosphere where they drifted into northeastern states and caused soot and smog to formulate, preventing these downwind states from coming into compliance with National Ambient Air Quality Standards.⁸⁹ The CSAPR project began in 2008 after the U.S. Court of Appeals for the District of Columbia vacated a George W. Bush era effort to deal with this same problem, thereby sending EPA to work on a replacement.⁹⁰ The replacement that the EPA came up with—CSAPR—was an emissions trading program with allowances distributed to states according to the degree to which they were capable of reducing emissions that were traveling across state lines.⁹¹ The rule was proposed on July 6, 2010,⁹² and finalized exactly one year later on July 6, 2011.⁹³ The announcement of the proposed rule

⁸⁸ U.S. Env’tl. Prot. Agency, *Overview of the Cross-State Air Pollution Rule (CSAPR)*, <https://www.epa.gov/csapr/overview-cross-state-air-pollution-rule-csapr> (last accessed Feb. 21, 2019).

⁸⁹ Richard L. Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to the Critics*, 82 MINN. L. REV. 535 (1997); REVESZ & LIENKE, *supra* note 5.

⁹⁰ Brian H. Potts, *The Court Kills EPA’s Cross-State Air Pollution Rule—But Which States Really Won?*, 25 ELEC. J. 36 (2012).

⁹¹ See Erin Carson & Eric Davis, *Final Impacts of Cross-State Air Pollution Rule Vary by Industry and Region*, ENERGY SOLUTIONS F. (May 27, 2014), https://enerknol.com/wp-content/uploads/2014/05/ESF_PnU_EPA-CSAPR_5.27.14.pdf; Potts, *supra* note 90.

⁹² Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone, 75 Fed. Reg. 45,210 (Aug. 2, 2010) (to be codified at 40 C.F.R. pts. 51, 52, 72, 78, 97). The date of publication in the *Federal Register* always follows the date that a proposed or final rule is signed and announced publicly. We use the latter date for our event analysis, as the earlier date is when the stock market received the news and copy of the agency’s decision.

⁹³ Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 Fed. Reg. 48,208 (Aug. 8, 2011) (codified at 40 C.F.R. pts. 51, 52, 72, 78, 97). The publishing of the final rule was delayed one month but was signed on July 6.

and the final rule marked the first time the full detailed regulatory language had been released, along with additional information about how the agency understands and interprets the regulatory language.

As not infrequently occurs with major EPA rules,⁹⁴ the finalized CSAPR was challenged in federal court by a coalition of utilities and upwind states. In 2012, the D.C. Circuit vacated CSAPR, citing concerns about the methods used to determine state allowances and the bypassing of the normal state implementation planning process.⁹⁵ However, on appeal, the U.S. Supreme Court reversed that decision, holding in *EPA v. EME Homer Generation* that the EPA’s approach to a “thorny causation problem” was a reasonable exercise of its authority under the Clean Air Act by considering states’ ability to pay for emissions reductions in addition to its “physically proportionate responsibility.”⁹⁶ With the victory in the Supreme Court, the EPA was poised to move forward with the first substantial regulation of the interstate pollution created by existing coal-fired power plants.

Did stock prices in the coal industry decline in the wake of the Court’s decision or the release of the new information associated with any of the regulatory events leading up to that decision? Table 2 presents the results of our event-study analysis of several of the key developments.⁹⁷ The minus signs in parentheses in the left-most column indicates the direction that we expected share prices to take if

TABLE 2: EVENT-STUDY RESULTS FOR THE CROSS-STATE AIR POLLUTION RULE

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre-Event (-5,-1)
PR Sign (-)	6-Jul-10	0.34	-1.55 [^]	-0.53	-1.73	2.03
FR Sign (-)	6-Jul-11	-.66 [^]	.87*	-0.18	0.03	-2.45**
S Ct Decision (-)	29-Apr-14	1.96*	-0.02	-0.83	1.11	0.18

Notes: The negative (-) symbols in the first column indicate the expected sign of the reported abnormal returns as would be suggested by the “war on coal” narrative. Estimates are precision-weighted cumulative average abnormal returns for each window. The market model used to estimate normal returns weights values based on the market capitalization of the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: p<.001=***, p<.01=**, p<.05=*, p<.10=[^].

⁹⁴ Cary Coglianese, *Litigating within Relationships: Disputes and Disturbance in the Regulatory Process*, 30 L. & SOC’Y REV. 735 (1996).

⁹⁵ *EME Homer City Generation v. EPA*, 696 F.3d 7 (D.C. Cir. 2012).

⁹⁶ *EPA v. EME Homer City Generation*, 134 S. Ct. 1584 (2014).

⁹⁷ In the upper row, the numbers in parentheses separated by commas under each column heading refer to the range of days included in each event-window. With “0” representing the day of the event, a range of zero to zero (that is, “0,0”) represents the abnormal return on the day of the event, whereas “1,1” represents the abnormal return on the day after the event and “0,2” represents a cumulative abnormal return of the day of the event and the two days following the event. As also noted in Table 2, we report two-tailed tests for statistical significance. We do this for all of the event study analyses in this article. Separately, we performed each analysis using a one-tailed test as well. Although not reported here, the results were substantially the same.

they followed the “war on coal” narrative: negative here because the narrative views CSAPR as harmful to the coal industry and each event either moved this regulation forward toward taking legal effect or sustained it on judicial review.

The results in Table 2 fail to show CSAPR events as having any meaningful effect on coal share prices—certainly nothing as might have been expected given the “war on coal” rhetoric. The direction of the market response to the proposed CSAPR rule signing was opposite that expected on the day one; although it was consistent on the second day, neither of the results were statistically significant. The release of the final rule saw a day-one change in the direction expected under a “war on coal”—but it was not statistically significant either. Furthermore, the final rule was followed by a statistically significant and *positive* day-two response, precisely the opposite of expectations. The Supreme Court’s decision was also followed by a statistically significant abnormal *positive* return on day one as well.

Our difference-in-differences analysis also failed to produce results consistent with expectations. As noted above, the difference-in-differences approach we used tests for any divergence between natural gas companies’ share prices and coal companies’ share prices in the wake of each event, rather than just coal stocks’ prices compared with those same companies’ pre-event prices. Here, the key variable in Table 3 is “DiD,” which is an interaction of the dependent variable (the average difference in daily returns) between two dummy variables: one for whether the observation occurred after the event, the other for whether the firm was in the coal industry versus natural gas. Simply put, a positive coefficient would mean that the stock price changes in the coal industry fared better than similar changes in the natural gas industry. Yet none of the coefficients meet the normal test of statistical significance, and the signs on the coefficients for half of the models are in the direction opposite that suggested by any regulatory “war on coal.” The only marginally statistically significant result for the difference-in-difference estimator was a 1.8 percent outperformance of coal compared to natural gas on the day after the Supreme Court’s decision—which is precisely the opposite of what the “war on coal” rhetoric would imply.⁹⁸

Overall, our results for CSAPR are hard to square with expectations of a resounding “war on coal.” For most of the event-windows, we fail to find any basis for rejecting our null hypotheses. For the two event-windows with statistically significant results, the direction of the effect is opposite that expected. Interestingly, the Supreme Court’s approval of the EPA’s first real foray into uncharted territory—the regulation of existing coal-fired power plants—not only did not appear to lead investors to value coal stocks less, but it seemed to lead them to value them more. Moreover, none of the results from the difference-in-differences analysis are significant; if anything, they might suggest that the Supreme Court’s decision resulted in more of a negative effect on natural gas stock prices than on such prices for coal. Commentators have suggested that industry had been revising downward its expected compliance costs with CSAPR over the course of the litigation,⁹⁹ so perhaps the absence of expected market responses to the Supreme Court’s decision simply indicates an increasing recognition of the limited impact of this regulation on the future profitability of coal mining firms.¹⁰⁰

⁹⁸ By “marginally” significant, we simply mean that it is significant at the ten percent level rather than at the standard five percent level of significance, even though we also report significance at the ten percent level when it occurs. In adhering to the five percent level as the test of significance, we follow the customary approach in social science research. See generally Richard Lempert, *The Significance of Statistical Significance*, 34 L. & SOC. INQUIRY 225 (2009).

⁹⁹ See Carson & Davis, *supra* note 91.

¹⁰⁰ We also checked two other litigation-related events using event-study analysis which yielded mixed results. First, even though we would have expected the vacatur of the rule by the D.C. Circuit to be a positive development for coal companies, the abnormal returns were *negative* and statistically significant, with a loss of 2.88 percent

TABLE 3: DIFFERENCE-IN-DIFFERENCES RESULTS FOR THE CROSS-STATE AIR POLLUTION RULE

	Day One (0,0)			Three Day (0,2)		
	S Ct			S Ct		
	PR Sign	FR Sign	Decision	PR Sign	FR Sign	Decision
DiD (Post EventXCoal)	-.614 (.862)	-.235 (.409)	1.81 [^] (1.08)	-.173 (.474)	.305 (.269)	.742 (.745)
Post Event	.398 (.460)	-.384* (.132)	.357 (.278)	-.051 (.300)	-.086 (.093)	-.323* (.163)
Coal Firm	.237 (.156)	-.026 (.120)	-.112 (.119)	.237 (.156)	-.026 (.120)	-.112 (.347)
S&P 500	1.44*** (.093)	1.22*** (.081)	.766*** (.066)	1.41*** (.092)	1.23*** (.082)	.793*** (.069)
Constant	-.032 (.077)	-.011 (.061)	.252*** (.048)	-.038 (.077)	-.013 (.062)	.251*** (.048)
Rho	.000	.000	.000	.000	.000	.000
Groups	28	30	30	28	30	30
N	588	630	630	644	690	690
R ²	.4377	.3588	.1644	.4756	.3679	.1320

Notes: Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

B. Mercury and Air Toxics Standards (MATS)

Few observers dispute the economic significance of the EPA’s regulation of mercury emissions from coal-powered utility plants. When Congress revisited the Clean Air Act in 1990, it greatly bolstered the EPA’s authority to regulate “hazardous air pollutants” (HAPs).¹⁰¹ Unlike with so-called “criteria pollutants,” for which regulations generally only apply to new sources, standards for HAPs can be applied to existing sources through technology-based emissions control requirements.¹⁰² The EPA has used this authority over 90 times since 1990.¹⁰³ With MATS, it took direct aim at existing coal-fired power plants, which emit mercury and certain heavy metals at a higher rate than combined cycle natural gas plants. When the EPA finalized MATS on December 21, 2011, the date when the EPA administrator signed the rule,¹⁰⁴ the agency estimated annual compliance costs would amount to \$9.6 billion (with \$37

across the three-day event window. We also checked the Supreme Court’s grant of the petition for certiorari—an event that we expected would be negative for the coal industry, given the decision of the lower court to vacate the rule—and these results were consistent with expectations, with a loss of 5.22 percent across the three-day event window. This is the only result for CSAPR consistent with expectations.

¹⁰¹ Clean Air Act Amendments of 1990, Pub. L. No. 101-549, §§ 301-306, 104 Stat. 2399, 2531-2584 (1990).

¹⁰² 42 U.S.C. § 7412.

¹⁰³ Wendy Wagner et al., *Rulemaking in the Shade: An Empirical Study of EPA’s Air Toxic Emission Standards*, 63 ADMIN. L. REV. 99 (2011).

¹⁰⁴ *EPA Announces Mercury and Air Toxics Standards (MATS) for Power Plants Rules and Fact Sheets*, U.S. ENVTL. PROT. AGENCY (Dec. 21, 2011), <https://www.epa.gov/mats/epa-announces-mercury-and-air-toxics-standards-mats-power-plants-rules-and-fact-sheets>.

TABLE 4: EVENT-STUDY RESULTS FOR THE MERCURY & AIR TOXICS STANDARDS

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre-Event (-5,-1)
PR Sign (-)	16-Mar-11	3.58***	1.35	-1.29*	3.64*	2.21^
FR Sign (-)	21-Dec-11	0.24	1.32^	-1.61***	-0.05	2.22
S Ct Decision (+)	29-Jun-15	4.80***	-3.64**	-4.23*	-3.07	-2.55

Notes: Positive (+) and negative (-) symbols in the first column indicate the expected sign of the reported abnormal returns as would be suggested by the “war on coal” narrative. Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

to \$90 billion in benefits).¹⁰⁵ With this kind of money at stake, it is little surprise that industry challenged MATS, just as it had with CSAPR. Initially, the challengers did not prevail at the D.C. Circuit Court of Appeals; however, on June 29, 2015, the Supreme Court held that the EPA had acted unlawfully by failing to consider compliance costs as part of a threshold inquiry into whether the regulation was “appropriate and necessary” under the Clean Air Act.¹⁰⁶ The regulatory “war on coal” narrative would imply that the Supreme Court’s decision should have had a positive effect on coal companies’ share prices, as it sent the rule back to EPA and limited the EPA’s ability to impose a future costly regulation on the industry.

The evidence, though, is not highly aligned with the expectations generated by the “war on coal” narrative. The event-study results in Table 4 show that, in the days after each event (rule promulgation, finalization, and litigation), coal stocks swung in both directions, sometimes in unexpected ways. For instance, the stock market’s reaction following the proposed rule’s unveiling was actually quite positive in the day-one window—precisely opposite expectations. But then it was nonexistent in the day-two window, and only statistically significant and consistent with expectations on the third day. When it came to the signing of the final rule, the market results were positive but not statistically significant. As with the proposed rule, only on the third day after the final rule appeared were results significant and consistent with expectations. And when it came to the Supreme Court’s surprising decision in *Michigan v. EPA*, although the market reaction did appear to deliver an expected boost to the coal market in the day-one results, the gains were more than offset by significant negative abnormal returns over the next two days, leaving a three-day cumulative result that was negative but nonsignificant.¹⁰⁷

¹⁰⁵ National Emission Standards for Hazardous Air Pollutants, 77 Fed. Reg. 9,304, 9,306 (February 16, 2012) (to be codified at 40 C.F.R. pts. 60, 63). This is the same rule as was finalized in December 2011, but the publication of the final rule lagged by a little more than a month the actual signing of the final rule, as noted in the immediately preceding footnote.

¹⁰⁶ *Michigan v. EPA*, 135 S. Ct. 2699 (2015).

¹⁰⁷ As with CSAPR, we also checked two other litigation-related events for MATS: the lower court decision, and the grant of certiorari by the Supreme Court. With the D.C. Circuit decision to uphold the rule, we expected to find negative returns. Although the sign was uniformly negative in every window we checked, none of the results registered as statistically significant. We also checked the Supreme Court’s grant of the petition for certiorari,

Taken together, the results from the three events are difficult to interpret in a way that would lend much support to the “war on coal” narrative. The initial market response to the proposed rule produced some statistically significant abnormal returns in the first day—but in the direction opposite of what the “war on coal” narrative would lead one to expect. Only the day-three results were significant in the direction expected, as was also the case with the final rule. Yet for the Supreme Court’s decision rejecting the final rule, it was the initial, day-one reaction that was consistent with expectations, while the second and third days showed significant reactions opposite of expectations. For all three events, if one looks at the market reaction across the entire three-day period, in no instance are the results significant and consistent with expectations. In fact, only for the proposed rule does the all-day window show a statistically significant result—and that is in the direction opposite of expectations.

