

# **“Organizational Form and Firm Performance: Evidence from the 'Death Sentence' Clause of the Public Utility Act of 1935”**

Francisco Pérez-González\*

Instituto Tecnológico Autónomo de México (ITAM)

September 2015

**Abstract.** This paper investigates the importance of organizational form for firm performance. I exploit variation in organizational form resulting from the implementation of the Public Utility Holding Company Act (PUHCA) of 1935. PUHCA, through its so-called “death sentence” clause, forced geographically fragmented holding companies (HCs) to divest affiliated firms. The main findings are five. First, PUHCA led to a drastic simplification of corporate ownership: over 40% of the sample firms became standalone. Second, former subsidiaries of regionally fragmented HCs were three times more likely to become independent than other firms affiliated to geographically integrated HCs. Third, using measures of HC regional fragmentation as instrumental variables for standalone status, I show that standalone firms are more productive than subsidiaries of HCs. Fourth, I find evidence that HCs that legally challenged PUHCA were likely to extract rents from consumers. Lastly, I show evidence that HC are superior at using financing strategies to minimize taxes. Overall, the evidence stresses the inefficiencies of entrenched holding companies and challenges the notion that PUHCA led to the “death” of the industry as anticipated by its critics.

JEL classification: G30, G34, G38, K20, K23, L20, L50, L94

Keywords: organizational form and productivity, ownership, holding companies, standalone firms, diversification, diversification discount, entrenchment, regulation, and capital structure

---

\* Email: [fpg@itam.mx](mailto:fpg@itam.mx). I thank Shai Berstein, Carola Frydman, Dirk Jenter, Amit Seru, Kelly Shue, Jeff Zwiebel, and seminar participants at the AEA meetings, Bocconi, Dartmouth, Duke, Harvard, HKUST, HKU, ITAM, NBER Corporate Finance, NTU, NUS, Stanford, and USI-Lugano for comments and Felipe Aldunate for excellent research assistance. All errors are my own.

*“The Holding Company Act was a severe law. It was the most stringent, corrective legislation that ever was enacted against an American industry.”*<sup>1</sup>

A central question in financial and organizational economics is whether and to what extent organizational structures affect the allocation and distribution of resources (Coase, 1937; Williamson, 1975, 1979, 1985; Klein, Crawford, and Alchain, 1978; Grossman and Hart, 1986; Hart and Moore, 1990; Rajan and Zingales, 1998, among others). While there is a large and established literature analyzing the potential channels through which organizational form can matter for economic efficiency and financial results, to this date we know surprisingly little about the empirical consequences of alternative organizational structures on the relative efficiency of firms. The empirical challenge is providing a clear counterfactual for the effect of organizational structures on firm performance

In this paper, I examine the impact of holding company structures on firm performance. Multidivisional or pyramidal holding companies possess several potential advantages relative to standalone firms. For example, they can lever financial, managerial, or other resources over a larger scale of assets. Such advantages are potentially valuable in the developmental stages of industries or countries, as internal firm transactions can potentially overcome frictions (Williamson, 1975; Stein, 1997; Khanna and Palepu, 2000, and others). Concentrating the power of independent firms in holding companies can, alternatively, reduce competition and exacerbate agency conflicts and informational frictions, leading to inefficiencies or expropriation at the expense of consumers or minority investors (Scharfstein and Stein, 2000; Morck, et al. 2005).

In contrast to the prevalent view that corporate ownership in the United States is mostly dominated by widely held standalone firms since early in the last century (Berle and Means, 1932), in the 1930s, a large fraction of electric and gas operating firms were dominated by holding companies (HCs), akin to those that are common in Western Europe and East Asian economies (LaPorta, et al. 1999, Claessens, et al. 2000, Khanna and Yafeh, 2007, among others). For example, Bonbright and Means (1932) estimate that in 1931, the 40 largest HCs controlled 89% of the power output in the country. Similarly, an investigation by the House of Representatives (1935) documented that multi-layered and complex corporate ownership structures were common.

---

<sup>1</sup> Troxel (1947).

In this paper, I exploit the variation in organizational form that resulted from one of the most drastic and controversial regulations in U.S. history: the Public Utility Holding Company Act (PUHCA) of 1935. PUHCA was enacted in response to alleged abuses uncovered by a detailed investigation by the U.S. Federal Trade Commission (1935), and the severe financial losses suffered by minority investors in the aftermath of the Great Depression. PUHCA's most controversial feature was the requirement that HCs limit their operations to a single geographically interconnected system. This latter provision was so far-reaching and controversial that holding company executives referred to it as the "death sentence" to the industry.<sup>2</sup> The death sentence provision was legally challenged in court but its constitutionality was ultimately upheld by the Supreme Court in 1946 (SEC, 1947). By 1952, the Securities and Exchange Commission (SEC), which was entrusted with the enforcement of the Act, reported the near-universal compliance with the death sentence provision (SEC, 1945).<sup>3</sup>

Overall, PUHCA's implementation provides an attractive laboratory in which to assess the effect of organizational form on efficiency *and* financial results, for at least three reasons.

First, it provides substantial time-series variation in the organizational choices of firms. Insider's legal challenge to PUHCA suggests that such variation was not voluntary. Forced organizational choices help in overcoming the concern that firm decisions were primarily responding to endogenous market forces.

Second, the death sentence clause (DSC) forced HCs to only retain one geographically integrated system and to dispose of non-integrated operating firms. Hence, HCs that were geographically fragmented, with operating firms across different regions, were more likely to be forced to divest affiliates, relative to geographically integrated HCs. The fact that some HCs were differentially forced to change their organizational structures *irrespective* of their investment opportunities provides me with a natural control group that helps in estimating the impact of organizational form on firm outcomes.

Third, detailed production and financial data at the operating business level is available from the U.S. Federal Power Commission. Such data allows me to evaluate the impact of organizational form on operating efficiency in terms of quantities not only financial results.

---

<sup>2</sup> See, for example, the 1934 annual report of Associated Gas and Electric Corporation (pp. 3) or the *Wall Street Journal*, February 14<sup>th</sup>, 1935.

<sup>3</sup> The SEC administered PUHCA even if the Act was not directly related to the Securities Act of 1933 or the Securities Exchange Act of 1934.

To study the effect of organizational form on firm performance, I assembled a hand-collected dataset using financial and production information filed before the Federal Power Commission by 291 operating firms in the industry; the dataset covers 2,754 firm-years from 1937 to 1960. To capture the effect of PUHCA on organizational structures, I complement these data with ownership information from 1935 and 1955, to capture both the ownership structure that was prevalent at the time that PUHCA was first discussed in Congress and the ownership patterns that resulted after PUHCA's enforcement was completed.

Using these data, I report five main results.

First, PUHCA led to a drastic simplification of corporate ownership. While in 1935 86% of operating electric utility firms were part of a holding company, by 1955, over 40% of those firms became standalone entities. As a result, standalone firms became the majority of the operating firms in the industry. In short, the data confirms the relevance of PUHCA in streamlining the U.S. corporate ownership landscape.

Second, I show that variables that capture the regional fragmentation of holding companies are powerful predictors of standalone status after the death sentence clause is implemented. To test for PUHCA's regional integration effects, I rely on three variables: (1) the fraction of firms in the HC that are over 500 miles away from the ultimate parent, a measure of the HC regional fragmentation, (2) the distance in miles to the ultimate or apex parent of a holding company, and (3) the distance in miles to the direct parent firm. Irrespective of the measure used, I show that regional fragmentation is an economically and statistically important determinant of organizational change. For example, I show that firms that in 1935 belonged to a HC where 75% of the affiliates were distant from their parent-firm were three times more likely to become standalone firms than others in HCs where only 25% of the entities were geographically distant. The R-squared of a model that relies on regional fragmentation to explain the changes in organizational form is over 0.2. In other words, the analysis confirms that regional variation was a first order determinant of organizational change in this setting.

Third, using measures of regional fragmentation as instrumental variables (IV), I show that after PUHCA's implementation standalone firms are more productive and profitable, and grow faster than firms affiliated with HCs. Consistent with the sharpened incentives of standalone firms, independent firms have higher total factor productivity and lower energy losses than other firms. Interestingly, standalone firms are not associated with higher prices. Mapping

real efficiency gains into financial results, I find that enhanced efficiency translates into lower production costs. There is no evidence that standalone firms increase overhead expenses or reduce leverage, which is inconsistent with significant synergy gains associated to HC status.

Fourth, focusing on the affiliates of holding companies that legally challenged PUHCA, I show that standalone firms increase efficiency *and* drastically reduce prices to consumers. Such result is interesting because HCs' challenge to PUHCA can be motivated by at least two forces: the desire to defend economic efficiency and/or the desire to preserve abnormal rents. The results provide empirical support to the idea that entrenched HCs can use related transactions to extract rents from consumers.

Fifth, consistent with superior HC tax arbitrage capabilities, standalone firms are less aggressive at capturing the tax benefits of debt relative to firms that are affiliated with integrated HCs. In particular, I find that firms operating in states with corporate income taxes decrease their leverage ratios and increase their cash holdings as they become independent. Hence, standalone firms face higher effective tax rates than operating firms of integrated holding companies.

Taken together, the evidence shows that standalone firms enhance economic efficiency. Firms that become standalone consistently improve their operational and financial results. In contrast, the affiliates of holding groups have a relative advantage at using financial strategies to minimize tax obligations. More generally, the results stress some of the potential channels through which large holding groups can use to affect the allocation of resources.

This paper complements the existing literature in at least three dimensions:

First, by focusing on organizational variation that is "rule-based," I can uncover the arguably exogenous effect of standalone status on firm operating and financial results. While there is a large literature in financial economics assessing the impact of organizational form, ownership, and diversification on performance, the bulk of the existing studies rely on endogenous firm characteristics, not arguably exogenous organizational structures.

Second, by constructing a unique dataset that contains actual production information, pricing, and financial results, I can directly assess the impact of organizational form on variables that are both economically relevant and inherently difficult to analyze using standard financial statement information. For example, I can separately investigate the consequences of standalone firm structure on quantity-based output variables, as well as on pricing to consumers.

Third, by focusing on a large-scale government intervention this paper provides a rich analysis of the many issues that must be considered in such programs. Given the prevalence of business groups around the world, the consequences of those groups for the aggregate allocation of resources is important. Similarly, recent policy interventions in the financial industry have been fiercely opposed by industry leaders. This paper indicates that forceful arguments for maintaining the status quo, such as referring to policy initiatives as “death sentence” provisions, may primarily reflect the private benefits, and not the social consequences, of such reforms.

The rest of the paper is organized as follows. Section I describes the industry and the genesis and the enforcement of PUHCA. Sections II and III introduce the empirical strategy and describe the data, respectively. Section IV presents the results. Section V concludes.

## ***I. The Electric Utility Industry and the Public Utility Act of 1935***

### ***I. A. Genesis of the Industry, Consolidation, and Abuses by Holding Companies***

At the close of the 19<sup>th</sup>, the electric industry was a rapidly growing industry. From 1882, when Edison built the first electric central lighting station in New York, to 1930, when 70% of the U.S. population lived in electrically lighted homes, the industry underwent rapid innovation, extensive growth, and eventual consolidation.<sup>4</sup>

While early on the industry was local in nature, with one firm serving an individual franchise-granting municipality, several factors played a role in encouraging industry consolidation. First, the industry required specialized financial, engineering, and construction resources (Bonbright and Means, 1932). Existing firms that possessed such scarce resources were in an ideal position to exploit new markets or to absorb inefficient firms. Second, the growth in energy applications (industrial, transportation, etc.) made expansion of existing firms attractive. Third, multistate HCs facilitated regulatory arbitrage. For example, cost recovery regulation and transfer pricing allowed multi-location HCs to achieve higher rates of return than other firms whenever the actual cost of a project was not transparent to regulators. Lastly, the fact that local governments had differential contractual agreements with each operating firm made mergers relatively costly compared to common ownership under a holding group structure (Bonbright and Means, 1932).

---

<sup>4</sup> See Hyman (1983) for a detailed account of the early evolution of the industry. See also Appendix A1. This section relies heavily on Hyman (1983), and on the final report of the U.S. Federal Trade Commission (1935).