Our difference-in-differences analysis yielded only one statistically significant result. As shown in Table 5, neither the proposed nor the final rules seemed to yield any diverging price reactions as between the coal and natural gas industries. Both rule promulgation events seemed to be generally positive for the natural gas and coal stocks together, as suggested by the generally statistically significant and positive

TABLE 5: DIFFERENCE-IN-DIFFERENCES RESULTS FOR THE MERCURY & AIR TOXICS STANDARDS

	Day One (0,0)			Three Day (0,2)		
	PR Sign	FR Sign	S Ct	PR Sign	FR Sign	S Ct
			Decision			Decision
DiD (Post EventXCoal)	.727 (.793) 1.44***	-.964 (1.15) .875***	6.02*** (1.61) -.913*	-.056 (.547) .854***	-.383 (.581) .158	.008 (.713) -1.36***
Post Event	(.440)	(.160)	(.361)	(.144)	(.127)	(.172)
Coal Firm	-.079 (.145) .946***	.325 (.203) 1.57***	-.601* (.253) .764***	-.079 (.145) .894***	.325 (.203) 1.57***	-.601* (.253) .254
S&P 500	(.084) .229***	(.108) -.370***	(.122) -.230***	(.081) .219***	(.108) -.368***	(.165) -.236***
Constant	(.071)	(.070)	(.054)	(.068)	(.070)	(.054)
Rho	.032	.000	.000	.000	.000	.005
Groups	30	30	33	30	30	33
N	630	630	693	690	690	759
R ²	.1597	.6506	.1105	.1841	.6358	.0560

Notes: Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^\wedge$.

which we expected would lead to positive abnormal returns for the coal firms, given the industry loss below and the likelihood that a grant of certiorari would lead to a reversal. In fact, though, the results suggest that market perceived the Supreme Court’s grant of certiorari as a negative event for the coal industry. The day-one returns were down 2.39 percent (statistically significant at the .001 level) and the cumulative three-day returns were down 4.12 percent (also statistically significant at the .001 level).

results on the post-event variable and the lack of statistically significant results for the difference variable. With respect to the Supreme Court decision, the difference-in-differences analysis appears consistent with the event study, in that the immediate impact of the Supreme Court's decision appears to have been associated with a sharp divergence between coal and natural gas in the expected direction, but this effect was short lived, as the three-day results show no difference in the performance of natural gas and coal returns.

Some complicating factors in interpreting the results for the Supreme Court's decision in *Michigan v. EPA* should be noted—even though it is not entirely clear which way they cut. One factor is that, by the time the Supreme Court handed down its decision, many utilities apparently had already complied with the rule and many of the anticipated coal-powered utility plant retirements had already taken place.¹⁰⁸ Perhaps that is why the initial positive reaction to the Supreme Court's decision dissipated quickly, as market actors realized that even the Court's decision would not have spared the coal industry any diminution in demand for coal from utilities. But another factor may also be important: The Supreme Court specifically declined to vacate the rule, instead remanding to the D.C. Circuit and allowing that lower court to make a decision about whether the EPA needed to start from scratch with cost considerations in mind. Ultimately, the D.C. Circuit left EPA's rule in place and did not halt any compliance deadlines, and the Supreme Court declined to review this subsequent decision by the lower court.¹⁰⁹ As a result, what initially looked like a legal victory for the coal industry when the Supreme Court handed down its decision in *Michigan v. EPA*—and which we have assumed it to be in outlining expectations in our analysis above—in fact never turned out to be any real victory at all.

C. The Clean Power Plan (CPP)

Although MATS and CSAPR made important strides in regulating the emissions of conventional pollutants from existing coal-fired power plants, from the standpoint of climate change they did not address the elephant in the room: carbon emissions from burning coal. As of 2016, coal-fired power plants emitted about 68 percent of the total carbon dioxide from the electric power sector, or about 1,241 million metric tons.¹¹⁰ In adopting the CPP, the EPA for the first time set direct carbon dioxide emissions guidelines for existing power plants and set up a process of state planning to come into compliance with these guidelines.¹¹¹ Altogether, the CPP was projected to lower carbon dioxide

¹⁰⁸ See Gavin Bade, *What the Supreme Court MATS Ruling Means for Utilities and the EPA Clean Power Plan*, UTILITY DIVE (July 2, 2015), <https://www.utilitydive.com/news/what-the-supreme-court-mats-ruling-means-for-utilities-and-the-epa-clean-po/401707/>; Susan E. Dudley, *Supreme Court to EPA: Fool Me Once*, FORBES (Feb. 10, 2016, 8:37AM), <https://www.forbes.com/sites/susandudley/2016/02/10/supreme-court-to-epa-fool-me-once/>; *EIA Annual Outlook 2012*, *supra* note 29. Although the event study analysis of the Supreme Court's decision might not have reflected the negative effects on the firms because they already incurred the costs, this would obviously not have been the case at the time the proposed and final rules were announced—and we find that the earlier of the significant reactions to the proposed and final rules ran in the direction opposite of expectations.

¹⁰⁹ See Brady Dennis, *Supreme Court Rejects Case Challenging Key White House Air Pollution Regulation*, WASH. POST (June 13, 2016), <https://www.washingtonpost.com/news/energy-environment/wp/2016/06/13/supreme-court-rejects-case-challenging-key-white-house-air-pollution-regulation/>.

¹¹⁰ See U.S. ENERGY INFO. ADMIN., *supra* note 9.

¹¹¹ See Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,661 (Oct. 23, 2015) (to be codified at 40 C.F.R. pt. 60).

emissions by 32 percent below 2005 levels by 2030 and deliver net public benefits between \$26 and \$45 billion.¹¹² Yet, due to unprecedented action by the Supreme Court, the CPP never took effect.

The CPP had been challenged in court by industry and several states on the same day it was finalized, and the challengers, as is routine, sought a judicial stay of the rule's legal effect pending litigation. The D.C. Circuit denied the challengers' motion for a stay, a decision which the challengers appealed to the Supreme Court (also as routine). But what was not routine was for the Supreme Court to grant such a stay of a regulation when the lower court had denied such a request. The Court had never done so before—ever.¹¹³ When the Supreme Court granted challengers' request, it not only handed down one of the most surprising Court decisions in the history of regulatory challenges, it also effectively added years to the timeline for regulating carbon dioxide emissions, giving a major and clear victory to utilities and the coal mining industry. It also signaled that a majority of the Supreme Court did not hold a favorable view of the EPA's regulation and that the agency was unlikely to prevail when the merits of the challenge would eventually reach the Court.¹¹⁴ In the so-called regulatory war, the coal industry secured a seemingly pivotal and unprecedented battlefield victory.

Yet, the CPP's effects on the coal industry would almost seem to have been something of an afterthought for investors. The unveiling of the proposed CPP was associated with no significant differences in either the event study (Table 6) or the difference-in-differences analysis (Table 7). And even though the final rule's signing corresponded with significant negative abnormal returns over the following two days, we cannot be at all assured that these differences in returns were associated with the CPP. The same day that EPA Administrator Gina McCarthy signed the CPP, one of the largest coal players—Alpha Natural Resources—filed for Chapter 11 bankruptcy after posting losses of \$875 million in 2014.¹¹⁵ We discuss bankruptcies and how they affected returns in greater detail in Section IV, but

¹¹² U.S. Env'tl. Prot. Agency, *Fact Sheet: Clean Power Plan Benefits of a Cleaner, More Efficient Power Sector*, <https://archive.epa.gov/epa/cleanpowerplan/fact-sheet-clean-power-plan-benefits-cleaner-more-efficient-power-sector.html> (last accessed Feb. 21, 2019).

¹¹³ See, e.g., Adam Liptak & Coral Davenport, *Supreme Court Deals Blow to Obama's Efforts to Regulate Coal Emissions*, N.Y. TIMES (Feb. 9, 2016), <https://www.nytimes.com/2016/02/10/us/politics/supreme-court-blocks-obama-epa-coal-emissions-regulations.html> (“The 5-to-4 vote [to grant the stay], with the court's four liberal members dissenting, was unprecedented—the Supreme Court had never before granted a request to halt a regulation before review by a federal appeals court.”); Lisa Heinzerling, *The Supreme Court's Clean-Power Power Grab*, 28 GEO. ENVTL. L. REV. 425, 425 (2016) (“In staying EPA's Clean Power Plan, the Supreme Court for the first time stopped a nationally applicable agency regulation prior to an initial decision on the merits of the rule in a lower court.”). The EPA has also characterized the Supreme Court's stay as “unprecedented.” *EPA Proposes Affordable Clean Energy (ACE) Rule* (Aug. 21, 2018), <https://www.epa.gov/newsreleases/epa-proposes-affordable-clean-energy-ace-rule>.

¹¹⁴ See, e.g., Ariane de Vogue et al., *Supreme Court Blocks Obama Climate Change Rules*, CNN (Feb. 10, 2016), <https://www.cnn.com/2016/02/09/politics/supreme-court-obama-epa-climate-change> (“The Supreme Court's order signals serious misgivings among some of the justices about the legality of the plan.”) (quoting Bruce Huber); Lawrence Hurley & Valerie Volcovici, *U.S. Supreme Court Blocks Obama's Clean Power Plan*, SCI. AMER. (Feb. 9, 2016) (“The Supreme Court's action casts doubt on the long-term future of the U.S. Environmental Protection Agency's rule because it increases the chances that the conservative-leaning Supreme Court would take the case after a lower court issues a decision on the legality of the regulations and ultimately would strike it down.”).

¹¹⁵ See Nathan Vardi, *U.S. Coal Company Alpha Natural Resources Files for Bankruptcy*, FORBES (Aug. 3, 2015, 10:36 AM), available at <https://www.forbes.com/sites/nathanvardi/2015/08/03/u-s-coal-company-alpha-natural-resources-files-for-bankruptcy>.

TABLE 6: EVENT-STUDY RESULTS FOR THE CLEAN POWER PLAN

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre-Event (-5,-1)
PR Sign (-)	2-Jun-14	-.48	-.36	.48	-.36	-.81
FR Sign (-)	3-Aug-15	-4.72***	-2.32*	-.99	-8.03**	-.87
S Ct Stay (+)	10-Feb-16	-2.98	-3.04	3.01***	-3.01	.93

Notes: Positive (+) and negative (-) symbols in the first column indicate the expected sign of the reported abnormal returns as would be suggested by the “war on coal” narrative. Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^\wedge$.

TABLE 7: DIFFERENCE-IN-DIFFERENCES RESULTS FOR THE CLEAN POWER PLAN

	Day One (0,0)			Three Day (0,2)		
	PR Sign	FR Sign	S Ct Stay	PR Sign	FR Sign	S Ct Stay
DiD (Post EventXCoal)	-.421 (.570)	-1.69 (1.72)	-2.10 (2.36)	-.075 (.378)	-.939 (1.18)	-1.12 (1.47)
Post Event	-.061 (.183)	-2.30*** (.662)	-1.62** (.603)	.224 (.142)	-.722* (.336)	-1.54 (1.06)
Coal Firm	-.227 (.224)	.707 (.449)	.093 (.383)	-.227 (.224)	-.716 (.457)	.093 (.383)
S&P 500	.739*** (.117)	1.75*** (.174)	2.11*** (.253)	.733*** (.118)	1.75*** (.175)	2.07*** (.220)
Constant	-.052 (.062)	-.878*** (.153)	.387* (.193)	-.051 (.062)	-.878*** (.152)	.379 [^] (.199)
Rho	.020	.000	.000	.019	.002	.000
Groups	31	33	32	31	33	32
N	651	680	672	713	744	736
R ²	.0595	.1251	.1883	.0570	.1040	.1785

Notes: Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^\wedge$.

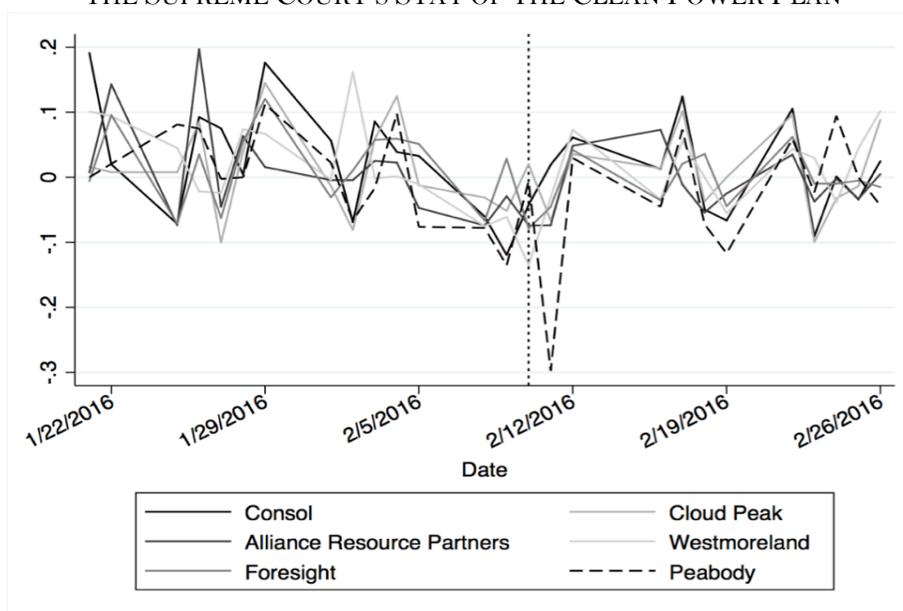
for now we simply note that there is much stronger evidence that bankruptcies in the industry affect coal companies’ share prices than regulations do. It seems highly plausible that the market reactions on August 3, 2015 and August 4, 2015 are attributable to the Alpha Natural Resources’ bankruptcy.

This reading is strengthened by the lack of positive returns for coal firms in the wake of the Supreme Court’s stay of the CPP just months later. In February 2016, the Supreme Court handed the coal industry a huge break. In a highly surprising decision to stay the CPP pending further litigation,

five Justices prevented the rule from taking legal effect.¹¹⁶ Although litigation surrounding important federal regulations is not uncommon,¹¹⁷ the Court’s decision to stay the CPP was widely considered “stunning”¹¹⁸ because apparently never before had the Supreme Court stayed a regulation that had yet to be reviewed by a lower court.¹¹⁹ The decision to stay the rule in such circumstances almost certainly indicated that, when the Supreme Court would inevitably hear an appeal of the lower court litigation, it would either uphold the appellate court’s decision to strike the rule down or would reverse an appellate decision upholding the rule. Even some of the lawyers for the entities challenging the CPP were apparently surprised to have the Court grant their petition.¹²⁰

Given this surprising turn of events, one might expect the Court’s stay decision to have had an immediate effect on the market capitalization of publicly traded coal firms, boosting the fortunes of a beleaguered industry engaged in a supposedly existential fight with regulators. From the standpoint of event-study methodology, the Supreme Court’s decision to grant a stay in the CPP stands as a true exemplar of exactly the kind of surprising and clear event that should provide a strong test of what market actors’ think in its immediate aftermath. Yet, investors’ reactions did not match expectations. Figure 3 displays the daily share price returns at closing (percentage change from the previous trading day) around

FIGURE 3: DAILY COAL STOCK RETURNS SURROUNDING THE SUPREME COURT’S STAY OF THE CLEAN POWER PLAN



¹¹⁶ See Jonathan H. Adler, *Supreme Court Puts the Brakes on the EPA’s Clean Power Plan*, WASH. POST (Feb. 9, 2016), <https://www.washingtonpost.com/news/volokh-conspiracy/wp/2016/02/09/supreme-court-puts-the-brakes-on-the-epas-clean-power-plan/>.

¹¹⁷ See Coglianese, *supra* note 94; ROBERT A. KAGAN, *ADVERSARIAL LEGALISM: THE AMERICAN WAY OF LAW* (2009).

¹¹⁸ Liptak & Davenport, *supra* note 113 (quoting Jody Freeman).

¹¹⁹ *See id.*

¹²⁰ As one news report explained: “The stay order was unexpected. Jeff Holmstead, an industry attorney at Bracewell whose clients are challenging the regulation, called the high court’s move ‘remarkable.’ It’s ‘the first time that the Supreme Court has ever stepped in at this stage to put a rule on hold,’ he said.” Amanda Reilly & Robin Bravender, *Is Obama’s Signature Climate Rule Doomed?*, E&E DAILY (Feb. 10, 2016), <https://www.eenews.net/stories/1060032134>.

the Supreme Court’s decision for the stocks of the seven publicly traded coal mining operations in operation at the time. Because the Supreme Court’s decision on February 9 came after the end of trading hours, the vertical dashed line at February 10 marks end of the first day that investors could react to the news. Contrary to expectations, none of the firms reacted strongly that day, and only one firm—Peabody Energy Corporation (dashed line)—responded on February 11, and that firm’s returns were severely negative, precisely the opposite of what the regulatory “war on coal” narrative would imply.