In the 1920s, the speed of consolidation in the industry accelerated. The number of generating companies fell by 63%, from roughly 4,300 to around 1,600 companies.<sup>5</sup> Most of the integration activity involved relatively small firms integrating into large holding companies. By 1931, it was estimated that the 40 largest holding companies controlled 89% of the power output in the country (Bonbright and Means, 1932). Of the 57 holding companies operating in 1935, 41 were chartered between 1922 and 1932 (Anderson, 1947). Massive consolidation was triggered by at least two factors. First, further technological change made efficient systems larger and more interconnected. For example, high-voltage technology facilitated the transmission of electricity to nearby communities. Second, financial innovation during the 1920s accelerated integration efforts. The boom in financial markets allowed HCs to rely on external resources, especially debt financing, to fuel acquisitions at an unprecedented speed.

By 1928, concerns about massive integration by holding companies became common. Additionally, alleged abuses by HCs triggered a U.S. Federal Trade Commission (FTC) investigation. Some of these concerns included: the risks for consumers and minority investors, as well as the inability of state-level commissions to regulate firms operating across state lines (FTC, 1935). HCs arguably exposed consumers to higher electricity rates resulting from transfer pricing, and other related transactions. For minority investors, HCs implied further separation of ownership and control that made tunneling increasingly profitable (Johnson, *et al.* 2000; Bertrand, Mehta, and Mullainathan, 2002). Lastly, the concentration of assets among relatively few investors raised concerns about the prospects of the U.S. economy (Roosevelt, 1942).

The Great Depression and the reduction in economic activity that followed made the case for government regulation potentially more appealing. Contraction in consumer demand hurt firm profitability, and, in consequence, several highly levered firms and HCs defaulted. As those firms defaulted, both bondholders and minority investors suffered substantial losses.

The election of Franklin D. Roosevelt (FDR) in 1933 set in motion the political drive towards regulation. During his political campaign, FDR argued that the overall concentration of assets in the hands of relatively few individuals or holding companies, were primary determinants of the economic problems facing the U.S. After the completion of the FTC investigation, which documented a large number of abuses, the Public Utility Holding Company Act was presented to Congress in 1935.

---

<sup>5</sup> McDonald (1957).

### ***I. B. PUHCA: Main Features and Enforcement Challenges***

The main objectives of PUHCA were to regulate the operations of companies involved in interstate commerce and to simplify the ownership landscape in the industry.<sup>6</sup> To achieve its objectives, PUHCA introduced several provisions: HCs had to register; issuance of securities had to be cleared with the SEC prior to being offered to investors; acquisition of securities was limited and was also subject to SEC approval; companies were required to file annual reports; the political activity of HCs was limited, among other provisions.

From the moment PUHCA was first presented to Congress, however, the most controversial provision of the Act was the so-called death sentence clause or Section 11 of PUHCA. Section 11 required HCs to limit their operations to a single, geographically integrated system, and to simplify their ownership structures. Section 11 was so controversial that it was dropped from the House version of the Act under industry pressure. It was only signed into law after a scandal, in which it was uncovered that HCs were using funds subject to rate recovery regulation to launch an aggressive lobbying campaign against the Act. Upon enactment, the SEC was instructed to enforce the Act as soon as “practicable after January 1, 1938.” (SEC, 1945).

The utility industry resisted *even* PUHCA’s registration provisions, which they took to the courts. In 1938, the Supreme Court upheld the constitutionality of the registration provision and thereafter, HCs registered with the SEC.

Subsequent to registration, the SEC invited HCs to voluntarily file their proposed compliance plans with the death sentence provision. Yet, the initial proposals sought to “justify the retention of existing scattered holdings” (SEC, 1945), which violated the integration provision of the Act. Given the limited progress with the voluntary approach to enforcement, in 1940, the SEC initiated formal affirmative proceedings against the largest systems. Those later proceedings led to controversial decisions, such as the order to the North American Company — a large HC—to divest itself and all properties other than those in one integrated location. North American resisted the SEC order and took it to the courts. Eventually, the Supreme Court upheld the constitutionality of the death sentence clause in 1946. As previously stressed, the SEC reported near-universal compliance with the Act by the early 1950s (SEC, 1953).

---

<sup>6</sup> This section relies primarily on the SEC's annual reports to Congress, available online at the following address: [http://www.sec.gov/about/annual\\_report](http://www.sec.gov/about/annual_report).

In the typical outcome of Section 11 or the death sentences proceedings, the main holding company ceased to exist. The largest integrated system was retained as one company, commonly with a holding company structure, owning assets in a single geographically integrated region. Regionally fragmented assets were paid to investors as dividends, sold to the public or to other firms. Smaller assets were sold or liquidated.

In sum, while PUHCA was enacted in 1935, the SEC did not start integration-related enforcement actions until the early 1940s. Moreover, HCs were not forced to comply with the Act until after the Supreme Court upheld its constitutionality in 1946. Enforcing PUHCA required a massive transformation of the ownership structure of the industry. Lastly, while PUHCA was eventually enforced, the debate about its consequences for efficiency and electricity rates ensued. Were HCs the scapegoats of a severe economic and financial crisis? Highly-levered firms are fragile to economic shocks, and after the Great Depression, highly-indebted HCs were doomed to be insolvent. Yet high leverage ratios do not imply that the affiliated HC firms were inefficient. In fact, prominent corporate finance models (e.g. Jensen, 1986) highlight the role of debt as a disciplinary force to drive economic efficiency.

I describe the empirical strategy next.

## ***II. Empirical Strategy***

A common approach to examine the effect of organizational form on firms' outcomes is to use cross-sectional specifications that compare firm profitability or productivity as a function of the firms' ownership characteristics.

For example:

$$y_{it} = \alpha + \beta * ORG_{it} + \psi_X X_{it} + \varepsilon_{it} \quad (1)$$

Where  $y_{it}$  is the outcome variable of interest (e.g., productivity) for firm  $i$  at time  $t$ .  $ORG_{it}$  is a firm organizational variable (holding company, conglomerate, pyramid, standalone, etc.). If, for example, standalone firms are a superior organizational form, and  $ORG_{it}$  is a dummy variable equal to one if the firm is standalone, and zero otherwise, we would expect  $\beta$  to be positive and statistically different from zero. If  $ORG_{it}$  was uncorrelated with other determinants of  $y_{it}$ , then  $\beta$  in specification (1) would provide an unbiased estimate of the effect of organizational form on firm outcomes.

In practice, however, testing for the effect of  $ORG_{it}$  is challenging due to the widespread endogeneity concerns. For example, highly performing organizations can become holding groups even when these structures are irrelevant for performance. Whenever HCs are the result of higher performance or other endogenous variable, it is difficult to establish the causal effect of organizations on outcomes using cross-sectional tests. Similarly, if omitted variables drive both higher performance and complex organizational form, the estimated coefficients in (1) can capture the effect of such variables and not the influence of organizations. Hence, a significant  $\beta$  can reflect a combination of several economic forces that are hard to disentangle empirically.

An alternative way to describe this inference challenge is to ask why two identical profit-maximizing firms would differ in terms of their organizational choices. First, if having a standalone organizational structure is, for example, valuable for efficiency, why would other identical firms select another organizational form? Normally, they wouldn't. Hence, there would be no variation in (1). It follows that firms that deviate from the optimal organizational choice would face an offsetting cost (or benefit) that would influence their decisions. To the extent that such offsetting cost is not observable and controlled for in (1), the estimated coefficients would be biased. Second, whenever organizational form is irrelevant for firm outcomes, but  $\beta$  is significant, then (1) is prone to report the effect of omitted variables. In other words, the concerns about the estimates from (1) relate to both its economic relevance and its interpretation.

In this paper, I exploit within-firm time-series variation in organizational choices. PUHCA forced a large number of firms to become standalone, a different organizational form from the one that the firms themselves had endogenously selected (HC affiliates). From the individual firm perspective, PUHCA provides plausibly exogenous time-series variation in ownership. Hence, if organizational structure affects firm outcomes, we would expect such variables to change as the firm adopts a new ownership structure.

Formally:

$$y_{it} = \alpha + \beta * Standalone_{it} + \psi_x X_{it} + v_i + \varepsilon_{it} \quad (2)$$

Where  $y_{it}$  is defined as in (1) and  $Standalone_t$  is a dummy equal to one if the firm becomes standalone. In (2), if organizations are economically important, we expect  $\beta$  to be significant. The sign of  $\beta$ , however, depends on whether *Standalone* status is beneficial for firm

outcomes. For example, a revealed-preference argument would imply that HC status was optimal from the perspective of the insiders of the holding companies. However, whether this preference resulted from actual operating superiority or from the ability of HCs to extract financial or other rents from consumers or minority investors is difficult to know ex-ante. The empirical tests in this paper seek to disentangle the net reduced-form effect of these competing forces.

An additional advantage of using time-series specifications in organizational status is that fixed effects specifications help in ruling out the confounding effect of time-invariant firm characteristics. To the extent that becoming a standalone firm induces changes in, for example, efficiency, time-invariant firm characteristics ( $v_i$ ) cannot explain those effects.

The challenge with (2) above is that while PUHCA introduced plausibly exogenous variation in *Standalone* status, other concurrent events could complicate inference. For example, the Act introduced several new industry regulations. Similarly, PUHCA's enforcement coincided with the post-war economic expansion, among other concurrent forces. To the extent that aggregate characteristics change over time,  $\beta$  in (2) would also be biased.

I seek to overcome these inference challenges by implementing an instrumental variables empirical strategy. I motivate the 2SLS-IV tests on PUHCA's restriction that ensuing HCs needed to be geographically integrated in terms of their productive infrastructure. Explicitly, PUHCA not only induced time-series variation in *Standalone* status, but its design determined from an ex-ante perspective which firms were more likely to become *Standalone*. In particular, regionally fragmented firms were more likely to become independent, while regionally integrated firms were likely to remain affiliated to HCs.

To implement the 2SLS-IV tests, I first run the following first-stage specification:

$$Standalone_{it} = a_{it} + b_i RF_i * PUHCA_{it} + \psi_\chi X_{it} + \epsilon_{it} \quad (3)$$

$Standalone_{it}$  is a dummy equal to one if the firm becomes independent after PUHCA is implemented, zero otherwise.  $RF_i$  is a variable that captures the regional fragmentation of a firm with respect to its parent company, which is measured before PUHCA is implemented and it does not vary over time.  $PUHCA_{it}$  is an indicator variable equal to one for the post-PUHCA period, zero otherwise.  $b_i$  captures the differential effect of PUHCA on regionally fragmented

versus regionally integrated firms. The second stage equation investigates the impact of standalone status on firm efficiency, profitability, and capital structure:

$$y_{it} = \alpha + \gamma * \widehat{Standalone}_{it} + \psi_{\chi} X_{it} + v_i + \varepsilon_{it} \quad (4)$$

where  $y_{it}$  is defined as in (2) and  $\widehat{Standalone}_{it}$  is the predicted value from (3). We are interested in  $\gamma$ , the arguably causal effect of organizational form on firm performance.

To proxy for regional fragmentation ( $RF_i$  in (3)), I use three measures:

(1) The *holding company* regional fragmentation ratio. This variable captures the ratio of firms in a holding group that are geographically distant (500 miles or more) from the ultimate parent firm. The ultimate parent is the corporation at the apex of the holding company. This proxy captures two forces. First, farther-away firms are less likely to be integrated. Second, a regionally fragmented group would tend to be broken into more standalone firms than one that is geographically integrated.

(2) The distance in miles to the *ultimate* parent company in 1935. This variable captures the distance between the main office of a firm and the central location of its ultimate parent firm. Intuitively, the farther away from the parent firm, the less likely that the group firm can be geographically integrated and meet the integration requirements of the death sentence provision.

(3) The distance in miles to the *direct* parent company in 1935. The direct parent company is the one that directly owns shares in the operating firm, even when it may not be an ultimate parent company of the operating firm. The intuition for using (3) is the same as for (2). Yet, (3) may be independently relevant whenever in the aftermath of PUHCA the direct parent company may be inclined to constitute a new separate holding company.

### **III. Data Description**

#### **III. A. Organizational Structures: Examples**

Figures 1 to 3 motivate the importance of complex organizational structures in the United States prior to 1935, and regional fragmentation for the application of PUHCA.