The event studies in Table 6 show that, for the first two days after the decision, coal stocks lost ground (although these results were not significant). It was only on the third day that stocks rebounded, leaving the industry with a three-day cumulative return that was normal by statistical standards (albeit still negative).¹²¹ Given the relative simplicity of the ruling—an unprecedented stay of the rule—we do not believe that the day-three positive result could have had much to do with the decision. We also note that, in this case, the first day of analysis was actually the first day *after* the Court’s decision, which was announced after trading hours on February 9, 2016. The market had time by the first day in our analysis to understand the Court’s ruling and factor that into stock prices—but, based on the empirical results, it appears the ruling made no difference to investors.¹²²

If one were to surmise that the CPP’s finalization had a negative effect on coal stocks (independent of the Alpha Natural Resources bankruptcy that occurred on the same day), then one would presumably expect that the stay of the rule by the Supreme Court would have been a positive event. Yet in neither the event study nor the difference-in-differences analysis did coal stocks do as well after the Supreme Court’s stay as they did before, nor as well as natural gas share prices did in response to the stay. Indeed, we even looked at intraday trading to see if stocks were down in the minutes after market open on February 10, 2016, before any other negative news could contaminate the effect of the previous night’s stay: even in the short-run, coal stocks were steeply down.¹²³

Of all the events we analyzed, the Supreme Court’s stay of the CPP is the clearest one to test the extent the effect of environmental regulations on the market’s assessment of the coal industry’s profitability. The CPP has played a central, if not the most central, role in the narrative of the regulatory “war on coal.”¹²⁴ Moreover the Court’s stay of the rule was, by all accounts, a shocking development that won great praise within the coal industry.¹²⁵ And yet, coal stocks never responded in a way consistent

¹²¹ As indicated in Table 6, we use February 10th as the event date for our analysis. We do so because the Court’s ruling came out after markets had closed on February 9th. Nothing of consequence hinges on this choice, as the same analysis using February 9th as the event date produces no clearer effects.

¹²² For much the same reason, three-day window results effectively become four-day window results, another reason why we are skeptical of attributing the reaction at that point to the Court’s decision.

¹²³ We were unable to locate any data on after-hours trading that could be used to investigate any effects prior to the opening minutes of February 10, 2016.

¹²⁴ On the campaign trail, Donald Trump claimed that the CPP “will shut down most, if not all, coal-powered electricity plants in America.” Tessa Berenson, *Read Donald Trump’s Speech on Jobs and the Economy*, TIME (Sept. 15, 2016), <https://time.com/4495507/donald-trump-economy-speech-transcript/>. As President, Trump has said of the Clean Power Plan: “Perhaps no single regulation threatens our miners, energy workers, and companies more than this crushing attack on American industry.” *Remarks by President Trump at Signing of Executive Order to Create Energy Independence* (Mar. 28, 2017), <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-signing-executive-order-create-energy-independence/>.

¹²⁵ See Andrew M. Harris, *The Last King of Coal Makes His Stand as Mines Vanish Around Him*, BLOOMBERG, <https://www.bloomberg.com/news/articles/2015-12-28/the-last-king-of-coal-makes-his-stand-as-mines-vanish-around-him>.

with expectations. If anything, stock prices declined further in the immediate response to the stay. Our results here would seem to draw into serious question the notion that environmental regulation was perceived by a serious threat to the coal industry's financial viability. That is not to say that the industry's viability was strong, just to say that investors in the industry—those with a real stake in understanding the relationship between regulation and the industry's financial prospects—did not apparently see the CPP as making any meaningful additional difference, all things considered.

D. Other Climate Policies

As noted, the CPP was the centerpiece of the Obama Administration's climate policy. Along with CSAPR and MATS, it has figured prominently in accounts of the federal government's regulatory approach toward climate change and the coal industry.¹²⁶ Yet the CPP was just one part of a larger "Climate Action Plan" announced in 2013 which articulated a range of policy actions to reduce GHG emissions not just by reducing emissions from electric utilities, but also by promoting greater fuel economy in transportation and energy efficiency in buildings and appliances.¹²⁷ Furthermore, at the same time that U.S. regulators were busy developing their domestic regulatory responses to climate change, world leaders were pursuing international negotiations over a global agreement with potential ramifications for coal. In December 2015, the international community reached agreement on the Paris Climate Accord, under which countries made commitments to reducing their greenhouse gas emissions—albeit commitments that were not in any fashion binding or enforceable under international law.¹²⁸ The Paris Accord signaled a more aggressive policy posture toward the threat of global climate change, which in turn was predicted to lead to a mass "divestment effect" in long-term investment in coal.¹²⁹ The United States committed under the Paris Accord to making by 2025 a substantial reduction in greenhouse gas emissions: 26-28 percent below 2005 levels. Of course, within his first year in office, President Trump delivered what would seem to have been a major win for the coal industry by announcing his intention to withdraw the United States from the Paris Accord—an announcement preceded by palpable level of "suspense" leading up to its actual delivery.¹³⁰

Table 8 reports the results of an event-study analysis of the Climate Action Plan announcement, the signing of the Paris Climate Accord, and President Trump's announcement that the U.S. would be withdrawing from the Paris Accord. The results for the Climate Action Plan and the announcement of the agreement over the Paris Accord are more indicative of the expected market reaction to climate policy's effects on the coal industry than were the domestic regulations typically associated with the regulatory "war on coal." Both the Climate Action Plan and the Paris Accord showed statistically

¹²⁶ See, e.g., REVESZ & LIENKE, *supra* note 5.

¹²⁷ See *supra* note 59. See generally Meredith Fowlie et al., *An Economic Perspective on the EPA's Clean Power Plan*, 346 SCI. 815, 816 (2014).

¹²⁸ See Cary Coglianese, *Pledging, Populism, and the Paris Agreement: The Paradox of a Management-Based Approach to Global Governance*, 34 MARYLAND J. INTL. L. (forthcoming); Daniel Klein et al., *The Paris Agreement on Climate Change: Analysis and Commentary* (2017); Sophie Yeo, *Top Questions and Answers Now That the U.S. Has Decided to Leave the Paris Climate Accord*, WASH. POST (June 1, 2017), <https://www.washingtonpost.com/news/energy-environment/wp/2017/06/01/the-world-built-a-climate-deal-for-the-u-s-trump-may-be-about-to-leave-it/>.

¹²⁹ See Bauer et al., *supra* note 67.

¹³⁰ On the suspense leading up to the announcement, see, e.g., Associated Press, *Trump Announcing Decision on Paris Climate Deal* (May 31, 2017) ("Building suspense about America's role in the world... Trump himself said Wednesday [the day before the announcement] that he was still listening to 'a lot of people both ways.'"). On the announcement itself, see, e.g., Yeo, *supra* note 128.

TABLE 8: EVENT-STUDY RESULTS FOR OTHER CLIMATE CHANGE POLICIES

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre- Event (-5,-1)
CAP (-)	25-Jun-13	-.67	-2.79***	-.14	-3.61***	-.01
Paris Accord (-)	14-Dec-15	-4.52***	-.10	.01	-4.62***	-2.31
Paris WD (+)	1-Jun-17	-.34	-1.75	-.20	-2.29	-4.73**

Notes: Positive (+) and negative (-) symbols in the first column indicate the expected sign of the reported abnormal returns as would be suggested by the “war on coal” narrative. Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^\wedge$.

TABLE 9: DIFFERENCE-IN-DIFFERENCES RESULTS FOR OTHER CLIMATE POLICIES

	Day One (0,0)			Three Day (0,2)		
	CAP	Paris Accord	Paris WD	CAP	Paris Accord	Paris WD
DiD (Post EventXCoal)	-.055 (.561)	-2.68 [^] (1.59)	.717 (.454)	-.017 (.279)	.049 (.717)	.679 (.494)
Post Event	.304 (.277)	-2.51** (.953)	.118 (.188)	-4.72*** (.147)	-1.02* (.411)	-7.79*** (.123)
Coal Firm	-4.25 [^] (.257)	-.294 (.381)	-.237 (.289)	-4.25 [^] (.257)	-.294 (.381)	-.237 (.289)
S&P 500	1.12*** (.074)	1.03*** (.112)	.796*** (.122)	1.12*** (.073)	1.10*** (.103)	.799*** (.108)
Constant	-0.006 (.053)	-9.10*** (.143)	-2.97*** (.074)	-0.005 (.053)	-9.04*** (.142)	-2.97*** (.074)
Rho	.040	.011	.002	.039	.007	.020
Groups	30	32	30	30	32	30
N	630	672	630	690	736	690
R ²	.4433	.0860	.0378	.4036	.0675	.0341

Notes: Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^\wedge$.

significant and negative effects on coal firms in either the day-one or day-two windows—strong enough that they also appear as statistically significant negative effects in the cumulative three-day window. The announcement of the U.S. withdrawal from the Paris Accord, though, did not appear to lead to any concomitant gains for coal. The abnormal returns across the window were, contrary to expectations, consistently negative, albeit not statistically significant.

At the same time that the event-study results suggest that some of the global or broader commitments to addressing climate change might have had some negative effects on stock prices for the coal industry, the difference-in-differences results reported in Table 9 appear to suggest that these effects may have applied more generally to the non-renewable energy sector. Only in the day-one estimation

for the Paris Accord signing is there any evidence of a diversion between natural gas and coal firms, and even that result is not statistically significant at the conventional level. This lack of a divergence is striking given that, at the time of these developments, natural gas was still seen as a key, if not even favored, energy source.¹³¹ In its Climate Action Plan, for example, the White House noted that “[b]urning natural gas is about one-half as carbon-intensive as coal, which can make it a critical ‘bridge fuel’ for many countries as the world transitions to even cleaner sources of energy.”¹³² The Plan made clear that the Administration’s policy was to prefer natural gas. Its discussion of what was then the EPA’s proposed CPP, the White House said that the proposal “reflects and reinforces the ongoing trend towards cleaner technologies, with natural gas increasing its share of electricity generation in recent years.”¹³³ The Plan also outlined a series of explicit steps the Administration planned to take to support natural gas development, noting that “[g]oing forward, we will promote fuel-switching from coal to gas for electricity production and encourage the development of a global market for gas.”¹³⁴ Yet judging from the analysis shown in Table 9, it appears that the market either did not believe the Administration’s stated support of natural gas over coal or it did not view these policy differences as financially meaningful.

IV. ASSESSING ROBUSTNESS: MARKET RESPONSES AND OTHER EVENTS

The lack of any strong and consistent reactions of the stock market to the key regulatory events in the supposed “war on coal” would appear to come as a surprise given the pervasive claims made that environmental regulation has been a key factor in burning out the coal business. In stark contrast with the kinds of claims made by politicians, as reported at the outset of this paper, we find no clear evidence that the financial market took regulatory developments to be a substantial threat to coal companies’ future profitability.

During the time period of our study—the period of the so-called regulatory “war on coal”—other economic factors impinged on the coal industry, most especially growing competition from natural gas sector. Perhaps one might imagine that these larger, long-term forces effectively drowned out any impact that climate change regulation may have had on the financial market performance of coal companies. That may be so, but the event-study methodology we have employed should not be affected by these longer-term trends. By focusing on extremely short windows of time, the event-study methodology factors out the secular trends that could otherwise threaten to confound longitudinal analysis. If there were in fact major economic effects on the coal industry from new environmental regulations (or their halting in the courts), and if investors are attentive to the financial effects of these regulatory events (as they clearly have an incentive to be), then their trading decisions in a short window of time after important regulatory events should show consistently negative abnormal returns. But they do not. Despite a modest effect here and there, our overall analysis indicates that the stock market really did not care much about the regulations that industry actors and politicians bemoaned so vocally.

The results of our analysis of the effects of environmental regulation are all the more striking in light of other analyses we conducted that show what the stock market *did* care about with respect to coal

¹³¹ EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES, THE ALL-OF-THE-ABOVE ENERGY STRATEGY AS A PATH TO SUSTAINABLE ECONOMIC GROWTH 4 (July 2014), https://obamawhitehouse.archives.gov/sites/default/files/docs/aota_report_updated_july_2014.pdf (noting that the Obama Administration “embraces natural gas as a transitional fuel”).

¹³² See CAP, *supra* note 59, at 19.

¹³³ *Id.* at 6.

¹³⁴ *Id.* at 19.

firms in the time period we studied. As a means of testing the robustness of our event-study methodology in this context, we studied other, non-regulatory events that might have affected the stock prices of coal companies, including elections and bankruptcies. We also looked at other, non-climate related regulatory events and, separately, conducted firm-level analyses of the same climate change regulations examined in Part III. Together, these robustness checks reveal that the failure to find stock market reactions to events in the supposed regulatory “war on coal” is no artifact of our event-study methodology. That same methodology has not only been used by others to show stock market reactions outside the environmental policy context, as we noted in Part II.A, but it also finds that coal stocks sometimes responded significantly to other events during the same time period as the regulatory “war on coal,” most especially bankruptcies in the industry. The juxtaposition of the findings we report in this Part with the findings in Part III underscores how the stock market reveals the emptiness of the political rhetoric about a regulatory “war on coal.”

A. Coal Industry Bankruptcies

Previous research indicates that bankruptcies affect share prices for other firms in the same industry. A bankruptcy declaration can sometimes be destabilizing, but other times it can be a boon to surviving competitors, perhaps because they see an opportunity to gain market share or to buy up liquidated assets. In recent years, a number of coal companies have filed for bankruptcy, including some of the biggest players such as Peabody, Arch, and Alpha Natural Resources. It is reinforcing of the efficacy of our event-study methodology that stock prices for competitor firms do react to bankruptcies by other firms in the coal industry. In fact, as Table 10 shows, the share prices for surviving coal firms indeed tend to react quite strongly to certain bankruptcy events. The bankruptcies of Arch, Alpha Natural Resources, and Walter Energy all seem to have elicited large cumulative event window swings.

The key takeaway from these findings for present purposes is simply their contrast with the general absence of a market response to the regulatory events, indicating that our findings for regulation were not the product of a methodology that is insensitive to changes in the market for coal and showing what kind of market reaction was strikingly missing in the wake of the regulatory events analyzed in Part III. (Sufficient data were only available to permit us to conduct a difference-in-differences analysis of the Peabody and Arch bankruptcies, with the results in those cases consistent with the event-study results in Table 10.)

TABLE 10: EVENT-STUDY RESULTS FOR COAL FIRM BANKRUPTCIES

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre- Event (-5,-1)
Peabody	13-Apr-2016	1.93	-.86	-.50	-1.27	7.08**
Arch	11-Jan-2016	-6.42**	-2.97	-.87	-10.26**	2.17
Alpha	3-Aug-2015	-4.72**	-2.32*	-.99	-8.03**	-.87
Patriot	12-May-2015	.32	-1.34 [^]	.63	-.39	-.21
Walter	15-July-2015	-2.42***	-2.35**	-3.06**	-7.54***	-2.59

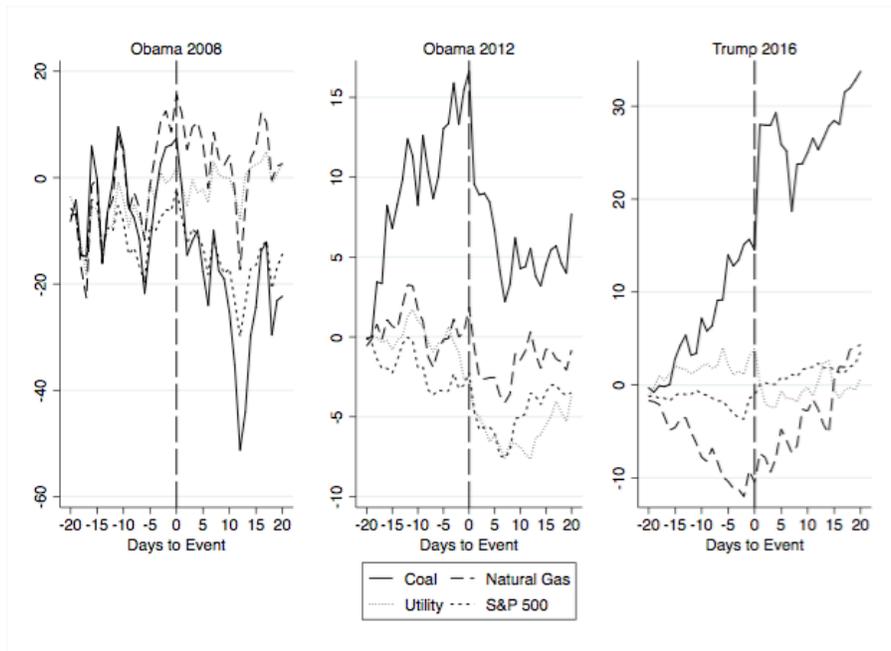
Notes: Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

B. Presidential Elections

Numerous event studies in the broader social science literature have found significant changes to corporations' share prices occur in the aftermath of national elections.¹³⁵ In much the same spirit as those other studies, we analyzed coal firms' fortunes after each of the previous three presidential elections. As Figure 4 shows graphically, coal industry stock returns responded in the wake of each presidential election day.

After the 2008 national election, coal stocks began a nose-dive: coal firms saw a -11.64 percent deviation from normal returns in the three days after the election (Table 11). Although the graphic depiction in Figure 4 suggests a similar decline after the 2012 election, the three-day cumulative average abnormal return that year was actually statistically insignificant, as shown in Table 11. By contrast, coal stocks jumped upwards in the immediate aftermath of President Trump's election in 2016. The day after the election, November 9, 2016, (which was the first time any trading could have incorporated information about Trump's victory), coal stocks exhibited a highly statistically significant 9.22 percent abnormal return and a three-day gain of 9.99 percent (Table 11). Perhaps even more notably, the difference-in-differences estimators in Table 12 show that the coal industry performed significantly worse after the Obama elections and better after the Trump election in both the one-day and three-day windows in the aftermath of these elections.

FIGURE 4: CUMULATIVE RETURNS SURROUNDING THREE PRESIDENTIAL ELECTIONS



¹³⁵ See, e.g., Steven J. Davis, Text-Based Insights into Stock Market Behavior, Presentation at the University of California, Berkeley (Apr. 24, 2018), [http://faculty.chicagobooth.edu/steven.davis/pdf//Text-Based%20Insights%20Into%20Equity%20Market%20Behavior%20Berkeley%20April%202018%20shorter%20v](http://faculty.chicagobooth.edu/steven.davis/pdf//Text-Based%20Insights%20Into%20Equity%20Market%20Behavior%20Berkeley%20April%202018%20shorter%20version.pdf)ersion.pdf; Pedro Santa-Clara & Rossen Valkanov, *The Presidential Puzzle: Political Cycles and the Stock Market*, 58 J. FIN. 1841 (2003).

TABLE 11: EVENT-STUDY RESULTS FOR PRESIDENTIAL ELECTIONS

	Date	Day One (0,0)	Day Two (1,1)	Day Three (2,2)	All Event (0,2)	Pre-Event (-5,-1)
Obama 2008 (-)	5-Nov-08	-3.68**	-7.54***	-4.3	-11.64***	8.15
Obama 2012 (-)	7-Nov-12	-3.12***	1.71*	0.01	-1.39	1.69 [^]
Trump 2016 (+)	9-Nov-16	9.22***	0.30	0.47	9.99***	-.57

Notes: Positive (+) and negative (-) symbols in the first column indicate the expected sign of the reported abnormal returns as would be suggested by the “war on coal” narrative. Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

TABLE 12: DIFFERENCE-IN-DIFFERENCES RESULTS FOR PRESIDENTIAL ELECTIONS

	Day One (0,0)			Three Day (0,2)		
	Obama 2008	Obama 2012	Trump 2016	Obama 2008	Obama 2012	Trump 2016
DiD						
(PostEvent	-5.25*	-5.26***	9.22***	-3.97***	-1.75*	2.93***
XCoal)	(2.10)	(1.23)	(2.43)	(1.17)	(.757)	(.614)
	3.60***	.182	2.71***	.795	-.274	.340
Post Event	(.942)	(.443)	(.601)	(.512)	(.204)	(.271)
	-.394	.703***	1.19***	-.394	.703***	1.19***
Coal	(.395)	(.189)	(.340)	(.395)	(.189)	(.340)
	1.54***	1.23***	.743***	1.52***	1.27***	1.16***
S&P 500	(.070)	(.091)	(.149)	(.067)	(.108)	(.136)
	.904***	.219***	-.459***	.902***	.224***	-.438***
Constant	(.146)	(.058)	(.107)	(.146)	(.057)	(.106)
Rho	.000	.000	.013	.000	.000	.000
Groups	27	30	29	27	30	29
N	594	660	638	648	720	696
R2	.6801	.2738	.2987	.6810	.2548	.1564

Notes: Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

The most important thing to note about these results is that they are much more robust than any of the findings from Part III. The only remotely comparable event-study finding from Part III was that for the final rule signing for the CPP—which, recall, occurred on the same day as a major bankruptcy in the industry—and even then the difference-in-differences analysis did not suggest that there was any divergence between coal and natural gas in the aftermath of the event. With elections, all of the signs indicate a major effect. Of course, this should not be surprising. Prior to the 2008 election, candidate Barack Obama noted publicly that, under his preferred approach to climate policy, “if somebody wants to build a coal-powered plant, they can; it’s just that it will bankrupt them because they’re going to be charged a huge sum for all that greenhouse gas that’s being emitted.”¹³⁶ The rapid decline in coal production, particularly from the Appalachian region, that followed Obama’s inauguration certainly could give the impression immediately after his reelection in 2012 that things would not be looking up for the coal industry.¹³⁷ In the 2016 election, not only did candidate Trump position himself as a potential savior to the coal industry,¹³⁸ he was running against an opponent, Hillary Clinton, who had in the campaign predicted that “[w]e’re going to put a lot of coal miners and coal companies out of business.”¹³⁹ With statements such as these, the future business climate for the coal industry could be reasonably assumed to be better under Trump and worse under Clinton and Obama.

One question that might be asked is whether these elections were just a proxy for perceived future changes to the regulatory environment for coal. Of course, if that were the case, it would be all the more striking that the actual regulatory events themselves that preceded the 2016 election never yielded clear changes to the price of coal stocks consistent with the direction of these electoral effects. The market’s non-responsiveness to the Supreme Court’s stay of the CPP would be particularly surprising, as that could not have been predicted by the market at the time of any election. It seems more plausible that elections simply reflect a general gestalt reaction of optimism or pessimism, rather than a consideration of specific policies. To the extent that the election response does reflect some specific forecast about policy, it may be that, instead seeing elections as a proxy for regulatory policy, investors see potential implications for tax benefits, subsidies, and other policies that will more directly and immediately affect coal firms’ bottom lines. The coal industry has long enjoyed substantial tax advantages, pension guarantees, leases to federal lands, and other financial benefits from the government which might be either threatened or expanded depending on who occupies the White House.¹⁴⁰

¹³⁶ Andy Barr, *McCain Hits Obama on Coal Comment*, POLITICO (Nov. 3, 2008), <https://www.politico.com/story/2008/11/mccain-hits-obama-on-coal-comment-015221>.

¹³⁷ Steve Cicala, *Who’s Waging the War on Coal? Not the U.S. Government*, FORBES (October 27, 2016), <https://www.forbes.com/sites/ucenergy/2016/10/27/whos-waging-the-war-on-coal-not-the-government/#24689024335d> (describing it as an “easy sell”—but a misleading one—to blame Obama for the decline in coal after he took office).

¹³⁸ See Trump, *supra* note 61.

¹³⁹ Lauren Carroll, *In Context: Hillary Clinton’s Comments About Coal Jobs*, POLITIFACT (May 10, 2016), <https://www.politifact.com/truth-o-meter/article/2016/may/10/context-hillary-clintons-comments-about-coal-jobs/>. Clinton later stated that this was the campaign statement of hers that she regretted most. HILLARY RODHAM CLINTON, *WHAT HAPPENED* 263 (2017).

¹⁴⁰ See, e.g., Carl Pope, *The Secret Coal Bail-out: Bigger Than GM*, HUFFINGTON POST (Mar. 31, 2017), https://www.huffpost.com/entry/the-secret-coal-bail-out_b_9577878 (arguing that federal policies on pensions, reclamation liability, and bonding amount to an estimated government “bailout” of the coal industry that is twice as large as the financial package given to General Motors in the wake of the 2007 financial crisis); David Roberts, *Friendly Policies Keep U.S. Oil and Coal Afloat Far More Than We Thought*, VOX (July 26, 2018), <https://www.vox.com/energy-and-environment/2017/10/6/16428458/us-energy-coal-oil-subsidies> (describing that estimates at least \$14.7 billion of federal subsidies given to coal companies every year).

Under President Trump, any expectations that his Administration would favor the coal industry with such direct financial benefits seem to have been borne out. His Department of Energy took the unusual step to propose that the Federal Energy Regulatory Commission (FERC) offer additional subsidies to the coal industry.¹⁴¹ Although FERC has not yet approved subsidized rate proposals, the overall supportive posture for coal subsidies under President Trump—not to mention at times even active lobbying by one of his senior political advisors—helped provide fertile ground for subsidies and tax breaks that have been granted at the state level.¹⁴² His Department of Interior also lifted the Obama Administration’s moratorium on federal coal leases and approved new coal mining projects on federal lands.¹⁴³ The financial impacts that these kinds of actions deliver are likely to be much more direct, tangible, and immediate to the coal industry than any that might have derived from changes to air pollution regulations on the electric utility industry, with its indirect, and perhaps at best marginal, effects on the demand for coal.

C. Direct Regulation of Coal Mining

One way to assess whether markets respond differently to policies with direct financial effects on the coal industry is to look for effects from a different kind of regulation. After all, the major environmental regulations we studied in Part III—CSAPR, MATS, and CPP—share a common feature: they only indirectly affect coal production rather than directly regulated coal extraction operations. Each of these “war on coal” rules targeted electricity generation by utility companies, some of which use coal as their energy source. They increased utilities’ costs for using coal as an energy source, and, as such, could be expected to decrease demand for coal and increase demand for natural gas—the latter which is much less carbon intensive than coal. The fact that utilities have been closing their coal-fired plants and avoiding building new ones has lent surface-level plausibility to the regulatory “war on coal” narrative, even if, as we have seen, the stock-market evidence is not consistent with such a narrative.¹⁴⁴

¹⁴¹ *Secretary Perry Urges FERC to Take Swift Action to Address Threats to Grid Resiliency*, U.S. Department of Energy (Sept. 29, 2017), <https://www.energy.gov/articles/secretary-perry-urges-ferc-take-swift-action-address-threats-grid-resiliency>; Tom DiChristopher, *Energy Department Proposes Change to Electricity Pricing That Could Boost Coal, Nuclear Plants*, CNBC (Sept. 29, 2017), <https://www.cnbc.com/2017/09/29/energy-dept-proposes-power-pricing-that-may-boost-coal-nuclear-plants.html>. For commentary on the legality of this proposal, see Dan Farber, *A Trumped-Up Bailout Plan*, L. PLAN. (Jun. 7, 2018), <https://legal-planet.org/2018/06/07/a-trumped-up-bailout-plan/>

¹⁴² *See, e.g.*, Gavin Bade, *Ohio Advances Coal, Nuclear Subsidies After Pressure from Trump Campaign Official*, POLITICO (May 29, 2019), <https://www.politico.com/story/2019/05/29/ohio-coal-nuclear-trump-1347274>; Associated Press & Anthony Izaguirre, *Gov. Justice Signs Tax Break for Power Company Amid Debt Claim* (July 31, 2019), <https://www.wvpublic.org/post/gov-justice-signs-tax-break-power-company-amid-debt-claim>; Steven Allen Adams, *Gov. Justice Signs, Vetoes Legislation by Deadline*, PARKERSBURG NEWS & SENTINEL (Mar. 28, 2019), <http://www.newsandsentinel.com/news/local-news/2019/03/gov-justice-signs-vetoes-legislation-by-deadline/>; David Roberts, *The U.S. Coal Industry Is Going Out, Not With A Whimper, But With A Burst of Rent-Seeking*, VOX (August 26, 2017), <https://www.vox.com/energy-and-environment/2017/8/25/16201218/us-coal-industry-handouts>. Although FERC initially rejected the Department of Energy subsidy proposal, there remains a possibility that the Commission might still develop a package that would financially aid the industry. Gavin Bade, *How McConnell’s Coal Guy is Helping Trump Remake Federal Energy Policy*, POLITICO (Aug. 5, 2019), <https://www.politico.com/story/2019/08/05/neil-chatterjee-mcconnell-coal-federal-energy-policy-1634304>.

¹⁴³ *The War on Coal is Over: Interior Announces Historic Coal Projects in Utah*, U.S. Department of Interior (Feb. 14, 2019), <https://www.doi.gov/pressreleases/war-coal-over-interior-announces-historic-coal-projects-utah> (announces approval of two new coal mining projects and two extended mining leases on federal lands).

¹⁴⁴ *See supra* Part III.

But the lack of systematic market evidence for the indirect effect on the coal industry of intensive environmental regulation of the utility sector does not necessarily mean that coal stock prices might never be affected by regulation. To test for the possibility that share prices might respond differently to regulations that directly applied to the extraction of coal, we separately analyzed potential stock market reactions from several other environmental regulatory actions adopted during the Obama Administration—specifically, those that directly regulated coal mining operations.

The Obama Administration, for example, initiated an effort to tighten regulations of one type of coal extraction activity known as mountaintop mining removal. In this process, which has become more prevalent in recent years, coal companies use explosives to crumble the tops of Appalachian mountains and then remove the “spoil” to reveal the coal underneath.¹⁴⁵ The Surface Mining Control and Reclamation Act gives the Secretary of the Interior the authority to regulate mining activity and the Clean Water Act gives the EPA authority to regulate the disposal of the spoil material, which is often dumped in nearby streams and valleys and can cause serious environmental harms.¹⁴⁶ In 2009, the EPA and the Army Corps of Engineers developed a plan (an inter-agency agreement, or IAP) for “enhanced coordination procedures” that in effect made it more difficult for coal companies to obtain permits to dump spoil.¹⁴⁷ This agreement was challenged and eventually struck down in a district court.¹⁴⁸ Then, in 2010, the EPA issued a controversial interim guidance aiming to “force the industry to adopt a practice of minimal or zero filling of valleys with mountain debris.”¹⁴⁹ This policy, too, was challenged and struck down by a district court.¹⁵⁰ Then, in 2014, a court of appeals reversed both district court decisions and reinstated both policies, in part on the basis that they were too informal to be reviewable as final agency action.¹⁵¹

Meanwhile, the Office of Surface Mining Reclamation and Enforcement (OSMRE) in the U.S. Department of Interior began a more formalized, notice-and-comment rulemaking effort that resulted in what came to be known as the “stream protection rule.”¹⁵² This rule, published in 2016 at the tail end

¹⁴⁵ See CLAUDIA COPELAND, CONG. RESEARCH SERV., RS21421, MOUNTAINTOP MINING: BACKGROUND ON CURRENT CONTROVERSIES (2015).

¹⁴⁶ Surface Mining Control and Reclamation Act, 30 U.S.C. §§ 1261, 1265; Clean Water Act, 33 U.S.C. §§ 1342, 1344 (creating the CWA Section 402 and Section 404 permit programs). See generally COPELAND, *supra* note 145.

¹⁴⁷ Memorandum of Understanding Among the U.S. Dep't of the Army, U.S. Dep't of the Interior, and U.S. Env'tl. Prot. Agency Implementing the Interagency Action Plan on Appalachian Surface Coal Mining (June 11, 2009), available at http://water.epa.gov/lawsregs/guidance/wetlands/upload/2009_06_10_wetlands_pdf_Final_MTM_MOU_6-11-09.pdf.

¹⁴⁸ Nat'l. Mining Ass'n. v. Jackson, 816 F.Supp.2d 37 (D.D.C. 2011).