Figures 1 and 2 present the organizational charts of two large HCs circa 1935: the Electric Bond and Share (EB&S) and the Associated Gas and Electric (AG&E) systems. EB&S had over 150 subsidiaries in 16 states with at least seven corporate layers (Figure 1). The

organizational chart of AG&E involved over 170 subsidiaries with an even large number of corporate layers (Figure 2, Zentz, 1952). Both figures stress that complex organizational structures were prevalent in the industry in 1935 and are at odds with the widespread perception that the U.S. conforms to a system of widely held firms.

Figure 3 shows the geographical dispersion of EB&S. This figure highlights two issues: first, EB&S had operations in several regions of the U.S. Second, the geographic distance across locations implied that it was impractical to physically integrate the productive infrastructure across these regions. As such, the enforcement of PUHCA *necessarily* implied the creation of new standalone firms. In contrast, given the integration requirement, HCs with nearby operating firms were more likely to be retaining them as HC firms even if they had complex organizational structures or dozens of operating firms.

### ***III. B. Data Sources***

Firm level data is from the U.S. Federal Power Commission (FPC). Starting in 1937, the FPC reports annual financial and operating information from electric utilities both privately and publicly owned. The primary source of the data is FPC Form 1, filed by firms with annual electricity revenue of \$250,000 or more. The data discloses balance sheet information, income accounts, and production results, including physical quantity data for each firm.

Given that the FPC data are available in book format, and to economize in data collection costs, I digitalize the following years: 1937, 1939, 1941, 1943, 1946, 1947, 1950, 1953, 1955, 1958, and 1960. Beyond financial and operating data, the FPC data allows me to identify the name of each of the operating firms and its main state of operations.

Ownership information from 1935 is from the Report of the Committee on Instate and Foreign Commerce to the House of Representatives (1935), or when missing from Moody's Manual of Investments (1935). Ownership information from 1955 is from Moody's Manual of Investments (1955). These sources provide ownership data both from before and after PUHCA was implemented. For each firm, I rely on ownership sources to collect: (i) the name of the direct parent company and (ii) the ownership stake held. For each owning firm, I repeat the data collection exercise and collect (i) and (ii) until I identify the ultimate parent company. Using those data, I compute the number of corporate layers used to control a firm.

Business location information is from the FPC 1940 Directory of Electric Utilities or from the ownership sources in case the relevant information was missing. I collect the main location of the operating and parent firms. Using zip code locations, I compute the geodesic or shortest distance between each firm and the direct or ultimate parent companies.

### ***III. C. Sample Selection and Summary Statistics***

To focus on the most relevant firms, I additionally impose the following selection filters. First, that the firm has non-missing values of assets, operating income, and net income. Second, that sales and asset values are of at least one million. Third, that each firm is reported in at least three FPC reports, one of which has to be from a year prior to 1945. Fourth, that the relevant ownership data is available for 1935.

I arrive at a sample of 291 firms and 2,754 firm-year observations. Despite these constraints, the assets of the sample firms account for 94% of the industry total.

Table I presents the summary statistics. The mean operating return on asset and net income ratios is 9.3% and 3.7%, respectively. Table I reports detailed cost structure information broken into the following exclusive categories. Relative to revenue, the largest cost components are generation (29.5%), transmission (8.8), administration (6.9%), and marketing expenses (5%). Mean long-term debt ratios are 35%, while cash balances and dividend-equity ratios are 2.6% and 4.9%, respectively. Using non-equity liabilities, average net-debt ratio is 40.7%.

A unique feature of these data is the availability of physical quantity information: each firm reports the value of the energy generated, as well as the energy lost. Using these variables I compute two straightforward measures of operating efficiency: (a) the loss ratio in terms of quantities, and (b) an input-adjusted measure of production using total assets and total expenses using an ordinary least-squares specification. This latter measure seeks to capture total factor productivity. Table 1 shows a mean ratio of energy loss of 10.7%. It also shows substantial variation in terms of input-adjusted output: firms in the 10<sup>th</sup> percentile produce 46% less output than the average firm, while firms in the 90<sup>th</sup> percentile produce 54% more output than average. Lastly, using the total value of energy sales and the energy sold in units, we can compute the average price charged per unit of energy sold. While this latter variable may be difficult to compare across firms due to regional and client-base differences, within-firm variation is likely to be more informative about the pricing behavior of each of the operating firms.

In 1935, 86% or 250 firms were affiliated with a holding company while only 41 firms were standalone entities. Consistent with the notion that the sample firms were held through complex ownership structures, the mean number of corporate layers between the ultimate parent and the sample firms is 2.1 (2.5 for group firms), with firms in the 90<sup>th</sup> percentile having 4 (5 for group firms) corporate layers. The HC data corresponds to 48 ultimate holding companies, with an average number of operating firms of 5.21 operating firms per system.

Table 1 shows that the average distance to ultimate parent companies was 640 miles, with substantial variation around it, i.e. a standard deviation of 594 miles. The corresponding mean distance to the direct parent company is 537 miles, with a standard deviation of 626 miles.

Table 1 also reports the fraction of firms in a holding group that are located at a distance of 500 miles or more from their ultimate parent company. The objective of this ratio is to capture the regional fragmentation of a holding group from the perspective of the death sentence provision. The mean ratio is 47%, and, crucially for this paper, there is substantial variation. The 10<sup>th</sup> percentile firm belongs to HCs where all firms are geographically close to the ultimate parent firms, while the 90<sup>th</sup> percentile firm belongs to a holding company where 90% of the member firms are geographically distant from the controlling entities.

Table 1 also reports the ownership information for 213 firms with matching information from 1955. By 1955, the fraction of HC firms was 41% or 87 firms, while the majority (126) of were standalone firms. The mean number of corporate layers in 1955 was 0.43 (1.06 for group firms). Remarkably, the 90<sup>th</sup> percentile had only one corporate layer above them. These summary statistics confirm one of the basic premises of this paper. Namely, that there was a substantial change in ownership arrangements between 1935 and 1955 in the utility industry.

## ***IV. Results***

### ***IV. A. Cross-sectional Evidence before PUHCA was Implemented.***

As a first pass on the importance of organizational structures, in Table II, I report cross-sectional specifications on the impact of subsidiaries on a long list of firm outcomes using data from 1937 and 1939. I focus on those two years because they precede the implementation of PUHCA. Panel A compares standalone to subsidiary firms, while Panel B shows result for subsidiaries and subsidiaries with multi-layered corporate structures, relative to standalone firms.

In terms of profitability, the results from Table II stress three correlations. First, firms across ownership structures are no different in terms of sales. While HC revenue is naturally higher, sales at the operating firm level do not differ systematically. Second, on average HC firms have higher profitability ratios that are explained by lower overhead costs. Those differences are consistent with the synergetic advantages of HCs. Third, net income ratios do not systematically differ across organizational forms. The latter pattern is consistent with differences in capital structure decisions, which we examine in Columns (VII) to (IX).

Consistent with the idea that holding groups had significantly larger levels of leverage, Table II shows differences of 9.7 percentage points, significant at the 1% level. At the pre-1940 mean leverage ratio, this difference corresponds to 27% higher debt ratios than standalone firms. Such differences underscore the potential advantage of group firms when raising capital or they may be driven by a group firm preference for debt over equity for tax or disciplinary arguments. In contrast, cash and dividend ratios are not systematically different across firms before 1940.

In terms of efficiency, the results from Table 2 indicate that firms affiliated with HCs were more productive, had lower energy losses, and lower prices. The evidence is suggestive of substantial output effects: group firm status is correlated with 25% more output per unit of inputs and 16% lower energy losses than other firms. Similarly, HC firms charge prices that are 23% lower than those of standalone firms.

Overall, the cross-sectional evidence of Table II, Panel A is consistent with the idea that HCs operational and financial efficiency is higher, relative to standalone firms.

In Table II, Panel B, I test whether HC firms with a distinct number of layers of corporate ownership behave differentially. These latter tests are motivated by the spirit of PUHCA, that surviving HCs needed to simplify their corporate structures. To the extent that multi-layered HC firms suffer from the detrimental effects of ownership, we would expect the financial or operational performance of firms to differ as a result.

The results in Table II, Panel B provide suggestive evidence that multi-layered HC firms are less efficient than others. In particular, those with four or more layers of corporate ownership are significantly less productive than other HC firms, making the net productivity of these firms indistinguishable from those of standalone firms. Similarly, the energy losses of multi-layered firms are larger and their prices are higher than those of single-layered group firms, eroding the bulk of the advantages of group firm status.

In sum, Table II highlights both the potential advantages and shortcomings of HC affiliation. By leveraging unique assets or economies of scale, group firms can potentially become more profitable and productive than standalone organizations. However, the internal complexity of organizations can eventually turn into a disadvantage, making the net effect on firm performance insignificant or potentially negative. Table II also stresses the empirical challenges of attributing the reported correlations as the causal effect of organizational forces.

#### ***IV. B. Patterns of Organizational Change.***

Table III formally tests for changes in organizational form between 1935 and 1955 for all sample firms (Panel A), and for those with matching ownership information for both periods (Panel B). The evidence presented in Column IV shows a large decline in the share of group firms, from 85.9% in 1935 to 40.8% in 1955, a decline of 45%, which is significant at the 1% level. Using the data in Panel B, we can isolate the actual ownership transitions from group to standalone firms. The numbers in Columns II and III show that 93 firms transitioned from being affiliated with a holding company to standalone status.

Columns V to VIII of Table III investigate whether the provision that no operating firm could be controlled with more than two corporate layers above the firm was enforced by 1955. Panel A shows that while in 1935, 21%, 28%, and 36% of firms had, respectively, one, two, and more than two layers of ownership above them, by 1955 those ratios were 38.5%, 2.3%, and 0. Hence, by 1955 firms with two layers of corporate ownership were rare, and no corporation had more than two layers of corporate ownership. Therefore, by 1955 all operating firms in the industry were in compliance with the organizational simplicity provision of PUHCA.

Having established that PUHCA led to a drastic change in the organizational form of electric utility firms, in Table IV I examine the determinants of such change. The death sentence clause required group firms to be geographically integrated with their ultimate parent firm in terms of their electric utility infrastructure. In consequence, measures for the geographic proximity to parent firms are natural candidates to explain which firms are more likely to become standalone firms by 1955. Firms that are geographically close to their parent firm could make a case for remaining affiliated to the SEC. In contrast, firms that do business far away from their parent firm would find it challenging to remain affiliated to a holding group.

Column I of Table IV provides strong empirical support for the idea that distance from the ultimate parent firm affects whether the HC firm becomes standalone by 1955. The estimated coefficient indicates that a firm that is located a thousand miles away from its parent is 28% more likely to be independent by 1955 than a firm that is near its parent firm, an effect that is significant at the 1% level. Standard errors are clustered at the parent firm level, which is the primary source of variation for each parent firm-affiliated firm match. Interestingly, distance from the parent firm explains, by itself, 12% of the variation in ownership changes between 1935 and 1955. Columns II and III of Table IV explore the functional form relationship between ultimate parent distance and organizational change using indicator variables for firms that are located over 100 or over 500 miles away from their parent firm. The evidence shows that firms only became standalone if they were sufficiently far away from their parent company. The 100 mile dummy is insignificant at conventional levels (Columns II and III), while the 500 mile indicator variable correlates with an economically large and significant increase in standalone status. These results confirm that nearby firms could be retained, while firms that were located at large distances from their parent firm were likely to become standalone entities.

To further investigate whether HC geographical fragmentation in 1935 predicted the organizational form of the affiliated firms in 1955, in Table IV, Column IV I test for the effect of the share or fraction of group firms located farther than 500 miles from the parent company on the decision to become a standalone firm. The idea behind this test is that an operating firm that belonged in 1935 to a HC would be more likely to be independent by 1955 if: (a) the parent company is located at least 500 miles away from it and (b) other firms in the group are also at distant locations from the parent. Intuitively, the case for the geographic integration of individual companies would be weaker the higher the regional fragmentation of the parent company. The results show that a firm that in 1935 belonged to a holding group where 75% of the operating firms were 500 miles or more distant from their parent firm is 31% more likely to become standalone than a firm in a group where only 25% of the firms were 500 miles or more distant from their ultimate parent. This group-based variable explains 21% of the variation in ownership structures, while the associated F-test is 24.5. In short, the holding group fragmentation ratio in 1935 is a powerful predictor of standalone status in 1955. In subsequent tests, I will use variation from this specification (first-stage) to examine the effect of standalone status on firm performance using a 2SLS-IV specification.

In Table IV, I also examine the functional form of the effect of group fragmentation ratio on standalone status by first splitting the sample firms into terciles, and then testing for differences in the estimated coefficients. The results, shown in Column V, stress that firms that belong to the second and third terciles of regional fragmentation are 31 and 52 percentage points, respectively, more likely to be independent by 1955 than firms in the first tercile, a difference that is significant at conventional levels. Economically, firms in the top tercile of fragmentation are 2.9 times more likely to be standalone than those in the first tercile. The results confirm that group-level regional fragmentation predicts standalone status in 1955.

Table IV, Column VI separately examines the effect of the distance of the operating firm from the direct parent company in 1935 on the organizational status of the firm in 1955. The estimated coefficient is virtually identical to the point estimate of the distance from the ultimate parent, as reported in Column I.

In Columns VII to X of Table IV, I compare the incremental information of several measures of firm geographic fragmentation relative to its ultimate parent firm or to its direct parent company. The results stress three issues. First, in terms of predictive power, the holding group's regional fragmentation ratio dominates the distance from the ultimate parent firm. Including both variables renders the latter control insignificant. Second, relative to the holding group's regional fragmentation ratio, the distance from the direct parent company captures incremental predictive information for explaining the organizational choices of firms in 1955. Third, including controls for firm or state characteristics does not affect the main result from Table IV, that relatively simple regional fragmentation variables explain a substantial (15% to 22%) fraction of the ownership variation experienced by firms that belonged to holding companies in 1935. I examine the economic consequences of such variation next.

#### ***IV. C. Instrumental Variables Analysis***

Arguably the simplest test for the impact of standalone status on firm performance is to examine whether changes in organizational form lead to changes in performance. In this section, I implement a version of such a test that also attempts to overcome the concern that changes in organizational form are endogenous. In particular, I argue that it is plausible that some of the regional fragmentation variation circa 1935 was orthogonal to *changes* (not levels) in business opportunities between 1935 and 1955. Specifically, I examine whether regional fragmentation

variables predict changes in firm performance (reduced form analysis), and test whether the predicted changes in standalone status explained by those variables influences firm outcomes (2SLS-IV tests). If the orthogonality assumption is met, the latter tests identify the causal effect of organizations on performance.

#### IV.C.1. Reduced Form Analysis

I proceed in three steps. First, I split the panel into two periods per firm: (a) the 1937 to 1939 years, or pre-PUHCA implementation period, and (b) the 1955 to 1960 years, or post-PUHCA, regime. Second, I compute the after-minus-before comparison for several measures of performance. Third, I examine whether the proxies for the regional fragmentation of a group firm or its group predict significant changes in firm performance.

Table V, Panel A presents the reduced form correlation between the HC regional fragmentation ratio and the changes in profitability, capital structure and operating efficiency. Similarly, Panels B and C show the reduced form correlation between the distance to the ultimate or direct parent, respectively and the differences in the variables of interest.

The regional fragmentation variables show three consistent empirical patterns. First, fragmented firms correlate with increases in profitability. Second, fragmented systems correlate with increases in dividend payouts. Third, and arguably most interestingly, they also correlate with significant efficiency gains: higher output, lower energy losses, and higher input-adjusted output. In consequence, reduced form results provide direct evidence that standalone firms improve the financial and operating performance of firms. To the extent that the orthogonality assumption is met, these correlations are arguably free from endogeneity and omitted variable concerns. However, the magnitude of the effects needs to be scaled to reflect the fact that only a fraction of the sample firms respond to the regional dispersion IVs. I turn to those tests next.

#### IV.C.2. Instrumental Variables

Table VI presents the 2SLS-IV estimates on the effect of standalone status on firm profitability, leverage and payout, and operational efficiency. Panel A relies on the holding group fragmentation ratio, based on the number of firms located over 500 miles from their parent company, as the IV, while Panels B and C, respectively, rely on distance to the ultimate or direct parent firm as instruments. Lastly, Panel D uses both the holding group fragmentation ratio and the distance to the direct parent firm as IVs.

Table VI shows that, as anticipated, the impact of standalone firms on firm performance is positive, economically important, and statistically significant across specifications. Standalone firms exhibit lower generation costs, and higher operating and net profitability. Interestingly, firms that become standalone do not significantly increase overhead or other expenses as a result of the change. In terms of magnitude, the impact of standalone firms on operating profitability is in the 3 to 4.2 percentage points range, significant at conventional levels. Such effects are large considering that the mean sample OROA is in the 9% range.

In terms of capital structure and payout policies, the evidence from Table VI stresses two results. First, firms' standalone status does not systematically affect leverage decisions. This finding is consistent with the idea that assets in place may be the dominant driver of the debt capacity of firms, rather than organizational status. An alternative way to rationalize the lack of results given the higher levels of profitability of standalone firms is that the frictions faced by standalone firms are higher than those faced by group affiliated firms. Second, standalone firms pay more in dividends than firms that are members of holding companies. The evidence suggests that standalone firms become more profitable and compensate investors with larger dividends.

The impact of standalone firms on efficiency and pricing is presented in Table VI, Columns X to XIII. Standalone firms produce more output (Columns X and XI), even adjusted for input use (Column XI). The magnitude of the estimated coefficients is large, indicating substantial economic effects in the 25% to 35% range, and the effects are significant at conventional levels. However, as is common with IV specifications, the standard errors are large, which does not allow us to rule out the possibility that the increases in operational efficiency are at single-digit levels. Consistent with higher levels of efficiency, energy losses drop by 2.2 percentage points, which in economic terms translates to a reduction in losses in the 20% range. Lastly, there is no systematic effect of organizational form on the pricing of electricity.

Taken together, the evidence from Table VI provides striking support for the idea that standalone firms enhance efficiency. The results across specifications are remarkably stable despite the relatively small sample size (179 firms) and the fact that the data is collapsed into two periods. Collapsing the data helps to address inference concerns raised by Bertrand et al (2004). The evidence suggests that the efficiency gains are not explained by higher prices; it is driven by an advantage in lowering production costs and increasing output. In contrast, the evidence casts doubt on the idea that the operational or financial synergies are crucial for firm performance.

In Table VII, I examine the robustness of the results to including annual firm data, changing the sample periods, and including firm and state variables as controls to capture time-varying firm heterogeneity. Given the panel structure of the data, to predict the changes in standalone status that resulted from PUHCA, I rely on an interaction of the regional fragmentation variables (holding company regional fragmentation ratio and distance of each operating firm from the direct parent firm in 1935) and a dummy equal to one for the post-PUHCA period, i.e., after the 1946 Supreme Court decision that upheld the Act.

Panels A and B of Table VII show results for the panel of firm-years that correspond to the collapsed data used in Table VI. Unsurprisingly, the results without controls are virtually identical to those shown in Table VI, Panel D, but are nevertheless reported for comparison purposes. Adding firm controls (Panel B) does not systematically affect the main conclusions of the analysis. The major difference is the lower estimated coefficients on sales and output, which indicate that an important fraction of the reported effect on output is explained by a larger firm scale. Still, the main finding that standalone firms are both more productive and more efficient in terms of input-adjusted output holds. In sum, while firm controls may introduce biases to the estimated coefficients of interest in an IV setting, the results from Table VII show that including firm characteristics does not alter the main result of this paper.

The results presented in Panels C and D of Table VII show that including the years of transition (1941 to 1953) in terms of the implementation of PUHCA reduces the estimated effect of standalone firms on profitability, dividend, and output efficiency measures. The estimated coefficients on profitability, dividend ratios, and input-adjusted output, however, continue to be economically and statistically significant at conventional levels.

#### IV.C.3. Firm Characteristics.

In Table VIII, I examine the potential channels for the organizational advantages of standalone firms. To this end, I split the sample firms into two groups based on the relative efficiency of each operating firm before PUHCA was implemented. To this end, I rely on input-adjusted output levels, to capture the relevant total factor productivity at the firm level in terms of quantities. By focusing on the top and bottom performing firms prior to 1940, we can potentially shed light on the heterogeneity of the organizational effects of standalone firms relative to large business groups.

The results in Table VIII, Panel A suggest that top performing group firms forced to become standalone by PUHCA become even better after the Act is implemented. Productivity increases and energy losses decline sharply. In contrast, the efficiency gains by those firms with below average productivity before PUHCA are not different from zero at conventional levels. This evidence is consistent with the notion that large holding groups can hold back promising divisions by imposing a version of socialism inside their groups (Scharfstein and Stein, 2000).

The evidence from Table VIII also stresses that increases in profitability are observed across the efficiency groupings. Both relatively efficient and inefficient firms (a) increase sales, (b) reduce costs, (c) increase profits, and (d) increase dividends after they transition to standalone status. This suggests that having managers focused on one project, i.e., a single standalone firm sharpens their incentives and the organizational results.

An interesting result shown in Table VIII, Panel B is that formerly inefficient firms that were part of a holding company significantly reduce their leverage ratios as they become standalone firms. This correlation is potentially consistent with the idea that holding companies impose high leverage ratios on the group firms despite their relatively weak operating position. However, such an interpretation is suggestive at best.

In Table IX, Panels A and B, I examine an alternative potential channel for the organizational results reported in Tables V and VI. Following Zentz (1952), I can identify the holding groups that challenged PUHCA based on argued economic losses. The so-called “bright-side” of large organizations would suggest that challenging systems would tend to be those that were likely to suffer once the holding companies were dismantled. In contrast, the “dark-side” view of conglomerates predicts that the legal challenges were driven by rent-preservation rather than genuine economic losses. Looking at the gains in performance for the two separate groups, we can indirectly assess which of the views dominates in this setting.

The results presented in Table IX cast doubt on the idea that those firms belonging to HCs that argued severe economic losses as a result of the death sentence clause performed better as group rather than standalone firms: the evidence in Panel A stresses that those firms were able to increase, not decrease, their profits and input-adjusted output relative to other firms that remained affiliated with the holding systems. The arguably more revealing Column XIII results stress that challenging firms that became standalone charged lower prices in the post-PUHCA

period relative to other firms. The combined correlations suggest that rent-preservation rather than pure efficiency arguments drove the complaints of the large holding groups before the SEC.

In Table X I explore whether tax considerations affect the results of this paper. This result is motivated by recent evidence from Panier, Pérez-González, and Villanueva (2013), who show that large business groups are more responsive to tax incentives than standalone businesses. To pursue these tests, I use data from Penninman (1980), who reports the states that had either corporate income or franchise taxes in place in 1930, and classify states into those with and without taxation. The analysis stresses three novel results that highlight the differential importance of taxation for financing decisions across group and standalone firms. First, firms operating in taxing locations decrease their leverage ratios as they become independent. Second, firms in tax-free environments decrease their cash holdings as they become independent. Third, firms that operate in high tax states increase their dividends after they become standalone firms.

Overall, the evidence shows that large holding companies use their multi-location status to minimize tax liabilities by relying on higher (lower) debt levels, lower (higher) cash balances, and fewer (higher) dividends in high (low) tax locations. In short, while the evidence does not support the idea that holding companies are superior at the core business operations, it does suggest that HCs have a relative advantage at minimizing tax obligations, which standalone firms cannot match due to their single-location operations.

## **V. *Conclusions***

In this paper, I use a detailed dataset from an important historical episode of government regulation in the United States to assess the impact of organizational form on the allocation of resources. The episode is the enforcement of the Public Utility Holding Company Act of 1935 (PUHCA), and its controversial “death sentence” provision. PUHCA was enacted in response to an investigation by the U.S. Federal Trade Commission (1935) that uncovered a large number of abuses by the large holding companies (HC) that controlled the electric utility in the early 1930s. The death sentence provision stipulated that HCs could only retain existing operating firms as long as their assets were geographically integrated and their corporate structures were simplified. The primary objective of the paper is to establish the arguably causal effect of standalone firms on production efficiency, profits, capital structure, and pricing to consumers.