¹⁴⁹ Guidance on Improving EPA Review of Appalachian Surface Coal Mining Operations under the Clean Water Act, National Environmental Policy Act, and the Environmental Justice Executive Order, 75 Fed. Reg. 18,500 (Apr. 12, 2010).

¹⁵⁰ Nat'l. Mining Ass'n. v. Jackson, 856 F.Supp.2d 150 (D.D.C. 2012).

¹⁵¹ Nat'l. Mining Ass'n. v. McCarthy, 758 F.3d 243, (D.C. Cir. 2014).

¹⁵² Stream Protection Rule, 81 Fed. Reg. 93,066 (Dec. 20, 2016) (to be codified at 30 CFR pts. 700, 701, 773, 774, 777, 779, 780, 783, 784, 785, 800, 816, 817, 824, 827). See generally Brad Plumer, *Why Trump Just Killed a Rule Restricting Coal Companies from Dumping Waste in Streams*, VOX (Feb. 16, 2017, 5:05 PM), <https://www.vox.com/2017/2/2/14488448/stream-protection-rule>. Although different than the typical troika of rules associated with the “war on coal” narrative, the stream protection rule has also sometimes been characterized by politicians as part of the “war on coal.” See *W.Va. Officials React to Stream Protection Rule*, STAR-HERALD (Dec. 20, 2016), <https://www.heraldstaronline.com/news/local-news/2016/12/w-va-officials-react-to-stream-protection-rule/> (quoting Senate Majority Leader Mitch McConnell as including the stream protection rule as part of the Obama Administration’s “eight-year war on coal”).

of the Obama administration, required coal mining firms to ensure that their new mines would not disrupt the “hydrological balance” of nearby streams and rivers.¹⁵³ The rule never went into effect, however. After the transition, the new Republican Congress in 2017 issued a resolution of disapproval under the Congressional Review Act (CRA), which vacated the rule and barred any similar rule in the future.¹⁵⁴

Table 13 reports the difference-in-differences estimators for coal versus natural gas in the aftermath of relevant events in the development of mountaintop mining regulations, both by the EPA and OSMRE.¹⁵⁵ (Event-study results are similar, but simply for economy of presentation, we report here the results from our difference-in-differences analysis.) Whereas significant results were hard to find with respect to regulations that indirectly affected coal mining—such as CSAPR, MATS, and the CPP, as well as the Climate Action Plan and the Paris Climate Accord—there is somewhat greater evidence that investors reacted to developments in the direct regulation of the coal industry. For each event listed in Table 13, we have indicated in parentheses the expected direction of the sign of the variable, depending on whether the event supported more stringent direct regulation of the coal industry (negative sign) or rejected or repealed such regulation (positive sign).

TABLE 13: DIFFERENCE-IN-DIFFERENCES ESTIMATOR FOR DIRECT REGULATION OF COAL MINING OPERATIONS

	Days from Event				
	1	3	5	10	20
IAP Signed (-)	-0.579	-1.47**	-1.27***	-.635*	-.283
Guidance Signed (-)	-0.454	-.494^	-.695***	-.428^	-.422^
IAP Vacated (+)	0.203	-0.393	0.38	-.164	0.452
Guidance Vacated (+)	1.42**	1.46**	1.28***	.928***	.673***
Appeals Ct Reverses in Part (+/-)	2.06*	.736^	0.419	0.244	.580***
Stream Protection PR (-)	-3.26**	-1.42*	0.233	-0.865	-0.101
Stream Protection FR (-)	-0.317	0.031	-0.07	-0.351	-0.347
CRA Resolution Introduced (+)	2.66*	0.041	-.402	-0.172	-0.045
Trump Signs CRA (+)	3.34*	0.371	-.538^	-0.305	-0.439

Notes: Positive (+) and negative (-) symbols in the first column indicate the expected sign of the reported coefficients as would be suggested by the “war on coal” narrative. Estimates are from a generalized linear model with random effects at the firm level and robust standard errors clustered on the firm. Statistical significance, as determined by a two-tailed t-test, are denoted as follows: $p < .001 = ***$, $p < .01 = **$, $p < .05 = *$, $p < .10 = ^$.

¹⁵³ See Plumer, *supra* note 152.

¹⁵⁴ Repeal of the Stream Protection Rule, Pub. L. 115-5, 131 Stat. 10. See also Congressional Review Act, 5 U.S.C. §§ 801-808.

¹⁵⁵ We also conducted event-study analysis as well. The event-study results are not dissimilar but, simply to economize on space, we report here only the results from the difference-in-differences analysis.

These more direct regulatory efforts were associated some statistically significant effects on coal firms' stock value in seven out of the nine events, with five events showing a statistically significant result within the one-day window. The district court's decision striking down the 2010 guidance shows the clearest association: statistically significant returns in the expected direction in every event window analyzed. Moreover, the signs on the returns in each analysis yielding statistical significance all run in the direction expected if investors consider additional regulation to be bad for business. The introduction and signing of the CRA resolution of disapproval were immediately viewed as positive events by the stock market.

One possible exception worth noting is the court of appeals' reversal of the district court's decision striking down the 2010 guidance. That decision is associated with a statistically significant *positive* result, even though it reinstated both the IAP and the guidance. At first blush, this sign seems counterintuitive given that (1) the imposition of the guidance in the first place resulted in returns with a consistently negative sign (and significantly negative at five days out), and (2) the vacating of the guidance was positive and statistically significant at each of the event windows. Yet, perhaps this positive sign should not be so surprising. As policy analyst Claudia Copeland argues, even as it reinstated the IAP and the guidance, the appeals court clarified that neither of these policy statements were formally binding, thus effectively giving at least a partial win to coal companies.¹⁵⁶ From industry's vantage point, the effect of the ruling was to reinstate the policies but essentially to make compliance with them optional. This understanding fits the positive returns associated with the court of appeals event.

Our analysis of mountaintop mining regulations reveals both that regulation can be associated with perceptible effects on stock prices and that our statistical methods do work to ferret out such associations. That has been our principal reason for conducting these analyses of a different set of regulations. As to why we find evidence that these direct forms of regulation of coal mining seem associated with stock price changes in the manner expected, when no such clear, significant statistical associations exist for the major but indirect regulations that were the principal focus of industry's ire and politicians' rhetoric about a "war on coal," we can only speculate here. Perhaps the economic consequences of direct regulation of coal mining operations were more readily capable of estimation or more certain for investors to take into account. Or perhaps other, more significant factors affect the demand for coal by utility plants, making the increased regulatory costs to utilities largely superfluous. Many coal-powered plants were already well past their retirement age and, with the advent of cheaper energy from the hydraulic fracturing of natural gas, investors may have known that demand for coal in the medium-to-long term was already in decline irrespective of any indirect regulations such as reflected in CSAPR, MATS, and the CPP. Or perhaps utility companies could be expected to raise their rates or otherwise absorb any cost increases without much spillover effect on the demand for coal. Whatever the reason, the key for our purposes here—namely, investigating claims of a "war on coal"—is to see that the primary regulations underlying those claims did not result in anything close to the same kinds of effects on coal stock prices that did direct regulations, bankruptcies, or election returns.

D. Market Responses by Individual Firms

As a final robustness test of our event-study analysis of the "war on coal" regulations' market effects, we disaggregated our event analyses of the CSAPR, MATS and CPP for the individual firms in our sample. Despite the ten firms in our study being "coal companies," they do each have fairly different business models and profiles. Some of the firms, such as Alliance Resources Partners and Cloud Peak are

¹⁵⁶ See COPELAND, *supra* note 145.

“thermal coal focused miners,” meaning they mostly produce coal that will be used for electricity generation, while others, such as Peabody and Arch, are more diversified.¹⁵⁷ In particular, Peabody and Arch have substantial metallurgical and coking coal production, which typically is used in industrial processes, such as steel manufacturing.¹⁵⁸ Likewise, there is substantial variation in the location of these companies’ mines. Eastern coal from the Appalachian region is higher in overall sulfur content, and early Clean Air Act regulations made this fact irrelevant by requiring scrubbers on all smoke stacks.¹⁵⁹ However, despite the protection of eastern coal afforded by environmental regulation, production of lower sulfur content coal in the Powder River Basin in Wyoming—much of it by Peabody Energy Company—has caught up in recent years, possibly destabilizing Appalachian production and the companies that primarily mine there, such as Alpha Natural Resources and Consol Energy.¹⁶⁰ This variation across firms only underscores the complexity of this industry and presumably the heterogeneity of these firms should itself provide reason for skepticism about the “war on coal” narrative, insofar as it claims that environmental regulations have a one-size-fits-all effect on coal firms.

To begin our firm-level analysis, we focus on how stock prices for individual firms responded to bankruptcy declarations in the industry. As Table 14 shows, bankruptcies in the coal mining sector have

TABLE 14: THREE-DAY CUMULATIVE AVERAGE
ABNORMAL RETURNS FOR SELECT COAL BANKRUPTCIES

	Peabody Declares	Arch Declares	Walter Declares
Peabody	-	-38.94**	-20.88***
Arch	-	-	-
Cloud Peak	-4.09	-18.27*	-14.85**
NAACO	-1.49	2.63	-2.02
ARP	2.52	-4.57	-1.75
Westmoreland	-3.22	-4.24	-6.50
Consol	-6.18	-17.80**	-14.85***
Foresight	35.18***	-23.53***	-1.1
Alpha	-	-	-7.38
Hallador	9.14 [^]	-8.86 [^]	-6.1

Notes: Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: p<.001=***, p<.01=**, p<.05=*, p<.10=[^].

¹⁵⁷ Reuben Gregg Brewer, *Here’s Why Alliance Resource Partners, L.P. is Still the Best Coal Miner*, The Motley Fool (Apr. 5, 2018), available at <https://www.fool.com/investing/2018/04/05/heres-why-alliance-resource-partners-lp-is-still-t.aspx>.

¹⁵⁸ Brad Plumer, *Why Peabody Energy, the World’s Largest Coal Company, Just Went Bankrupt*, Vox (Apr. 13, 2016), available at <https://www.vox.com/2016/4/13/11420882/peabody-energy-bankruptcy-coal>.

¹⁵⁹ See BRUCE ACKERMAN & WILLIAM T. HASSLER, CLEAN COAL/DIRTY AIR: OR HOW THE CLEAN AIR ACT BECAME A MULTIBILLION-DOLLAR BAIL-OUT FOR HIGH-SULFUR COAL PRODUCERS (1981).

¹⁶⁰ SNL Metals & Mining, *These Are the Top Producing Central Appalachia Coal Mines in Q2’14*, MINING.COM (Aug. 11, 2014, 6:22 AM), <http://www.mining.com/web/these-are-the-top-producing-central-appalachia-coal-mines-in-q214/>.

led to palpable investor responses for some of the surviving firms. As we explained earlier, the missing estimates in Table 14 are due to bankruptcies, both at the firm whose bankruptcy is the event in question (e.g., there would be no Peabody data for the Peabody bankruptcy) and previous bankruptcies (e.g., Arch’s bankruptcy overlapped with Peabody’s declaration of bankruptcy). The results in Table 14 suggest that bankruptcies in the coal industry matter to investors in a way that regulation of coal-powered electric utilities does not. In the wake of the Peabody bankruptcy, one company experienced positive abnormal returns. However, the stock for this company and three others suffered statistically significant negative effects following the Arch bankruptcy, and three other companies saw a statistically significant drop in share prices following the Walter bankruptcy filing. It is worth noting, moreover, the sheer magnitude of the abnormal returns for these events and comparing them to the magnitude of even the relatively few statistically significant results from the analysis of regulatory events. Judging from the magnitude of the returns shown in Tables 10 and 14, bankruptcies appear to be much more important to investors than any other type of event.

Applying this same firm-level approach to environmental regulatory events, we report results in Table 15 for the three-day cumulative responses by individual firms. Surprisingly few statistically significant changes in share prices are observed. Putting the finalization of the CPP to the side for a moment (as the Alpha bankruptcy occurred on that same day), only eight out of 64 other results are statistically significant. Of these, only two have a sign in a direction consistent with expectations that would follow from the regulatory “war on coal” narrative.

Notably, several coal firms—Cloud Peak, Westmoreland, and Consol—did see double digit abnormal declines around the finalization of the CPP. Hallador also saw a statistically significant decline. It might seem, then, that the CPP—but by and large not any of the other regulations—could

TABLE 15: THREE-DAY CUMULATIVE AVERAGE ABNORMAL RETURNS FOR INDIVIDUAL FIRMS FOLLOWING THE “WAR ON COAL” REGULATIONS

	CSAPR			MATS			CPP		
	PR Sign	FR Sign	S Ct	PR Sign	FR Sign	S Ct	PR Sign	FR Sign	S Ct
Peabody	0.31	-2.22	2.77	7.56**	0.22	-17.94***	0.83	-5.35	-26.60*
Arch	-	-	-	-	-	-	-	-	-
Cloud Peak	-0.56	-0.2	-2.00	5.17	0.78	-8.65^	0.48	-20.21***	.86
NAACO	-2.96	1.59	-11.33***	-5.85	-0.34	-0.04	-0.43	5.05^	1.83
ARP	-0.02	0.35	3.82^	5.65*	1.81	3.88	-2.88^	-1.1	-9.56**
Westmoreland	-11.61*	-0.36	3.59	0.28	-4.64	-5.12	3.66	-21.84***	-8.84
Consol	-0.08	3.03	6.39*	5.12^	2.01	-4.34	3.25	-15.83***	4.13
Foresight	-	-	-	-	-	.55	-	-4.24	-7.64
Alpha	-0.6	-2.52	8.99	4.86	2.97	-8.87	-4.52	-	-
Hallador	-	1.69	-1.03	-2.92	-5.31	1.81	-3.97	-8.99*	8.36^

Notes: Estimates are precision-weighted cumulative average abnormal returns for each window. The results are from a market model using value-weighted returns for the constituent firms. The estimation window (-305,-55) was separated from the event window (-5,10) by fifty trading days. Statistical significance, as determined by a two-tailed standardized cross-sectional z-test, are denoted as follows: p<.001=***, p<.01=**, p<.05=*, p<.10=^.

have negatively affected just a small handful of publicly traded firms. At the most, then, these firm-level results might suggest that any negative effects of the “war on coal” regulations on firms in the coal sector were heterogenous, with some firms affected to some degree even though overall the industry saw no systemic effect. In this sense, the effects of climate regulations on the coal industry may be little different than the effects of regulation more generally.¹⁶¹ Still, even this finding of heterogenous effects across different firms would be itself noteworthy because it contrasts with the fervent political rhetoric claiming an industry-wide a regulatory “war on coal”—not on some individual coal firms. Rather than any systemic assault, a few air pollution regulations imposed on the utility sector may have, at the most, affected the stock prices of only a few individual coal firms.

But in fact, even such a limited conclusion cannot be drawn because the coal industry saw one of its largest bankruptcies (Alpha Natural Resources) occur on the same day that the CPP was signed. Moreover, no statistically significant abnormal returns for any company are observed in connection with the *proposed* CPP rule. We thus cannot say with any confidence that any of the effects in Table 15 for the four firms showing statistically significant, negative abnormal returns can be attributed to the signing of the CPP rather than the Alpha bankruptcy. Based on the market reactions to bankruptcies as reported above, the overall effect—in its size, direction, and number of firms—looks more consistent with a reaction to the Alpha bankruptcy than to the CPP. This conclusion is only reinforced by the firm-level share reactions to the unprecedented Supreme Court stay of the CPP, as the only two firms with statistically significant changes in their share prices saw those prices decrease—not increase as one would have expected based on the “war on coal” rhetoric.