I first show that PUHCA led to a radical change in the ownership characteristics of firms in the industry. While in 1935 only 14% of utilities were standalone firms, by 1955 the fraction of independent entities grew to 59%. More relevant for the analysis, I show that the standalone treatment was largely determined by PUHCA's death sentence provision. In particular, firms that in 1935 were part of regionally fragmented holding companies were three times more likely to be independent in 1955 than those that were regionally integrated before PUHCA was implemented.

Using the idea that a fraction of regionally dispersed firms were more likely to become standalone irrespective of their investment opportunities, I examine the effect of organizational form on firm performance.

Overall, this paper provides robust empirical support for the idea that standalone or independent firms are more efficient than comparable corporations that are affiliated with a large holding company. Firms that become independent are more productive and profitable, grow faster, and pay more dividends than firms affiliated with HCs. Moreover, I do not find evidence of significant operating synergies resulting from holding company or group affiliation. In contrast, I do find evidence that entrenched holding companies can use their structures to charge higher prices to consumers. Lastly, also find that through their multi-entity structures, holding companies may have a relative advantage at minimizing tax obligations.

The results of this paper can potentially inform comparative corporate governance debates. The fact that complex holding company structures first appeared and then eventually disappeared from the U.S. corporate ownership landscape, stresses the relevance of time-varying market or government forces (Kandel, et al. 2013). In the electric utility industry, the evidence shown stresses that complex holding companies ceased to exist as a direct consequence of the policies of an activist government.

Lastly, the results of this paper have potential implications for assessing the economic efficiency consequences of large business groups. As previously reported in the literature, pyramidal ownership or large business groups are common in Western Europe, East Asia, and some Latin American countries (LaPorta, et al. 1999, Claessens, et al. 2000, Khanna and Yafeh, 2007, among others), and, as stressed by Morck, et al. (2005), the concentration of corporate assets is typically correlated with weaker economic performance.

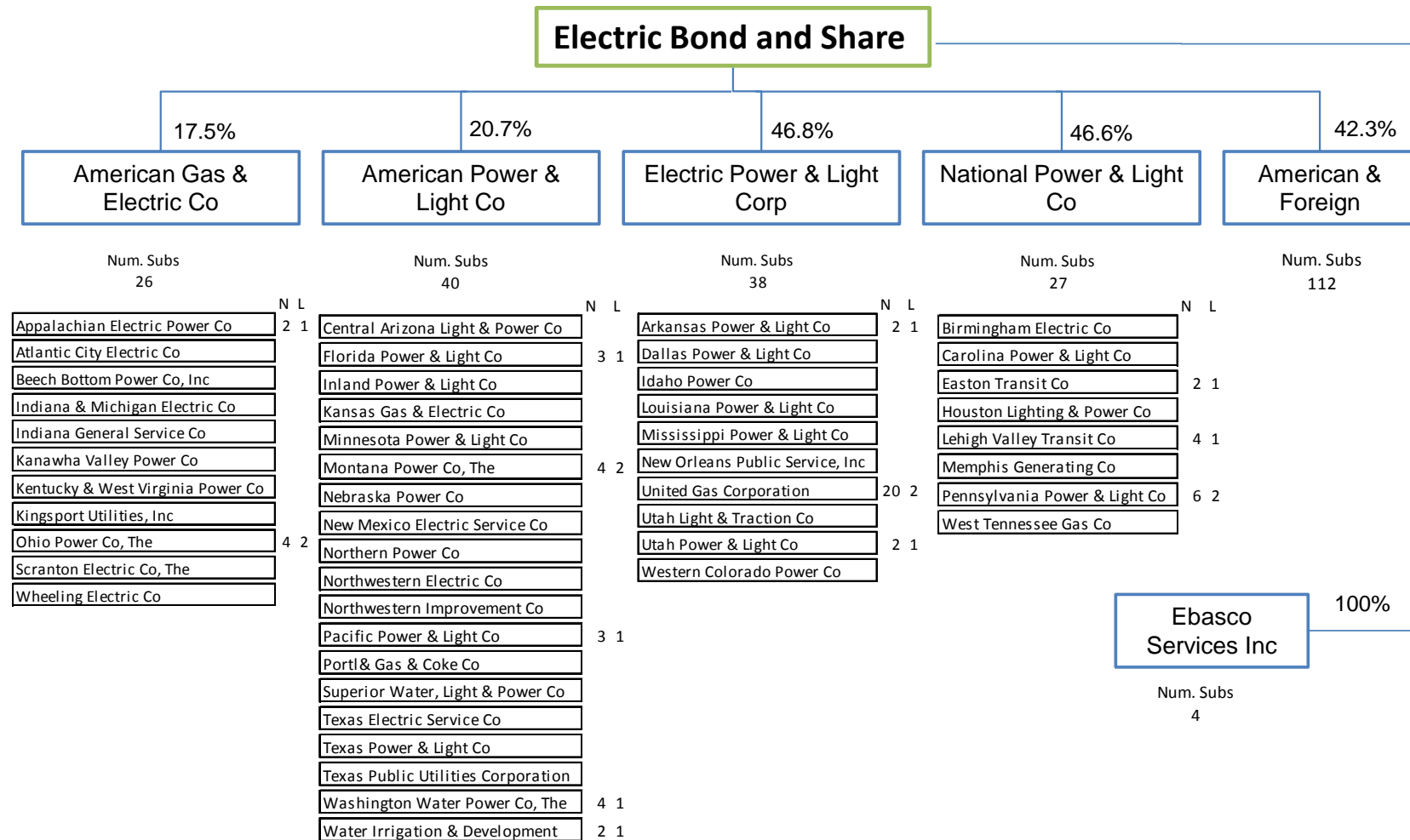
Whether the results of this paper extend to other countries or industries is a fascinating area for further research.

## References

- Almeida, Heitor and Daniel Wolfenzon. "A Theory of Pyramidal Ownership and Family Business Groups," *Journal of Finance*, Vol. 61, pp. 2637-2681, 2006.
- Baker, George P. and Thomas N. Hubbard. "Make versus Buy in Trucking: Asset Ownership, Job Design and Information." *American Economic Review*, Vol. 93, No. 3: 551-572, 2003.
- Bennedsen, Morten, Kasper M. Nielsen, Francisco Pérez-González, and Daniel Wolfenzon. "Inside the Family Firm: The Role of Families in Succession Decisions and Performance." *Quarterly Journal of Economics*, 2007, Vol. 122, No. 2: 647-691.
- Berle, Adolf and Means, Gardiner. *The Modern Corporation and Private Property*. (New York: McMillan, 1932).
- Bertrand Marianne, Esther Duflo and Sendhil Mullainathan, 2004. "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics*, Vol. 119(1), pp. 249-275.
- Bertrand, Marianne, Paras Mehta, and Sendhil Mullainathan. *Ferretting Out Tunneling: An Application to Indian Business Groups*. *Quarterly Journal of Economics*, 2002, Vol. 117, pp: 121-48.
- Beshears, John. "The Performance of Corporate Alliances: Evidence from Oil and Gas Drilling in the Gulf of Mexico." *Journal of Financial Economics* 110, No. 2 (November 2013): 324-346.
- Bonbright, J. C., and G. C. Means. *The Holding Company: Its Public Significance and Its Regulation* (New York: McGraw-Hill, 1932).
- Claessens, Stijn, Djankov, Simeon, and Lang, Larry H. P. "The Separation of Ownership and Control in East Asian Corporations." *Journal of Financial Economics*, 2000, 58(1-2), pp. 81-112.
- Coase, Ronald. "The Nature of the Firm." *Economica*, pp. 386-405.
- Emmons, William M. III, "Franklin D. Roosevelt, Electric Utilities, and the Power of Competition," *Journal of Economic History*, Vol. 53, No. 4 (Dec., 1993), pp. 880-907.
- Gopalan, Rakhakrishnan, Vikram Nanda, and Amit Seru. "Affiliated Firms and Financial Support: Evidence from Indian Business Groups." *Journal of Financial Economics*, 2007, Vol. 86, pp:759-95.
- Grossman, Sanford and Oliver S. Hart. "The Costs and Benefits of Ownership: a Theory of Vertical and Lateral Integration." *Journal of Political Economy*, Vol. 94: 691-719, 1986.
- Hart, Oliver S. and Moore John, "Property Rights and the Nature of the Firm." *Journal of Political Economy*, Vol. 98, No. 6, 1990.
- Hyman, Leonard S. *America's Electric Utilities: Past, Present, and Future*, (Public Utility Reports: Arlington, VA), 1983.
- Johnson, Simon, Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer. "Tunneling." *American Economic Review*, Vol. 90, No. 2, 2000, pp. 22-27.
- Kandel, Eugene, Konstantin Kosenko, Randall Morck, and Yishay Yafeh, "Business Groups in the United States: a Revised History of Corporate Ownership, Pyramids and Regulation, 1930-1950." NBER Working Paper 19691, 2013.
- Khanna Tarun, Palepu K. "Is Group Affiliation Profitable in Emerging Markets? An Analysis of Diversified Indian Business Groups." *Journal of Finance*, April 2000; 55(2):867-891.
- Khanna Tarun and Yishay Yafeh, "Business Groups in Emerging Markets: Paragons or Parasites?" *Journal of Economic Literature*, 2007 Vol. 45, No. 22, pp: 331-372.
- Klein, Benjamin, Robert Crawford, and Armen Alchian, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," *Journal of Law and Economics*, 21, Oct., 297-326, 1978.
- La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer (1999), "Corporate Ownership around the World," *Journal of Finance*, Vol. 54, pp. 471-517.
- Moody's Manual of Investments, American and Foreign: Public Utility Securities, several years.

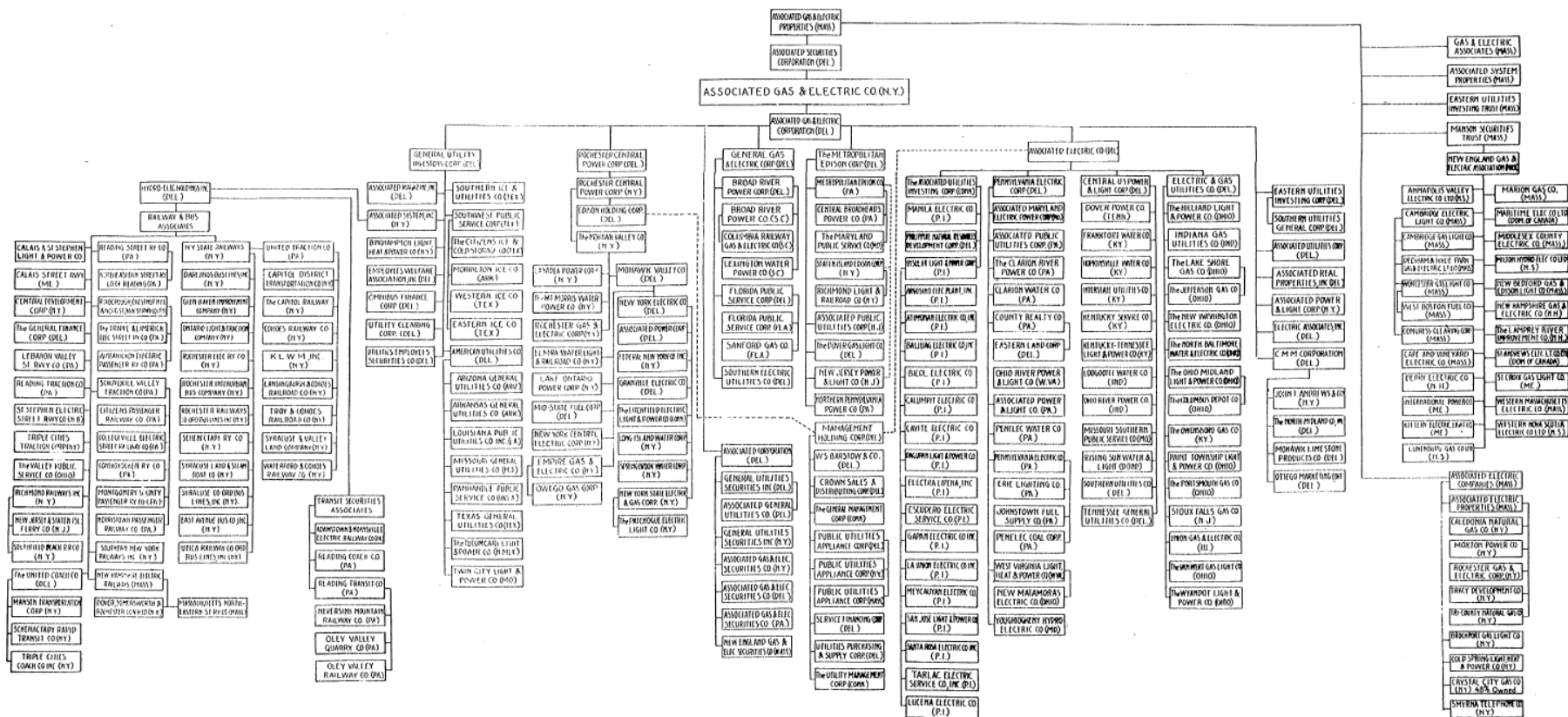
- Morck Randall, Bernard Yeung, and Daniel Wolfenzon, "Corporate Governance, Economic Entrenchment, and Growth," *Journal of Economic Literature*, 2005, Vol. 43, pp. 657-722.
- Penniman, Clara. *State Income Taxation*, (Baltimore and London: the John Hopkins University Press, 1980).
- Priest, George L. "The Origins of Utility Regulation and the "Theories of Regulation" Debate." *Journal of Law and Economics* Vol. 36, 1993, pp. 289-323.
- Rajan Raghuram, and Luigi Zingales. "Power in a Theory of the Firm," *Quarterly Journal of Economics*, 113: 387-432, 1998.
- Ritchie, Robert. *Integration of Public Utility Holding Companies*. (Ann Arbor: University of Michigan Law School, 1954).
- Robinson, David, T., "Strategic Alliances and the Boundaries of the Firm". *Review of Financial Studies* 21, 649-681.
- Roosevelt, Franklin D. "Appendix A: Message from the President of the United States Transmitting Recommendations relative to the Strengthening and Enforcement of Anti-trust Laws" *American Economic Review*, 1942, Vol. 32, pp. 119-128.
- Scharfstein, David S. and Jeremy C. Stein. "The Dark Side Of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment," *Journal of Finance*, 2000, Vol. 55 No. 6, December, pp. 2537-2564.
- Schrade, William R., and W. David Walls. Holding Companies, Market Liquidity, and the Development of the Electric Power Industry. *Journal of Energy and Development*, 2008, Vol. 32, pp:1-14.
- Seru, Amit, "Firm Boundaries Matter: Evidence from Conglomerates and R&D Activity." Forthcoming, *Journal of Financial Economics*, 2013.
- Stein, Jeremy C. "Internal Capital Markets and the Competition for Corporate Resources." *Journal of Finance*, 1997, Vol. 52:111-33.
- Stein, Jeremy C. "Information Production and Capital Allocation: Decentralized versus Hierarchical Firms." *Journal of Finance*, 2002. Vol. 57:1891-921.
- Troxel, Emery. *Economics of Public Utilities* (New York: Rinehart and Company, Inc., 1947).
- Twentieth Century Fund, *Electric Power and Government Policy* (New York: Twentieth C. Fund, 1948).
- U.S. Federal Power Commission, Directory of Electric Utilities in the United States, Washington, 1940.
- U.S. Federal Power Commission, Statistics of Electric Utilities in the United States, Classes A and B Privately Owned Companies, Washington, several years.
- U.S. Federal Trade Commission, Report on Utility Corporations Pursuant to Senate Resolution No. 83, 70th Congress, 1st Sess., Part 84A (Washington: U.S. Government Printing Office, December 1935).
- U.S. House of Representatives, Report of the House Committee on Interstate and Foreign Commerce on the Relation of Holding Companies to Operating Companies, Part I, 73<sup>rd</sup> Congress, 2<sup>nd</sup> session, House Report No. 827, (Washington, D.C.: U.S. Government Printing Office, 1935).
- U.S. Securities and Exchange Commission, Annual Report, several years.
- Waterman, Merwin, *Economic Implications of Public Utility Holding Company Operations* (Ann Arbor: University of Michigan, School of Business Administration, 1941).
- Williamson, Oliver E. *Markets and Hierarchies: Analyses and Antitrust Implications*, (New York: The Free Press. 1975),
- Williamson, Oliver E. "Transaction Cost Economics: the Governance of Contractual Relations," Vol. 22, *Journal of Law and Economics*, pp: 233-262, 1979.
- Williamson, Oliver E. *The Economic Institutions of Capitalism: Firms, Markets and Relational Contracting*. (New York: The Free Press, 1985)
- Zentz, Wiliam, M. "The Economic Effects of Forced Geographic Integration of Electric Utility Holding Companies," unpublished Ph.D. thesis, University of Michigan, 1952.

FIGURE 1. ELECTRIC BOND AND SHARE: ORGANIZATIONAL CHART



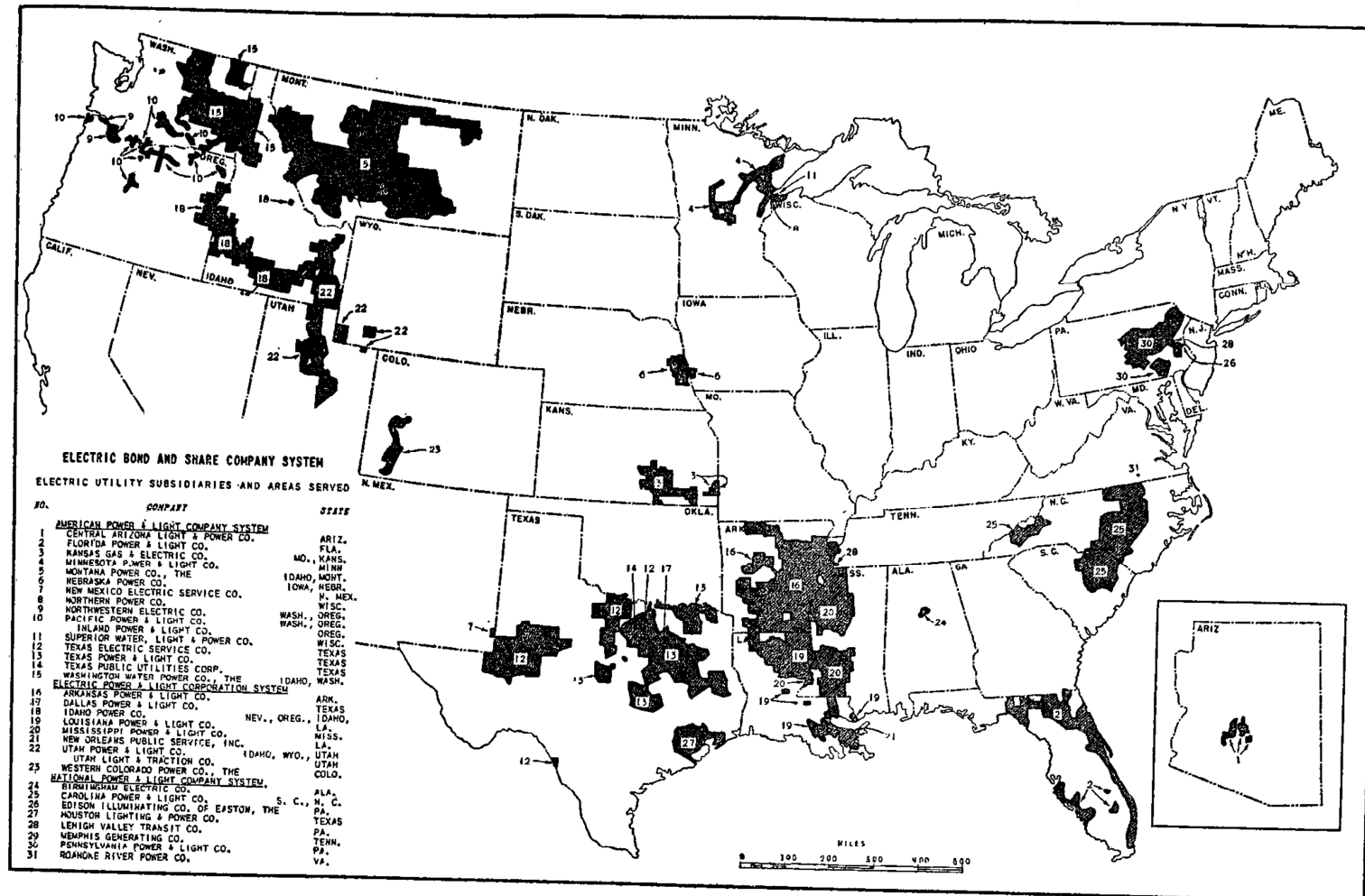
Source: Author's based on ownership information from the SEC, 1941. N refers to the number of subsidiaries below the firm. L refers to the number of corporate ownership layers below the firm.

**FIGURE 2. ASSOCIATED GAS AND ELECTRIC CO: ORGANIZATIONAL CHART**



Source: U.S. House of Representatives (1935).

FIGURE 3. ELECTRIC BOND AND SHARE



Source: Moody's (1940)

**TABLE I. SUMMARY STATISTICS**

This table reports summary statistics for electric utilities with matching financial and operating information from the Federal Power Commission for the years 1937, 1939, 1941, 1943, 1946, 1947, 1950, 1953, 1955, 1958 and 1960. *Ln total assets*, *sales*, and *total expenses* are the natural logarithms of the value of total assets, sales, and total expenses. *EBIT to assets ratio (OROA)* is the ratio of earnings before interest and taxes (EBIT) to total assets. *Net income to assets* is the ratio of net income to total assets. *Electric plant ratio* is the ratio of electric plants to total assets. *Residential client ratio* is the ratio of residential consumers to the total number of consumers reported. *Production costs to sales ratio* is the ratio of direct generation costs to total sales. *Transmission & distribution, marketing and selling, and administrative and general expenses* ratios are cost categories relative to sales. *Depreciation to assets ratio* is the ratio of depreciation charges relative to assets. *Long-term debt to assets ratio* is the ratio of long term debt to assets. *Cash to assets ratio* is the ratio of cash holdings to assets. *Net debt to assets ratio* is the ratio of the sum of long term debt minus cash to total assets. *All net debt to assets ratio* is the ratio of short term liabilities plus long term debt minus cash divided by total assets. *Dividends to equity* is the ratio of total dividend payments to the book value of equity. *Energy loss to total energy available* is the ratio of reported energy losses to the total value of energy available, generated, and purchased in thousands of KWH. *Ln total energy* is the natural logarithm of the total energy generated by the firm. *Ln price* is the natural logarithm of the ratio of total revenue from electric sales to total energy units sold. *Input adjusted output* is the residual from an OLS regression that uses the natural logarithm of assets and expenses as controls for the total value of energy produced by the firm. It seeks to capture the total factor productivity of the firm, and by construction has an average of zero. Ownership information from 1935 is from the Report of the Committee on Instate and Foreign Commerce to the House of Representatives (1935) or from Moody's *Manual of Investments* (1935) whenever the first source did not report it. Ownership information from 1955 is from Moody's *Manual of Investments* (1955). A firm is classified as a *group firm* if the firm is reported as such by another corporation; otherwise it is classified as *standalone*. *Number of ownership layers* is the number of corporations or layers of firm ownership above a reporting firm. For example, if a firm is affiliated with another firm that is in turn affiliated with an ultimate corporate owner, the number of firms or layers is 2. *Distance to ultimate (direct) parent* is the distance from the firm's main office to the ultimate (direct) parent main office, in thousands of miles. The ultimate parent company is the firm at the apex of the business group. The direct parent company is the firm that directly holds an ownership stake in the relevant firm. *Holding company regional fragmentation ratio* is a variable constructed at the holding group level that captures the ratio of firms that are located at least 500 miles from the ultimate parent firm, relative to the total number of group firms.