V. IMPLICATIONS FOR REGULATORY REFORM

In the previous parts of this paper, we report the findings from our efforts to look carefully, through a variety of empirical lenses, for what investors thought about the key regulatory developments that figured prominently in the narrative of a “war on coal” from new regulations on existing coal-power utility plants. Yet we could not find any clear, systematic indication that investors thought much at all of the main regulatory protagonists in the “war on coal” story: CSAPR, MATS, and the CPP. It is true, of course, that the coal industry as a whole experienced a substantial secular decline in production levels over the last decade, along with a loss of jobs, numerous facility closings, and several bankruptcies. But the results presented in this paper are consistent with the view that this decline has stemmed mostly—if not entirely—from secular causes, such as the rise of less expensive natural gas (and, increasingly, sources of renewable energy), rather than acute regulatory events. We find no evidence that would allow us to conclude that key Obama-era environmental regulations targeting coal-fired electricity generation led to changes in the investment in the coal industry consistent with the “war on coal” narrative. At the same time, the same measures and methods of analysis did reveal significant responses in coal company stock prices from other events, such as bankruptcies and elections, suggesting that the lack of consistent responses to the “war on coal” regulations is not merely an artifact of our data or empirical methods.

In this final part, we recap our principal findings, putting them into further context and drawing out their implications for regulatory law and policy more generally. The lack of any consistent,

¹⁶¹ Other research indicates, for example, that individual environmental regulations may lead to employment effects at some individual firms while not having much of any aggregate on overall employment. See Cary Coglianese & Christopher Carrigan, *The Jobs and Regulation Debate*, in *DOES REGULATION KILL JOBS?* 6-11 (Cary Coglianese et al., eds., 2013).

systematic evidence that would allow us to dismiss the null hypothesis for the events pivotal to the regulations targeted by the “war on coal’s” proponents is certainly striking. After all, under standard economic theory, forcing utility companies to internalize their negative externalities from burning coal should increase the private costs of using coal and lead utilities to look to alternative sources of energy. The stock market should thus respond negatively to news of events leading to new regulations and positively to those events blocking or reversing those regulations. These same expectations also follow from the repeated political rhetoric alleging a regulatory “war on coal.” Yet news of the key events in the development of “war on coal” regulations, as well as their subsequent litigation, show at best only fleeting and inconsistent associations with coal stock prices. As we explain in this final part, the absence of evidence sufficient to support the expectations that follow from the “war on coal” narrative may prove less surprising when one takes a step back and considers the results of our analyses in light of other research on the coal industry specifically and regulation more generally.¹⁶² We take our research findings to support a cautionary lesson about basing regulatory policy decisions on complaints about the costs of regulation put forward by self-interested actors who have reason to look for scapegoats or set themselves up as regulatory reform saviors.

A. Situating the Stock Market’s Non-Response to the “War on Coal”

As explained in Part II of this paper, we have relied on standard empirical methods in our effort to isolate the reactions of stock market investors to key regulatory events that we thought may have affected coal companies’ financial performance. If the dire predictions underlying the narrative of the regulatory “war on coal” had merit, then it is surprising not to see investors in coal companies responding in clear, perceptible ways to the announcement of key battles in this regulatory “war.” The event-study technique we have principally relied on here has been widely used by other researchers to find market reactions to new developments, including government regulations.¹⁶³ It works to identify how the market processes new information that comes forward publicly, as occurs with the release of the text of a proposed or final rule and the accompanying information from the agency’s regulatory impact analysis. In the face of this new information, it holds constant and controls for the overall trends in stock prices and looks at what change occurs within a short time after the release of news of the event under examination. As noted earlier, a statistically significant change in stock prices that occurs immediately after the public release of news of an event provides confidence that investors saw the event as having meaningful impact on the future financial performance of the companies included in the analysis. When such an immediate change is sustained over another day or two, this implies, generally speaking, a stronger and more-than-fleeting effect.

For each of the three principal regulations associated with the “war on coal” narrative, we analyzed three key events in their development—the announcements of each proposed rule and final rule as well as the relevant Supreme Court decisions—using one- to three-day event windows. The vast majority of these event-window combinations yielded no statistically significant changes in stock prices in response to the regulatory events. If we look at the results that might be said in principle to provide the strongest support for a market response to these regulatory developments, we find that only four events across the three regulations yielded any statistically significant result on day one—and in all of

¹⁶² It is also not the first time in the field of regulatory law that what appears to be received wisdom fails to hold up to empirical scrutiny. See Cary Coglianese, *Assessing Consensus: The Promise and Performance of Negotiated Rulemaking*, 46 DUKE L.J. 1255 (1997); Daniel E. Walters, *The Self-Delegation False-Alarm: Analyzing Auer Deference’s Effects on Agency Rules*, 119 COLUM. L. REV. 85 (2019).

¹⁶³ See *supra* Part II.A.

these instances there exists reason to question how meaningfully these results can support the regulatory “war on coal” narrative. With CSAPR, the only event showing a statistically significant day-one abnormal return was the Supreme Court’s decision to uphold the rule—but coal stocks gained, rather than lost as would have been expected from claims of a “war on coal.”¹⁶⁴ With MATS, the announcement of the Supreme Court decision faulting the way EPA had justified its rule did yield a statistically significant positive abnormal return on day one—but it was followed on both days two and three with statistically significant *negative* abnormal returns.¹⁶⁵ The proposed MATS rule also showed statistically significant returns on the first day following its release, but these returns were positive—again, opposite what would be expected from claims about a “war on coal.” Now, the release of the final CPP did yield statistically significant negative returns on both days one and two; however, these results cannot be taken to imply anything about the market’s reaction to CPP because a major coal firm bankruptcy occurred on the very same day the final rule was announced.¹⁶⁶

When these seemingly “best-case” responses to regulatory events are compared with the market responses to bankruptcies in the coal industry, it becomes still clearer what is lacking in the observed market reactions to the “war on coal” rules. Out of the five bankruptcies analyzed, three resulted in immediate day-one statistically significant negative returns. (A fourth yielded marginally significant negative returns within the first two days.)¹⁶⁷ Over the entire three-day event window, the returns were negative for each of the five bankruptcies, and three of these five were statistically significant.¹⁶⁸ By contrast, only two of the nine regulatory events resulted in a statistically significant abnormal return across the entire three-day event window—and, perhaps tellingly, one of these ran in the direction opposite of expectations (MATS proposed rule) and the other occurred on the same day as the Alpha bankruptcy (CPP final rule).¹⁶⁹

The fact that we find much clearer and more consistent reactions in response to bankruptcies provides a degree of assurance that our lack of comparable findings with respect to the “war on coal” regulations is not merely an artifact of our empirical methods. Nevertheless, we did use a second statistical method in a further effort to ferret out market effects that might have been consistent with the regulatory “war on coal.” That second method—a difference-in-differences analysis—compared changes in coal stock prices to changes in natural gas stock prices, with the idea that what is bad for the coal industry probably would be good for the natural gas industry, and vice versa. By benchmarking coal stock prices not just against their own trends but also against trends in natural gas prices, we may well even have found a measure that would be biased in favor of finding effects consistent with the “war on coal” narrative. After all, changes in the coal industry might be more likely to be significant when compared with changes in the natural gas industry, which should move in the opposite direction. Despite this potential bias in favor of the “war on coal” account, only one out of the eighteen difference-in-differences analyses we conducted on the “war on coal” regulations yielded a statistically significant result.¹⁷⁰ By comparison, every one of our six difference-in-differences results for national elections was statistically significant and in alignment with expectations.

¹⁶⁴ See *supra* Table 2.

¹⁶⁵ See *supra* Table 4.

¹⁶⁶ See *supra* Table 6; see also note 113 and accompanying text.

¹⁶⁷ See *supra* Table 10.

¹⁶⁸ See *id.*

¹⁶⁹ See *supra* Table 2; *supra* Table 4; *supra* Table 6.

¹⁷⁰ See *supra* Table 3; *supra* Table 5; *supra* Table 7.

At this point, it might be asked whether our failure to find any comparable results supportive of the rhetoric of the “war on coal” could stem from factors other than market disinterest in the key regulatory events. For example, perhaps the financial effects of the applicable regulations were somehow factored into coal firms’ stock prices long before the regulatory events in our study were even announced. In light of the statistically significant day-two returns after the release of the Climate Action Plan (CAP) in 2013, for example, it might be wondered whether that earlier event was the moment when the market priced in the negative effects from the CPP, even though the latter would not be proposed for another year.¹⁷¹ Perhaps in other similar ways the news of impending CSAPR and MATS rules leaked to the market earlier and thus the effects of these rules on the coal industry were already factored into stock prices by the time they were proposed. For three principal reasons, we do not find such alternative speculations provide a convincing explanation for the results of our analysis.

First, even though stock markets can and do take the possibility of future events into account, the occurrence of an event still can provide additional news that affects stock prices further. For example, every time an election is held, the markets already know in advance, come election day, that one of two candidates will win—and yet the declaration of a winner still brings with it something new, namely certainty, which can affect stock prices. The same can be said of regulations. Even following the release of CAP, the CPP was far from certain until it was released. Moreover, the release of a proposed or final rule gives markets new information in terms of the actual regulatory language contained in these documents. The regulatory events that we studied—announcements of proposed and final rules—were each accompanied by the release of new information about the specific details of the regulatory proposal or decision.

Second, we have no reason to think that regulatory impacts would have been pre-factored by the market only for the “war on coal” regulations but not for other regulations. As we noted in Part II, other researchers have found abnormal returns in similar event studies of different regulations.¹⁷² We even found significant abnormal returns with coal stocks in the immediate aftermath of the proposed stream protection rule and related regulatory events that directly affected coal mining operations.¹⁷³ We mainly just failed to find clear and consistent significant results associated with the “war on coal” regulations.

Finally, and most importantly, the market had absolutely no reason in advance to factor in the Supreme Court’s stay of the CPP. It is simply implausible to think that the market had factored in an entirely unprecedented event that surprised even lawyers involved in the case.¹⁷⁴ Moreover, if one assumes *arguendo* that negative financial effects from the proposed CPP rule had already been factored into coal stock prices due to CAP, that would only provide greater reason to expect positive returns from the Supreme Court’s stay. If the effects of a regulation were already built into and depressing the value of coal company share prices, then a totally surprising decision halting that regulation from taking effect, as well as signaling its likely ultimate demise, should have positively affected share prices for coal firms. Overall, if the regulatory “war on coal” were the existential threat to the industry that critics claimed, then the Court’s shocking stay should have clearly and immediately boosted coal company stock prices—but it did not.¹⁷⁵

¹⁷¹ See *supra* Table 8. Of course, CAP showed no effect in difference-in-differences analyses. See *supra* Table 9.

¹⁷² See *supra* note 79 and accompanying text.

¹⁷³ See *supra* Table 13.

¹⁷⁴ See *supra* note 111 and accompanying text.

¹⁷⁵ See *supra* Table 6. Perhaps much the same could be said for the announcement of the planned U.S. withdrawal from the Paris Agreement, as it was not entirely clear up until the day of the announcement what decision, if any, that President Trump had decided to announce.

Overall, perhaps the most plausible explanation for our results stems from the overwhelming effects of lower natural gas prices on the demand for coal. The “war on coal” regulations, recall, did not directly regulate the coal industry; they regulated the electric utility industry, thereby increasing the costs to operate old coal-powered electricity plants and thus decreasing the likelihood that utilities would keep these plants running or would replace them with new coal-powered electricity plants. Yet, we fail to see evidence from the reactions of the stock market that would be consistent with the expected effects of an indirect reduction in the demand for coal induced by these regulations. What we do see around the same time are dramatically decreasing natural gas prices that were already driving coal company decisions to close down aging coal-powered plants and replace them with natural gas.¹⁷⁶ Given the strong preexisting and ongoing competitive pressures from natural gas driving down the demand for coal, perhaps whatever additional effects on coal demand coming from regulations imposed on electric utilities were viewed as *de minimus*. In other words, if there was any proverbial war going on, the mortal wound may have already been inflicted by the natural gas industry, such that any additional (regulatory) wound did not make much if any difference to investors.¹⁷⁷

But, then one might ask: What accounts for the negative market reaction to the Paris Accord?¹⁷⁸ By December 2015, when the agreement was announced, stock market investors fully recognized the substantial decline in demand for coal in the face of cheaper alternative sources of energy. If a “second-wound” hypothesis were plausible, why did the market respond to the adoption of the Paris Accord? In fact, that market response was also one of the stronger ones we observed: a statistically significant decline in coal share prices immediately followed the Accord’s announcement, and a marginally significant decline in the difference-in-differences analysis. This decline seems all the more curious in light of the absence of any statistically significant positive returns eighteen months later in the wake of President Trump’s announcement of his intended withdrawal from the agreement.¹⁷⁹ Yet, rather than a curiosity, these results may actually be consistent with the “second-wound” hypothesis. With domestic market demand from coal already rapidly in decline due to low natural gas prices, policy actions affecting only domestic markets—e.g., EPA regulations, the U.S. withdrawal from the Paris Accord—would be expected to have little incremental effect on demand for coal. An industry dying from a decline in domestic demand, though, may at least have one lifeline available to it in the form of exports to foreign markets. By some accounts, that appears to be what coal firms and their investors had been banking on for the future of the industry.¹⁸⁰ The signing of the Paris Accord, however, signaled that the demand for

¹⁷⁶ Moreover, coal’s share prices correlate highly with the market price for natural gas. *See supra* Figure 2.

¹⁷⁷ The use of death as a metaphor to describe the coal industry is far from unique to us. *See, e.g.,* Roman Mendeleevitch et al., *The Death Spiral of Coal in the U.S.: Will Changes in U.S. Policy Turn the Tide?*, CLIM. POL. (July 24, 2019), doi.org/10.1080/14693062.2019.1641462; Frederick Hewett, *Coal Mining is a Dying Industry. So Why Does It Play an Outsized Role in Our Energy Policy?*, WBUR (Aug. 22, 2018), <https://www.wbur.org/cognoscenti/2018/08/22/trump-epa-coal-pollution-fred-hewett>. Of course, in using such a metaphor to characterize an entire industry, we do not mean to overlook or trivialize the fact that the same industry, through its operational risks as well as the combustion of its product, leads to some literal loss of human life.

¹⁷⁸ *See supra* Table 8.

¹⁷⁹ The returns were actually negative, but not statistically significant. *See id.*

¹⁸⁰ The Trump Administration has even looked into the possibility of converting coastal military bases into new ports for increased coal exports to Asia. *See* Matthew Brown, *West Coast Military Installations Eyed for U.S. Fuel Exports*, ASSOC. PRESS (Oct. 15, 2018), <https://www.apnews.com/573a19c3d43643e5b2d961b46cd99c67>. On the outlook for coal exports more generally, see Houser et al., *supra* note 29, at 39 (noting that “in recent years” China “provided a growing market for US coal exports”); Thomas F. Hoffman, *Can Exports Save the Coal Industry?*, HILL (Mar. 9, 2018), <https://thehill.com/opinion/energy-environment/377201-can-exports-save-the-us-coal->

coal by other countries around the world would also be on the decline. In the end, the divergent market responses to the signing of the Paris Accord and the announced U.S. withdrawal could be quite consistent with investors viewing regulation as largely irrelevant to domestic demand while still at one time possessing optimism over a future with coal exports.

Our purpose here, of course, has not been to develop and test a theory of stock market reactions to regulation as much as to investigate the plausibility of the “war on coal” narrative. Without a doubt, the U.S. coal industry suffered a dramatic decline during the Obama Administration. Coinciding with coal’s demise was both the establishment of new environmental regulations *and* a dramatic decrease in natural gas prices. In our empirical analysis, we sought to isolate the effects of the key regulations often attributed to the industry’s demise but found no convincing evidence that investors saw systematic effects from regulation consistent with the “war on coal” narrative. Granted, it is always possible that further analysis might yield other insights. We also recognize, of course, that any study of stock prices necessarily cannot speak to effects on privately held firms. Yet on the basis of all we have been able to analyze, it would appear that, rather than seeing regulators as inflicting substantial harm on the coal industry, the stock market treated the key regulatory events essentially as irrelevancies. With a serious economic war taking place between the coal industry and its market competitors, the EPA’s regulatory agenda may have constituted at most a minor skirmish.

B. The “War on Coal” and the Overstatement of Regulatory Impacts

A conclusion that investors did not see air pollution regulations to be a major financial concern will seem surprising, especially given the vociferous complaints leveled in the political sphere by opponents of these regulations. Yet on reflection, such a conclusion probably is not entirely surprising after all. Other research actually shows that environmental regulation has had only small effects on coal production and, more generally, that such regulation has not played a major role in terms of industrial competitiveness or levels of employment across the economy.

As noted in Part I, two other empirical studies have used different methods and data to discern how much, if at all, air pollution regulations imposed on coal-power electricity plants explain the overall fall-off in demand for coal. In a one study, Harvard economists conducted both (1) a longitudinal analysis of state-level data on the share of electricity generated by coal based on the presence of cross-state air pollution rules, such as CSAPR and the MATS rule, as well as (2) a separate event study of plant closures in response to MATS.¹⁸¹ Using the results of these analyses, they decomposed the overall changes in coal production from 2008-2016, estimating that only 9.2% of coal’s decline could be attributed to air pollution regulations.¹⁸² What, then, played the “dominant role” in the industry’s decline?¹⁸³ The relative prices of natural gas.¹⁸⁴

industry; Jude Clemente, *The U.S. Coal Export Boom To Asia*, FORBES MAG. (Oct. 7, 2018), <https://www.forbes.com/sites/judeclemente/2018/10/07/the-u-s-coal-export-boom-to-china/#5e45d8073454>; Howard Gruenspecht, *The U.S. Coal Sector: Recent and Continuing Challenges* 14-15 (Jan. 2019), https://www.brookings.edu/wp-content/uploads/2019/01/H.Gruenspecht_U.S.-Coal-Sector_Final_Jan_2019.pdf.

¹⁸¹ Coglianesse et al., *supra* note 31, at 9-18.

¹⁸² *Id.* at 21.

¹⁸³ *Id.* at 3.

¹⁸⁴ *Id.* (noting that “the major driver in the decline [of coal production] is the relative price of coal to natural gas”).

In a second study, Columbia University researchers assumed for sake of analysis that all closures of coal plants in the years between 2011 to 2016 stemmed from regulatory burdens, but they still concluded that, even under such a very strong assumption, no more than 3.9 percent of the drop in coal production during that period could have been attributable to regulation.¹⁸⁵ They also used a version of a model developed by the U.S. Energy Information Administration’s to forecast the likely effects of a rollback of the Clean Power Plan and a range of other environmental policies; however, they found that these changes, even if all of them were adopted *and* even if natural gas prices increased at rates higher than current government forecasts predict, would never bring coal production back to anywhere close to its peak levels prior to the Obama Administration.¹⁸⁶ From their analysis, “[t]he bottom line is that for the next few years, natural gas prices and, to a lesser extent, renewable energy costs will play a far greater role in determining US coal consumption than President Trump’s deregulatory agenda.”¹⁸⁷

It may well be that, at the time new air pollution regulations were in development during the Obama Administration, sophisticated investors already understood what researchers have since documented: the effects of decreasing prices of natural gas overwhelm any effects of the regulations. For an industry already mortally wounded by its economic competition, any second wound inflicted by regulation may have amounted to little more than a cut on the finger.

More broadly, the results of our analysis fit within a larger pattern of overstated claims about the negative economic effects of regulation, especially when made by industry representatives and politicians. One such claim made by some industry lobbyists and Republican politicians grows out of analysis commissioned by the National Association of Manufacturers purporting to show that regulation imposes about \$2 trillion in annual costs to the economy—roughly equivalent to dropping out of the U.S. economy the entire state of New York.¹⁸⁸ But as others have explained, the basis for this assertion suffers from numerous methodological problems that contribute to a vastly overstated assertion.¹⁸⁹ In commenting on an earlier, similar study by the same authors as the NAM-funded report, legal scholar Cass Sunstein noted that the claim is “deeply flawed and should not be relied on as a basis for quantifying regulatory costs.”¹⁹⁰ Economist Austan Goolsbee put it still more succinctly, calling the claim “utterly erroneous.”¹⁹¹

Of course, no one denies that specific regulations can and do sometimes impose substantial costs on industry—even if they also deliver substantial benefits to society at the same time. But getting precise, reliable estimates of the negative ramifications of all regulations across the entire U.S. economy, or even all regulations within a particular substantive area of regulation, can be difficult. Still, credible

¹⁸⁵ Houser et al., *supra* note 29, at 22.

¹⁸⁶ *Id.* at 38-39.

¹⁸⁷ *Id.* at 39.

¹⁸⁸ *See, e.g.*, Crain & Crain, *supra* note 3.

¹⁸⁹ *See, e.g.*, Maeve P. Carey, *Methods of Estimating the Total Cost of Federal Regulations*, Congressional Research Service Report No. 7-5700 (Jan. 21, 2016), <https://fas.org/sgp/crs/misc/R44348.pdf> (methodically reviewing a list of concerns with the Crain and Crain estimate); Parker, *supra* note 3 (reviewing the “flawed methodology” underlying the Crain and Crain estimate). The \$2 trillion dollar per year claim is not one of net costs either; it leaves out the benefits of regulation entirely.

¹⁹⁰ *How Best to Advance the Public Interest?: Hearing Before the S. Comm on Homeland Security and Governmental Affairs*, 112th Cong. 220 (2011) (statement of Cass R. Sunstein, Administrator, Office of Information and Regulatory Affairs).

¹⁹¹ Austan Goolsbee, *A 21st Century Regulatory System* (Jun. 23, 2011), <https://obamawhitehouse.archives.gov/realitycheck/blog/2011/06/23/21st-century-regulatory-system>.

research does exist on the effects of environmental regulation as a general matter. Specifically, this research considers the impacts of environmental regulation on industrial competitiveness and on employment. With respect to both of these impacts, existing research tends to find the negative ramifications of regulation relatively modest.

For example, in one of the most extensive reviews of the literature on the relationship between environmental regulation and the international competitiveness of U.S. industry, economist Adam Jaffe and several colleagues conclude that “[o]verall, there is relatively little evidence to support the hypothesis that environmental regulations have had a large adverse effect on competitiveness.”¹⁹² They report that “studies attempting to measure the effect of environmental regulation on net exports, overall trade flows, and plant-location decisions have produced estimates that are either small, statistically insignificant, or not robust to tests of model specification.”¹⁹³ One of the main reasons for their finding was that, by and large, “the cost of complying with federal environmental regulation is a relatively small fraction of total cost of production.”¹⁹⁴ Subsequent research has tended to continue to show only relatively modest impacts of environmental regulation on U.S. industry’s competitiveness in a global marketplace.¹⁹⁵

Similarly, the overall effects of environmental regulation on employment levels in the United States appear at best quite modest, to the extent that they amount to anything at all perceptible in the aggregate. In one of the earliest studies, economists Eli Berman and Linda Bui analyzed the effects of air pollution regulation on manufacturing jobs in Southern California, with its more stringent air pollution rules, and other parts of the country, finding no substantive or statistically significant effects.¹⁹⁶ Economists Richard Morgenstern and his colleagues have examined four major industrial sectors throughout the United States and have found no substantively or statistically significant association between spending by firms on compliance with environmental regulations and levels of employment.¹⁹⁷

Economist Michael Greenstone has compared air quality regions in attainment status with those in nonattainment (the latter being subject to greater regulation), finding an average of about 40,000 fewer jobs per year among the facilities located in nonattainment regions. To place this finding in some context, consider that one to two million people can be laid off from their jobs every month, even in normal economic times.¹⁹⁸ More importantly, Greenstone’s analysis could not distinguish between jobs

¹⁹² Adam B. Jaffe et al., *Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?*, 33 J. ECON. LIT. 132, 157 (1995).

¹⁹³ *Id.* at 157-158.

¹⁹⁴ *Id.* at 158.

¹⁹⁵ See, e.g., Joseph E. Aldy, *Frameworks for Evaluating Policy Approaches to Address the Competitiveness Concerns of Mitigating Greenhouse Gas Emissions*, 70 NATIONAL TAX J. 395, 398 (2017) (noting that “the empirical literature typically finds quite limited impacts of environmental regulations on international competitiveness”).

¹⁹⁶ Eli Berman and Linda T. M. Bui, *Environmental Regulation and Labor Demand: Evidence from the South Coast Air Basin*, 79 J. PUBLIC ECON. 265 (2001).

¹⁹⁷ Richard D. Morgenstern et al., *Jobs Versus the Environment: An Industry-Level Perspective*, 43 J. ENV. ECON. MGT. 412 (2002). For two of the four industrial sectors, Morgenstern and his colleagues actually found some indication of small *increases* in employment associated with greater spending on regulatory compliance.

¹⁹⁸ Bureau of Labor Statistics, *Layoffs and Discharges Levels and Rates*, <https://www.bls.gov/news.release/jolts.t05.htm>.

actually being eliminated versus jobs instead being shifted from higher regulated areas of the country to lower regulated areas.¹⁹⁹

Without question, regulation can sometimes affect the viability of some companies, just as it can help other businesses, such as those that supply pollution control technology. But in the aggregate, the research on environmental regulation does not support the view of regulation as a massive job-killer. Indeed, “what we know about the relationship between regulation and employment contrasts strikingly with the grandiose claims found in contemporary political debate about either dramatic job-killing or job-creating effects of regulation.”²⁰⁰

Based on the broader body of empirical research on regulation, there exists “little reason to expect that U.S. economic woes can be solved by reforming the regulatory process.”²⁰¹ Our findings in this paper raise the possibility that stock market investors reached a similar conclusion about the economic woes afflicting the coal industry.

C. Scapegoats and Saviors: Implications for Regulatory Law and Policy

Our findings, combined with the results of other studies, also suggest immediate implications for what can be expected from current reforms to environmental regulation. The Trump Administration, for example, has rescinded the CPP and replaced it with a new regulatory regime that delegates much regulatory authority to states to set emissions standards.²⁰² It has also proposed additional deregulatory efforts, such as scaling back environmental permitting requirements to make it easier to allow the construction of new coal-fired power plants.²⁰³ Yet, these deregulatory efforts do not appear to have boosted market expectations about coal companies’ profitability.²⁰⁴ At least eight coal companies have declared bankruptcy since the start of the Trump Administration and more than fifty coal plants have shut down.²⁰⁵ According to one estimate, “[t]wice as much coal-fired electrical generation shut down in

¹⁹⁹ Michael Greenstone, *The Impacts of Environmental Regulations on Industrial Activity: Evidence from the 1970 and 1977 Clean Air Act Amendments and the Census of Manufactures*, J. POLIT. ECON. 110 (2002).

²⁰⁰ Coglianesse & Carrigan, *supra* note 161, at 10.

²⁰¹ *Id.*

²⁰² Repeal of the Clean Power Plan; Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guidelines Implementing Regulations, 84 Fed. Reg. 32,520 (July 8, 2019) (to be codified at 40 C.F.R. pt. 60).

²⁰³ See Benjamin Storrow, *This Section Buried in EPA’s Rule May Be the Most Important*, GOVERNORS’ WIND & SOLAR ENERGY COALITION (2018), <http://governorswindenergycoalition.org/this-section-buried-in-epas-rule-may-be-the-most-important/>.

²⁰⁴ Stephen Lee, *Coal Stock Prices Barely Budge After Trump’s Coal-Boosting Plans*, BLOOMBERG ENV’T (Dec. 6, 2018), <https://news.bloombergenvironment.com/environment-and-energy/coal-stock-prices-barely-budge-after-trumps-coal-boosting-plan>.

²⁰⁵ See, e.g., Irina Ivanova, *For The First Time, The U.S. Got More Electricity From Renewables Than Coal*, CBS NEWS (June 27, 2019), <https://www.cbsnews.com/news/renewable-energy-electricity-surpasses-coal-in-us-for-the-first-time/> (on plant closings); Ben Genman, *Coal Bankruptcies Are Piling Up*, AXIOS (July 19, 2019), <https://www.axios.com/coal-bankruptcies-are-piling-up-453158be-2f06-4f33-aa30-d1f8ecc842ec.html> (on bankruptcies); Jeremy Hill, *Blackhawk Files Chapter 11, Joins List of Bankrupt Coal Miners*, BLOOMBERG (July 19, 2019), <https://www.bloomberg.com/news/articles/2019-07-19/blackhawk-files-chapter-11-joins-list-of-bankrupt-coal-miners> (same). See generally Jonathan Chait, *Trump Has Lost His War on the War on Coal*, N.Y. MAG. (Feb. 18, 2019), <http://nymag.com/intelligencer/2019/02/trump-tva-climate-change-coal.html>.

Trump’s first two years than Barack Obama’s first four.”²⁰⁶ If coal is to be rescued by the Trump administration—if it even can be—then it seems that doing so will require more than regulatory rollbacks. This realization may help explain why the Trump Administration has taken additional, even if less visible, steps to propose subsidies to the coal industry.²⁰⁷ Regulatory reform by itself appears insufficient to resuscitate an industry dying from economic competition.

A broader implication follows from our work. In any area of law and regulation, there is value in treating with some skepticism the rhetorical claims that business leaders and their political boosters make.²⁰⁸ If financial markets do not appear to exhibit signs consistent with a regulatory war on a particular industry, then policymakers should have little reason to take that industry’s claims seriously when making regulatory decisions. Government agencies should instead make regulatory policy decisions on the basis of careful regulatory impact analyses grounded in reliable evidence—an important but sometimes still debated principle for effective regulatory decision-making.²⁰⁹ Courts should similarly be especially attentive when reviewing deregulatory actions under the arbitrary and capricious standard, ensuring that agencies have not overstated the positive economic effects to industry expected to follow from specific regulatory changes.²¹⁰

Regulators, courts, and the public have particular reason to view skeptically any claims of the mortal effects from regulation that business leaders make when their firms struggle in the face of new competition or other unfavorable economic conditions. When businesses start to fail, the members of these firms’ management teams have ample incentive to shift the blame from themselves to someone or something else. That scapegoat needs to be something other than the failing firms’ business competitors too. After all, admitting that competitors beat out a business (or even an entire industry) is just another way of admitting that the managers of the losing firm (or industry) failed to succeed in the market game. When searching for someone or something else to blame, business leaders and politicians find

²⁰⁶ Erik Sherman, *Coal Power Plant Shutdowns Surge Under Trump*, FORTUNE MAG. (Jan. 14, 2019), <https://fortune.com/2019/01/14/coal-power-plants-trump/>.

²⁰⁷ Less visible efforts include those that fit into a more general pattern of concealing distributional policymaking in tax expenditures and subsidies—a phenomenon that Suzanne Mettler calls the “submerged state.” SUZANNE METTLER, *THE SUBMERGED STATE: HOW INVISIBLE GOVERNMENT POLICIES UNDERMINE AMERICAN DEMOCRACY* (2011).

²⁰⁸ Cary Coglianese et al., *Seeking Truth for Power: Informational Strategy and Regulatory Policymaking*, 89 MINN. L. REV. 277, 288 (2004) (although firms are often in a position to have better information than government agencies, “[r]egulators should certainly not rely on all, or perhaps even most, of the information volunteered by industry).

²⁰⁹ The terms of debate over regulatory analysis have been largely set for decades, particularly with regard to the question of requiring that agencies conduct benefit-cost analysis of their most economically significant rules. *See, e.g.*, FRANK ACKERMAN & LISA HEINZERLING, *PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING* (2005) (objecting to the monetization of certain benefits, such as the saving of human life); CASS R. SUNSTEIN, *COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION* (2003) (arguing that benefit-cost analysis is an important component of sound policy decision-making); RICHARD L. REVESZ & MICHAEL A. LIVERMORE, *RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH* (2011) (defending benefit-cost analysis as a means to avoid undue emphasis on compliance costs and insufficient attention to regulatory benefits); Alan B. Morrison, *OMB Interference with Agency Rulemaking: The Wrong Way to Write a Regulation*, 99 HARV. L. REV. 1059 (1986) (raising institutional concerns about White House oversight of agency rulemaking).