Variables	No. of Obs.	Mean	Std Dev.	p10	Median	p90
<i>Ln total assets</i>	2,754	17.171	1.595	14.990	17.232	19.232
<i>Ln sales</i>	2,754	15.732	1.530	13.706	15.704	17.752
<i>EBIT to assets ratio (OROA)</i>	2,754	0.093	0.029	0.058	0.092	0.130
<i>Net income to assets ratio</i>	2,754	0.037	0.015	0.018	0.037	0.055
<i>Electric plant ratio</i>	2,754	0.833	0.256	0.541	0.962	1.000
<i>Ln total expenses</i>	2,754	14.858	1.483	12.926	14.799	16.856
<i>Residential client ratio</i>	2,754	0.747	0.206	0.585	0.817	0.883
<i>Production costs to sales ratio</i>	2,754	0.295	0.126	0.153	0.275	0.465
<i>Transmission &amp; distribution costs to sales ratio</i>	2,754	0.088	0.030	0.055	0.088	0.123
<i>Marketing and selling costs to sales ratio</i>	2,754	0.050	0.020	0.027	0.050	0.074
<i>Administrative and general expenses to sales ratio</i>	2,754	0.069	0.024	0.042	0.067	0.098
<i>Depreciation to assets ratio</i>	2,754	0.021	0.007	0.012	0.021	0.031
<i>Long-term debt to assets ratio</i>	2,754	0.352	0.176	0.000	0.401	0.520
<i>Cash to assets ratio</i>	2,754	0.026	0.022	0.007	0.020	0.050
<i>Net debt to assets ratio</i>	2,754	0.326	0.181	-0.013	0.377	0.500
<i>All net debt to assets ratio</i>	2,754	0.407	0.168	0.127	0.448	0.574
<i>Dividends to equity</i>	2,754	0.049	0.027	0.010	0.050	0.080
<i>Energy loss to total energy available</i>	2,754	0.107	0.044	0.055	0.105	0.164
<i>Ln total energy</i>	2,754	12.729	1.733	10.383	12.711	15.017
<i>Ln price</i>	2,754	3.003	0.495	2.446	3.050	3.544
<i>Input adjusted output</i>	2,754	0.000	0.484	-0.463	-0.053	0.537
<i>Group firm, 1935</i>	291	0.859	0.349	0.000	1.000	1.000
<i>Number of ownership layers, 1935</i>	291	2.148	1.537	0.000	2.000	4.000
<i>Distance to ultimate parent company, 1935</i>	250	0.640	0.594	0.043	0.475	1.546
<i>Distance to direct parent company, 1935</i>	250	0.537	0.626	0.001	0.299	1.454
<i>Holding company regional fragmentation ratio</i>	250	0.467	0.360	0.000	0.587	0.904
<i>Group firm, 1955</i>	213	0.408	0.493	0.000	0.000	1.000
<i>Number of ownership layers, 1955</i>	213	0.432	0.542	0.000	0.000	1.000

**TABLE II. GROUP FIRM CHARACTERISTICS BEFORE THE IMPLEMENTATION OF THE PUBLIC UTILITY HOLDING COMPANY ACT OF 1935**

This table examines the correlation between group firm status in 1935 and firm characteristics in 1937 and 1939 using a cross-sectional specification. Panel A reports the differential characteristics of group firms relative to standalone firms. A firm is classified as a *group firm* if it is reported as such by another corporation; otherwise it is classified as *standalone*. Panel B also examines the differential characteristics of group firms with different numbers of corporate layers: (a) single layer, (b) 2 layers, (c) 3 layers, and (d) 4 or more layers of corporate ownership in 1935. Standalone firms are the omitted category in Panels A and B. The dependent variables are classified as follows: (1) profitability: (i) *ln sales* (Column I), (ii) production costs to revenue ratio (Column II), (iii) overhead or administrative expenses to sales ratio (Column III), (iv) depreciation ratio, the ratio of depreciation expenses to total assets (Column IV), (v) OROA or the ratio of EBIT to total assets (Column V), and (vi) net income, the ratio of net income to total assets (Column VI); (2) leverage and payout: (i) debt ratio or the ratio of long term debt to total assets (Column VII), (ii) cash ratio or the ratio of cash to total assets (Column VIII), and (iii) dividend ratio is the ratio of total dividends to the book value of equity (Column IX); and (3) efficiency and pricing: (i) *ln output* or the natural logarithm of the total energy generated by the firm (Column X); (ii) energy loss is the ratio of reported energy losses to the total value of energy available, generated, and purchased in thousands of KWH (Column XI); and (iii) *ln price*, the natural logarithm of the ratio of total revenue from electric sales to total energy units sold (Column XII). All specifications include the natural logarithm of firm assets and year dummies as controls. Columns (II) to (XII) include controls for: (a) the electric plant share of total assets and (b) the residential client ratio, relative to the total. Columns (VII) to (IX) include OROA as a control variable. Columns (X) to (XI) include *ln expenses*, the natural logarithm of total expenses, as a control variable. The specifications in Panel B include the same control variables as those in Panel A, but the estimated coefficients are omitted. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing		
	<i>Ln Sales</i>	Prod. Costs	Overhead	Depr. ratio	OROA	Net income	Debt ratio	Cash ratio	Div. ratio	<i>Ln Output</i>	Energy loss	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)
<b>Panel A. Standalone vs. group firm</b>												
<i>Group firm</i>	<b>0.048</b> (0.066)	<b>0.012</b> (0.017)	<b>-0.021</b> *** (0.005)	<b>-0.002</b> (0.001)	<b>0.008</b> ** (0.004)	<b>0.001</b> (0.004)	<b>0.097</b> *** (0.033)	<b>-0.003</b> (0.003)	<b>0.002</b> (0.002)	<b>0.253</b> *** (0.078)	<b>-0.020</b> ** (0.010)	<b>-0.229</b> *** (0.074)
<i>Ln assets</i>	0.854 *** (0.032)	-0.036 *** (0.006)	-0.005 *** (0.001)	-0.001 *** (0.000)	-0.005 *** (0.001)	-0.003 ** (0.001)	0.035 *** (0.012)	-0.000 (0.001)	0.004 *** (0.001)	0.554 *** (0.077)	0.007 (0.005)	-0.168 *** (0.017)
<i>Electric plant share</i>		0.008 (0.019)	-0.002 (0.006)	0.003 ** (0.001)	0.015 *** (0.004)	0.017 *** (0.004)	-0.031 (0.037)	0.001 (0.004)	0.011 ** (0.005)	0.402 *** (0.138)	-0.014 (0.013)	-0.194 * (0.104)
<i>Residential client ratio</i>		-0.066 * (0.035)	0.017 ** (0.007)	0.010 *** (0.002)	0.032 *** (0.005)	0.015 *** (0.004)	-0.009 (0.060)	-0.001 (0.007)	-0.010 ** (0.004)	-1.320 *** (0.158)	0.086 *** (0.016)	1.452 *** (0.183)
<i>OROA</i>							-2.846 *** (0.564)	0.158 *** (0.050)	0.821 *** (0.077)			
<i>Ln expenses</i>										0.617 *** (0.092)	-0.013 ** (0.006)	
Number of observations	566	566	566	566	566	566	566	566	566	566	566	566
R-squared	0.916	0.268	0.126	0.205	0.211	0.146	0.287	0.085	0.512	0.919	0.156	0.474
<b>Panel B. Standalone vs. group firm, and multilayer group firm</b>												
<i>Group firm</i>	<b>0.031</b> (0.083)	<b>0.005</b> (0.017)	<b>-0.021</b> *** (0.005)	<b>-0.001</b> (0.001)	<b>0.008</b> * (0.004)	<b>0.002</b> (0.004)	<b>0.071</b> * (0.039)	<b>-0.000</b> (0.004)	<b>-0.001</b> (0.003)	<b>0.367</b> *** (0.105)	<b>-0.034</b> *** (0.010)	<b>-0.324</b> *** (0.098)
<i>Group firm, 2 layers</i>	-0.006 (0.068)	0.004 (0.011)	0.002 (0.005)	-0.000 (0.001)	-0.001 (0.003)	-0.003 (0.002)	0.037 (0.029)	-0.002 (0.003)	0.004 (0.003)	-0.106 (0.097)	0.019 *** (0.006)	0.071 (0.087)
<i>Group firm, 3 layers</i>	-0.007 (0.069)	-0.003 (0.015)	-0.001 (0.005)	-0.002 ** (0.001)	0.000 (0.005)	-0.002 (0.004)	0.058 * (0.034)	-0.004 (0.004)	0.006 (0.004)	-0.108 (0.098)	0.018 ** (0.008)	0.118 (0.097)
<i>Group firm, 4 or more layers</i>	<b>0.144</b> (0.147)	<b>0.048</b> ** (0.023)	<b>-0.003</b> (0.013)	<b>-0.003</b> *** (0.001)	<b>0.001</b> (0.008)	<b>0.002</b> (0.008)	<b>-0.017</b> (0.075)	<b>-0.007</b> * (0.004)	<b>0.006</b> (0.004)	<b>-0.322</b> *** (0.087)	<b>0.021</b> * (0.011)	<b>0.258</b> *** (0.078)
Number of observations	566	566	566	566	566	566	566	566	566	566	566	566
R-squared	0.917	0.291	0.129	0.232	0.212	0.153	0.304	0.098	0.517	0.922	0.178	0.492

**TABLE III. ORGANIZATIONAL STRUCTURE: 1955 VS. 1935**

This table reports the number of firms and the organizational characteristics of electric utilities with matching financial and operating information from the Federal Power Commission between 1937 and 1960, where available. Ownership information from 1935 (Row (i)) is from the Report of the Committee on Instate and Foreign Commerce to the House of Representatives (1935) or from Moody's *Manual of Investments* (1935) whenever the first source did not report it. Ownership information from 1955 (Row (ii)) is from Moody's *Manual of Investments* (1955). A firm is classified as a *group firm* (Column II) if the firm is reported as such by another corporation; otherwise it is classified as *standalone* (Column III). The fraction of group firms is reported in Column IV. *Number of ownership layers* is the number of corporations or layers of firm ownership above a reporting firm. *Layers above=1* (Column VI) is an indicator variable equal to one if the firms' owner is a corporation that does not report another corporation as its ultimate owner, zero otherwise. *Layers above=2* (Column VII) is an indicator variable equal to one if the firm reports exactly two layers of corporate ownership above itself, zero otherwise. *Layers above>2* (Column VIII) is an indicator variable equal to one if the firm reports more than two layers of corporate ownership as controlling shareholders, zero otherwise. Panel A reports information for all firms and Panel B reports information for those corporations with matching financial and ownership information for at least one year in both: (a) 1937 to 1939 and (b) 1955 to 1960. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	All firms	No. of group firms	No. of stand-alone firms	Group firm =1	No. of ownership layers	Layers above =1	Layers above =2	Layers above >2
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
<b>Panel A. Unbalanced panel</b>								
i. Based on 1935 ownership information	291	250	41	0.859 (0.037)	2.148 (0.278)	0.213 (0.054)	0.285 (0.075)	0.361 (0.082)
ii. Based on 1955 ownership information	268	87	126	0.408 (0.066)	0.432 (0.072)	0.385 (0.065)	0.023 (0.019)	0.000 (0.000)
Difference 1955 vs. 1935 (ii) minus (i)		-163	85	-0.451 *** (0.059)	-1.716 *** (0.246)	0.172 * (0.094)	-0.262 *** (0.080)	-0.361 *** (0.082)
<b>Panel B. Balanced panel</b>								
i. Based on 1935 ownership information	213	180	33	0.845 (0.041)	2.052 (0.253)	0.239 (0.067)	0.263 (0.086)	0.343 (0.077)
ii. Based on 1955 ownership information	213	87	126	0.408 (0.066)	0.432 (0.072)	0.385 (0.065)	0.023 (0.019)	0.000 (0.000)
Difference 1955 vs. 1935 (ii) minus (i)		-93	93	-0.437 *** (0.060)	-1.620 *** (0.226)	0.146 (0.100)	-0.239 ** (0.091)	-0.343 *** (0.077)