²¹⁰ On the arbitrary and capricious standard, see 5 U.S.C. §706(2)(A) and *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983). Courts should, of course, also ensure that regulators have taken into account any loss of benefits that might follow the relaxation or modification of regulations.

government regulation an easy target.²¹¹ Regulators are a bit like the referees in a sports game—and anyone with passing familiarity with sports knows that a losing team and its fans can readily blame the referee for their loss.²¹² Of course, a regulatory agency is more than just a referee, but the policies adopted by an entity such as EPA are outside the control of the management team, which means that blaming industry failure on regulation imputes no responsibility to managers themselves. It cuts off the argument that the firm simply did not compete well enough in the market. It avoids the need to acknowledge that other firms or another industry—say, the natural gas industry, with its falling prices due to technological innovations—had simply done a better job of competing in the marketplace. Regulation can be easily framed as an invading force that distorts competition and tilts the playing field.

Regulated businesses' incentives go still further beyond engaging in cheap talk and scapegoating. They have another strategic reason to employ anti-regulatory rhetoric, even when it is overstated: it can help advance other, larger policy goals. Even if coal executives, industry association lobbyists, and politicians knew that CSAPR, MATS, and the CPP (or any of their repeals) would be unlikely to change the underlying business fundamentals facing the coal industry, blaming regulations for killing the coal industry nevertheless moves to the forefront of political discourse the need for government relief. Blaming utility-plant regulation potentially puts on more favorable terrain political demands about *other* policies—including subsidies, tax benefits, and federal leases.²¹³ Normally, it might be difficult to

²¹¹ Psychologists and sociologists have long recognized the tendency of humans to scapegoat others—that is, to place blame for a tragic or failed circumstance on those who bear no responsibility that circumstance. This tendency is thought to be most pronounced under times of stress—as surely is any period of economic dislocation or the collapse of a major industry's competitive position. ÉMILE DURKHEIM, *THE ELEMENTARY FORMS OF THE RELIGIOUS LIFE* 404 (1995). Furthermore, the targets of scapegoating tend to be those who are disfavored, lower status, or powerless. Seldom popular, and serving in a position of constant oversight by and dependence on other political actors, regulators can make an easy and soft target for scapegoating whenever a firm or industry fails or an economic crisis occurs. Christopher Carrigan & Cary Coglianese, *Oversight in Hindsight: Assessing the U.S. Regulatory System in the Wake of Calamity*, in *REGULATORY BREAKDOWN: THE CRISIS OF CONFIDENCE IN U.S. REGULATION* 3, 6-9 (Cary Coglianese, ed., 2012). Furthermore, the target of scapegoating need not even be other people, but “can also apply to non-human entities.” NEEL BURTON, *HIDE AND SEEK: THE PSYCHOLOGY OF SELF-DECEPTION* (2019). Thus, *regulation*, probably even more than *regulators*, becomes an even easier target for scapegoating, as it is a thing—even an abstraction—that is entirely incapable of defending itself. Moreover, the word's connotation is hardly revered by most people. Cary Coglianese, *Building a Better World: A Framework for Making Regulation Work*, in *MAKING REGULATION WORK* (Cary Coglianese, forthcoming). The negative connotations surrounding the word “regulation,” which no doubt exhibit a certain ideological valence, have led some commentators to recommend that progressives abandon the use of the term in favor of a word such as “protection.” GEORGE LAKOFF, *MORAL POLITICS: HOW LIBERALS AND CONSERVATIVES THINK* 210 (3d. ed. 2016); George Lakoff, *The Public's Viewpoint: Regulations are Protections* (Jan. 28, 2017), <https://georgelakoff.com/2017/01/28/the-publics-viewpoint-regulations-are-protections/>.

²¹² As one sports commentator has noted, “[t]here's a major psychological reason fans and competitors blame referees for a loss....[B]y blaming the officials you can deny your team actually deserved the loss. In other words, it is more acceptable to ignore the loss if it can be blamed on the referees, rather than your team's play.” Kevin Burke, *Leave the Refs Alone, It's Not Their Fault Your Team Lost*, *SPORTING NEWS* (Dec. 10, 2015), <https://www.sportingnews.com/us/nfl/news/nfl-referees-blown-calls-controversy-fans-college-football/vz9x9ja888os1m4lmtpo1gtis>. See also *id.* (noting also that “it is not uncommon when they lose for athletes and coaches to blame referees”).

²¹³ To put this broader incentive in terms of a concept getting a great deal of attention in contemporary politics, the rhetoric of a “war on coal” may have expanded the “Overton Window” to the coal industry's benefit—that is, expanded the range of acceptable public discussion, normalizing policies that might otherwise be deemed out of the realm of the possible. Given at least the surface-level antipathy to subsidies in the stereotypical conservative canon—as exemplified by the political Right's vitriol of the subsidies awarded under the Obama Administration

convince a president or an administration to take up the cause of bailing out particular industrial plants. Yet by investing in a narrative that government policy has decimated its viability, and then succeeding in making that narrative central on the macro-political stage, the coal industry and its political boosters may have made it more likely that politicians would support subsidies and tax benefits that might more effectively prop up dying firms, at least for a time. Donald Trump accepted the “war on coal” narrative and used it as a central part of his successful presidential campaign, so it comes as little surprise that his Administration has given serious consideration to granting subsidies to the coal industry—a controversial but consequential prospect for any industry that is failing to compete in the marketplace. It is also not surprising that other elected officials propagating the regulatory “war on coal” narrative have also sought to build support for direct subsidies and tax benefits. The latter are an easier sell politically when they aim to help an industry that has “just gone through the God-awfullest war on coal for the last eight years prior to President Trump.”²¹⁴

Political leaders have their own independent incentives to push a regulatory “war” narrative. When they define problems afflicting an industry as ones created by excessive regulation, they can more easily make themselves look like saviors—standing up for workers by fighting against the scapegoat of burdensome regulation. Although Presidents do reap credit when the overall economy is going well, and they incur the public’s blame when it is not, in reality there is only so much any Administration can do to affect the overall economy or to salvage an industry getting beat out by larger competitive forces. Fundamental changes in the economy or to a major industry are usually brought about by technological innovation, global events, and other macroeconomic forces outside the day-to-day control of White House or even Congress. Regulation is an advantageous target to would-be political saviors because a regulatory fight is actually one that politicians can wage.²¹⁵ The Trump Administration certainly cannot reverse the technological developments that brought about the shale revolution and the plummeting cost of natural gas. Changing regulatory law is feasible, while changing the economic law of supply and demand is not. Furthermore, an Administration can make a big public display of making regulatory changes in a way that is simply not as politically acceptable to do when it comes to doling out subsidies to industry or giving away targeted tax credits to corporations. Practically speaking, then, regulatory change is the best way, if not at times the only realistic way, for political candidates and elected officials to trumpet themselves as the saviors of a dying industry. Even if the payoff in terms of real economic benefits to a dying industry might be limited or nonexistent, regulatory reform still can deliver symbolic outcomes that are helpful to politicians.

None of this is to suggest that every business leader or politician who has perpetuated the “war on coal” narrative has acted insincerely or deliberately to promote their own self-interests. The strategic, self-interested reasons for blaming regulation may at times simply reinforce, at least for some leaders, an ingrained psychological self-defense mechanism that accentuates biases against regulation.²¹⁶ Belief

to Solyndra and other renewable energy firms—the “war on coal” rhetoric may have helped prepare the ground for subsidy proposals for the coal industry after 2017. After all, it is easier to convince others that “anything goes” when a war is raging.

²¹⁴ Office of the Governor, *Gov. Justice, Energy Leaders Denounce Bloomberg’s Attack on Working West Virginians*, <https://governor.wv.gov/News/press-releases/2019/Pages/Gov.-Justice,-energy-industry-leaders-denounce-Bloomberg%E2%80%99s-attack-on-working-West-Virginians.aspx>.

²¹⁵ Carrigan & Coglianese, *supra* note 211, at 7 (discussing how politicians who want to “do something” often turn to making legal changes even when they are merely symbolic gestures).

²¹⁶ Social science research indicates that at least some forms of racial scapegoating tend to increase almost automatically when economic conditions falter. Emily C. Bianchi, Erika V. Hall & Sarah Lee, *Reexamining the Link Between Economic Downturns and Racial Antipathy: Evidence That Prejudice Against Blacks Rises During Recessions*, 29

in the “war on coal” is convenient—and perhaps even accepted unconsciously. Especially for someone already predisposed to a political ideology that opposes regulation, a decline in coal production coterminous with policy initiatives by the Obama Administration may have activated a confirmation bias that only reinforced the “war on coal” narrative.²¹⁷ But acknowledging that the psychological possibility of implicit tendencies to accept a “regulatory war” narrative does not diminish the need for policy decisionmakers to exercise caution. Regulatory officials and courts should be especially on guard to the possibility of deregulatory overreaction when any major industry’s fortunes are in decline.²¹⁸

One final point bears mentioning. Just as anti-regulatory rhetoric should not be taken at face value, the assumption that regulation of any kind will always achieve its ultimate aims seems also deserving of suspicion. We note that President Obama, seeking to underscore his Administration’s commitment to combatting climate change, appears to have been willing at times to accept the “war on coal” narrative, perhaps no less than coal industry executives.²¹⁹ Yet even if some in the Obama Administration desired to drive the coal industry out of existence, the Administration’s signature climate initiatives appear unlikely to have added little to no further momentum to the decline of the coal industry—at least, that would be another plausible inference from our failure to see clear evidence in investors’ behavior consistent with a “war on coal.” For those who are concerned about climate change, this might imply that the Obama Administration’s regulatory efforts were too timid. Some scholars have indeed suggested that the Clean Power Plan, even as it offered great symbolic purchase to the public,

PSYCH. SCI. 1584 (2018). We know of no research that similarly investigates in any systematic way the relationship between economic conditions and attitudes about regulation. However, survey research does show that support for free trade policy declines when individuals in import-related industries are laid off from work. Edward D. Mansfield, Diana C. Mutz, & Devon Brackbill, *Effects of the Great Recession on American Attitudes Toward Trade*, 49 BRIT. J. POL. SCI. 37 (2016).

²¹⁷ On confirmation bias generally, see DANIEL KAHNEMAN, THINKING, FAST AND SLOW 81 (2013). We accept that anyone—including stock market investors—can be susceptible to confirmation bias or other cognitive limitations. See, e.g., ROBERT J. SHILLER, IRRATIONAL EXUBERANCE (2000); RICHARD H. THALER, MISBEHAVING: THE MAKING OF BEHAVIORAL ECONOMICS 205-253 (2015). Yet market analysts and investors do not have the kind of incentives that industry leaders and politicians have to accept overstated claims about regulatory “wars.” Quite the contrary, investors with money on the line have incentives to investigate and understand how regulatory and other events will actually affect the financial performance of publicly traded firms. See *supra* note 71 and accompanying text. In this regard, it seems at least somewhat ironic that both the EPA and the electric utility industry now seem to agree that the Clean Power Plan would have resulted in very little if any meaningful economic effects, given the underlying market fundamentals that are leading utilities to shift to natural gas. EPA, Regulatory Impact Analysis for the Repeal of the Clean Power Plan, and the Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units 2-4--2-7, 2-12--2-13 (June 2019); Letter from Quinlan J. Shea, III, Vice President, Environment & Natural Resources, Edison Electric Institute, to Andrew Wheeler, EPA Administrator 4 (Oct. 31, 2018), <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2017-0355-24034&attachmentNumber=1&contentType=pdf>.

²¹⁸ Carrigan & Coglianese, *supra* note 211, at 14 (“We should be skeptical not for skepticism’s sake but because acting on stock reactions could lead to other kinds of failures in the future.”). Recent scholarship has suggested that, under highly limited circumstances, regulators ought to take into account broad macroeconomic considerations, such as when the economy as a whole is in a deep recession and interest rates have already been lowered virtually to zero. YAIR LISTOKIN, LAW AND MACROECONOMICS: LEGAL REMEDIES TO RECESSIONS (2019); Jonathan S. Masur & Eric A. Posner, *Should Regulation Be Countercyclical?*, 34 YALE J. ON REG. (2017). Whatever the merits of these arguments, they apply only in response to economy-wide conditions, not to the continued viability of a particular industry.

²¹⁹ See *supra* note 134 and accompanying text.

was in some ways a limited measure with critical design weaknesses.²²⁰ Our findings suggest that, whether a policymaker is concerned with regulatory costs or with benefits, it is always important to scrutinize claims about regulation and its effects. Regulatory policies, after all, can amount to symbolic gestures just as de-regulatory ones can.

CONCLUSION

For much of the last decade, the coal industry's decline has stood at the center of a national debate over government regulation in the United States. Some of the loudest voices in that debate have claimed that major rules the Obama Administration imposed on coal-powered electricity plants worked to the severe detriment of the coal industry. These regulations have even been said to have brought about a large decline in coal production during the last ten years. Yet notwithstanding industry leaders' and politicians' strong charges of a regulatory "war on coal," we find no meaningful support from our analysis for placing responsibility for coal's decline on environmental regulation.²²¹

Our research, the first to address how financial analysts and market participants assessed news of environmental regulation on the coal industry's fortunes, may seem to yield puzzling results in light of the "war on coal" rhetoric. After all, if the EPA's Clean Power Plan was the signature battle in the "war on coal," then surely the market would have responded positively to the U.S. Supreme Court's unprecedented stay of that rule. Yet, if anything, coal investors' reaction to the Court's decision was negative. Across a range of key regulatory events, the stock market appears to have failed time and again to respond in ways that would have confirmed industry leaders' and their political allies' confident "war on coal" story.

It would even seem as if investors simply did not worry much about the regulatory "war on coal" narrative. Their main worry presumably centered on the bigger battle the coal industry faced with its competitors in the natural gas sector. As such, investors may have figured out that natural gas already had sealed the industry's doom long before the "war on coal" regulations could have any appreciable economic effects. Of course, investors did seem to worry about, and respond to the news of, other events having potentially more immediate implications for the short-term profitability of coal firms, such as bankruptcies in the industry.²²² But altogether, the lack of meaningful response of stock prices to major regulatory events is consistent with a view, supported by other evidence as well, that environmental regulations had little to do with the decline of coal production over the last decade.

The findings reported here are actually also not surprising in light of a considerable body of research showing how little environmental regulations more generally seem to matter in shaping the international competitiveness of U.S. industry or affecting overall employment.²²³ Caution seems warranted whenever business leaders and politicians make regulation the scapegoat for economic woes and promise to save entire industries by rolling back regulations. After all, scapegoats and saviors operate in the world of political symbols. Symbolic appeals can serve the self-interest of business leaders

²²⁰ See, e.g., Hari M. Osofsky & Hannah J. Wiseman, *Regional Energy Governance and U.S. Carbon Emissions*, 43 *ECO. L. Q.* 143 (2016) (noting that, although the CPP was the most ambitious regulatory effort to regulate carbon emissions to date, its state-based model also mapped awkwardly onto the regional energy governance structures that were best positioned to ensure that climate regulation would work).

²²¹ See *supra* Part III.

²²² See *supra* Part IV.

²²³ See *supra* Part V.B.

and politicians, especially when a major industry finds itself in decline, but they will not help much when making actual public policy decisions. Government officials need to see regulatory scapegoating for what it is and seek to analyze all regulatory impacts with care, taking into account both the potential costs of regulatory decisions as well as their potential benefits.²²⁴

²²⁴ See, e.g., *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (stating that agencies must not overlook “an important aspect of the problem” they seek to solve through a regulatory action); *State of California v. U.S. Bureau of Land Management*, 277 F. Supp.3d 1106, 1122 (2017) (concluding that “[w]ithout considering both the costs and the benefits [an agency] failed to take [an] ‘important aspect’ of the problem into account and was therefore arbitrary” and that “[m]erely to look at only one side of the scales, whether solely the costs or solely the benefits, flunks this basic requirement”). See generally Cary Coglianese & Gary E. Marchant, *Shifting Sands: The Limits of Science in Setting Risk Standards*, 152 U. PA. L. REV. 1255 (2012); Cary Coglianese, *Thinking Ahead, Looking Back: Assessing the Value of Regulatory Impact Analysis and Procedures for its Use*, 3 KOR. LEG. RES. INST. J. L. & LEG. 5 (2013).