**TABLE IV. DETERMINANTS OF ORGANIZATIONAL CHANGE: EVIDENCE FROM THE "DEATH SENTENCE" CLAUSE**

This table examines the determinants of organizational change as a result of the implementation of the death sentence clause of PUHCA. The death sentence clause of PUHCA mandated that holding companies could only retain as group firms those operating businesses that were geographically integrated with the parent company. The dependent variable is an indicator variable equal to one for firms that were standalone in 1955, but that were reported as group firms affiliated with a holding company in 1935, zero otherwise. The data is collapsed at the firm level and it only includes firms reported as group firms in 1935 for which matching financial information was available for at least one year in the post-1955 period (179 firms). The table reports the effect of the following control variables: (1) *distance to ultimate (direct) parent in 1935* is the distance from the firm's main office to the ultimate (direct) parent main office, in thousands of miles; (2) *distance to parent firm in 1935, over 100 miles* (or *500 miles*) are indicator variables equal to one if the firm is located at a distance farther away than the threshold, zero otherwise; (3) *firms over 500 miles from ultimate parent in 1935* is the ratio of group firms that are located 500 miles or more from the ultimate parent company in 1935, relative to the total number of firms in the holding company; (4) *firms over 500 miles from ultimate parent in 1935* with indicator variables that are terciles constructed based on (3), where the tercile with the lowest share of firms located 500 miles away from the ultimate parent is the omitted category. *Ln assets* is the natural logarithm of firm assets. *OROA* is the ratio of EBIT to total assets. *Ln state population* is the natural logarithm of the population of the state where the firm's main office is located. Size, profitability, and population controls are firm averages for 1937-1939. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Standalone firm, 1955									
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)
<i>Distance to ultimate parent firm in 1935, miles (thousands)</i>	0.279 *** (0.079)						0.056 (0.062)			
<i>Distance to ultimate parent firm in 1935, over 100 miles</i>		0.108 (0.160)	-0.063 (0.194)							
<i>Distance to ultimate parent firm in 1935, over 500 miles</i>			0.294 * (0.165)							
<b><i>Holding company regional fragmentation ratio</i></b>				<b>0.627 *** (0.127)</b>			<b>0.565 *** (0.161)</b>	<b>0.515 *** (0.143)</b>		<b>0.442 *** (0.138)</b>
<i>Firms over 500 miles from ultimate parent in 1935, indicator 2</i>					0.305 ** (0.133)					
<i>Firms over 500 miles from ultimate parent in 1935, indicator 3</i>					0.516 *** (0.150)					
<i>Distance to direct parent firm in 1935, miles (thousands)</i>						0.275 *** (0.070)				0.084 * (0.044)
<i>Ln assets</i>								0.102 *** (0.023)	0.092 *** (0.027)	
<i>OROA</i>								-0.014 (1.651)	1.183 (1.574)	
<i>Ln state population</i>								-0.123 *** (0.028)	-0.056 (0.038)	
Constant	0.332 *** (0.093)	0.429 *** (0.131)	0.429 *** (0.131)	0.211 ** (0.081)	0.269 ** (0.108)	0.361 *** (0.085)	0.204 ** (0.084)	0.202 ** (0.082)	0.543 (0.633)	-0.571 (0.736)
Number of firms	179	179	179	179	179	179	179	179	210	179
R-squared	0.118	0.006	0.077	0.212	0.178	0.129	0.214	0.226	0.119	0.283
F-test	12.64	0.454	2.099	24.52	5.997	15.67	14.87	18.14	14.06	22.58

**TABLE V. FRAGMENTED HOLDING COMPANIES AND DIFFERENCES IN PROFITABILITY, LEVERAGE, AND OPERATING EFFICIENCY (REDUCED FORM)**

This table examines the correlation between variables that capture the degree of regional fragmentation of a holding group (Panel A), the distance of an operating firm to its ultimate parent company (Panel B), or the distance of an operating firm to its direct parent company (Panel C), and differences in several measures of (1) firm profitability, (2) leverage and payout decisions, and (3) efficiency and pricing. The data is collapsed at the firm level and it only includes information on firms that were reported as group firms in 1935, for which matching financial information was available for at least one year in the post-1955 period (a balanced panel of 179 firms). To compute the differences in each of the variables around the introduction of PUHCA, I compute the average outcome variable for (a) 1937 to 1939 and (b) 1955 to 1960. Each difference is computed as (b) minus (a). The dependent variables are classified as follows: (1) profitability: (i) *ln sales* (Column I), (ii) production costs to revenue ratio (Column II), (iii) overhead or administrative expenses to sales ratio (Column III), (iv) depreciation ratio, the ratio of depreciation expenses to total assets (Column IV), (v) OROA or the ratio of EBIT to total assets (Column V), and (vi) net income, the ratio of net income to total assets (Column VI); (2) leverage and payout: (i) debt ratio or the ratio of long term debt to total assets (Column VII), (ii) cash ratio or the ratio of cash to total assets (Column VIII), and (iii) dividend ratio, the ratio of total dividends to the book value of equity (Column IX); and (3) efficiency and pricing: (i) *ln output*, or the natural logarithm of the total energy generated by the firm (Column X); (ii) input adjusted output, which is the residual from an annual OLS regression that uses the natural logarithm of assets and expenses as controls for the total value of energy produced by the firm to capture the total factor productivity of the firm (Column XI); (iii) energy loss, the ratio of reported energy losses to the total value of energy available, generated, and purchased in thousands of KWH (Column XII); and (iv) *ln price*, the natural logarithm of the ratio of total revenue from electric sales to total energy units sold (Column XIII). Each estimated coefficient corresponds to a different regression. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Differences in Profitability						Differences in Leverage and Payout			Differences in Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. Holding company regional fragmentation ratio</b>													
Firms over 500 miles from parent, ratio	0.274 ** (0.123)	-0.082 ** (0.033)	-0.003 (0.009)	0.002 (0.002)	0.027 *** (0.009)	0.017 ** (0.007)	-0.010 (0.037)	-0.008 (0.007)	0.019 *** (0.006)	0.422 *** (0.141)	0.171 ** (0.070)	-0.014 ** (0.006)	-0.049 (0.051)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
<b>Panel B. Distance to 1935 ultimate parent firm, miles (thousands)</b>													
Distance to 1935 ultimate parent firm, miles (thousands)	0.132 (0.084)	-0.041 *** (0.015)	-0.004 (0.004)	-0.000 (0.001)	0.008 (0.005)	0.007 ** (0.003)	0.019 (0.017)	0.001 (0.003)	0.009 (0.005)	0.222 ** (0.095)	0.094 ** (0.039)	-0.012 *** (0.003)	-0.041 (0.028)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
<b>Panel C. Distance to 1935 direct parent firm, miles (thousands)</b>													
Distance to 1935 direct parent firm, miles (thousands)	0.107 (0.072)	-0.039 ** (0.015)	-0.001 (0.004)	-0.000 (0.001)	0.010 ** (0.004)	0.008 ** (0.003)	0.021 (0.017)	-0.001 (0.003)	0.012 *** (0.004)	0.184 ** (0.078)	0.097 *** (0.033)	-0.013 *** (0.002)	-0.054 ** (0.023)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179

**TABLE VI. ORGANIZATIONAL FORM AND FIRM OUTCOMES: INSTRUMENTAL VARIABLES**

This table examines the effect of organizational form on (1) firm profitability, (2) leverage and payout policies, and (3) efficiency and pricing. I instrument for *standalone* status using: (i) *holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from their ultimate parent company (Panels A and D), (ii) *distance of each operating firm from the ultimate parent firm* in 1935 (Panel B), and (iii) *distance of each operating firm from the direct parent firm* in 1935 (Panels C and D). A standalone firm is a firm that in 1935 was affiliated with a holding company firm but became standalone by 1955. The data is collapsed at the firm level and it only includes information on firms that were reported as group firms in 1935, for which matching financial information was available for at least one year in the post-1955 period (a balanced panel of 179 firms). To compute the differences in each of the variables around the introduction of PUHCA, I compute the average outcome variable for (a) 1937 to 1939 and (b) 1955 to 1960. Each difference is computed as (b) minus (a). I examine the impact of becoming a standalone firm on the following dependent variables: (1) profitability: (i) *ln sales* (Column I), (ii) production costs to revenue ratio (Column II), (iii) overhead or administrative expenses to sales ratio (Column III), (iv) depreciation ratio, the ratio of depreciation expenses to total assets (Column IV), (v) OROA or the ratio of EBIT to total assets (Column V), and (vi) net income, the ratio of net income to total assets (Column VI); (2) leverage and payout: (i) debt ratio, or the ratio of long term debt to total assets (Column VII), (ii) cash ratio, or the ratio of cash to total assets (Column VIII), and (iii) dividend ratio, or the ratio of total dividends to the book value of equity (Column IX); and (3) efficiency and pricing: (i) *ln output*, or the natural logarithm of the total energy generated by the firm (Column X); (ii) input adjusted output, which is the residual from an annual OLS regression that uses the natural logarithm of assets and expenses as controls for the total value of energy produced by the firm to capture the total factor productivity of the firm (Column XI); (iii) energy loss, the ratio of reported energy losses to the total value of energy available, generated, and purchased in thousands of KWH (Column XII); and (iv) *ln price*, the natural logarithm of the ratio of total revenue from electric sales to total energy units sold (Column XIII). Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. Instrumental variable: Holding company regional fragmentation ratio</b>													
Standalone firm	0.437 ** (0.194)	-0.130 ** (0.054)	-0.005 (0.013)	0.004 (0.003)	0.044 *** (0.015)	0.027 ** (0.011)	-0.017 (0.058)	-0.012 (0.012)	0.031 *** (0.011)	0.673 ** (0.262)	0.273 * (0.142)	-0.022 ** (0.011)	-0.078 (0.083)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
<b>Panel B. Instrumental variable: Distance to 1935 ultimate parent firm, miles (thousands)</b>													
Standalone firm	0.472 (0.297)	-0.146 *** (0.055)	-0.014 (0.016)	-0.001 (0.003)	0.030 * (0.017)	0.025 ** (0.011)	0.068 (0.070)	0.003 (0.010)	0.032 * (0.017)	0.794 ** (0.379)	0.338 * (0.184)	-0.045 ** (0.018)	-0.148 (0.111)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
<b>Panel C. Instrumental variable: Distance to 1935 direct parent firm, miles (thousands)</b>													
Standalone firm	0.389 (0.261)	-0.141 ** (0.056)	-0.005 (0.014)	-0.002 (0.003)	0.037 ** (0.015)	0.030 *** (0.009)	0.075 (0.073)	-0.002 (0.009)	0.044 ** (0.018)	0.670 ** (0.319)	0.351 ** (0.172)	-0.048 *** (0.015)	-0.196 * (0.107)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
<b>Panel D. Instrumental variables: (a) Holding company regional fragmentation ratio, (b) Distance to 1935 direct parent firm, miles (thousands)</b>													
Standalone firm	0.426 ** (0.192)	-0.133 ** (0.053)	-0.005 (0.013)	0.002 (0.003)	0.042 *** (0.014)	0.027 *** (0.010)	0.004 (0.058)	-0.010 (0.011)	0.034 *** (0.011)	0.673 *** (0.256)	0.291 ** (0.143)	-0.028 ** (0.012)	-0.105 (0.082)
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179

**TABLE VII. THE IMPACT OF STANDALONE FIRMS ON FIRM OUTCOMES: ALTERNATIVE SPECIFICATIONS**

This table examines the effect of organizational form on (1) firm profitability, (2) leverage and payout policies, and (3) efficiency and pricing. The table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone* status using: (i) *holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from their ultimate parent company, (ii) *distance of each operating firm to the direct parent firm in 1935*, and *after*, a post-PUHCA indicator variable (first stage is omitted). *Standalone* is an indicator variable equal to one for a firm that in 1935 was affiliated to a holding company firm but became standalone by 1955, and zero for non-switching firms and for the pre-PUHCA period. Panels A and B examine the robustness of the results to using annual observations for the years 1937, 1939, 1955, 1958, and 1960. Panels C and D examine the robustness of the results to also including data for 1941, 1943, 1946, 1947, 1950, and 1953. All specifications in Panel A and B include year dummies as controls. Panels B and D examine the robustness of the results to including controls that seek to capture the heterogeneity in the evolution of each of the variables of interest. All specifications in Panels B and D include the following controls: the natural logarithm of firm assets and state population, to control for firm size and electricity demand, respectively. Columns (II) to (XIII) also include controls for (a) the electric plant share of total assets and (b) the residential client ratio relative to the total. Columns (VII) to (IX) include OROA as a control variable to proxy for profitability. Columns (X) to (XI) include *ln expenses*, the natural logarithm of total expenses as a control variable. Other than the *standalone* estimated coefficient, all others are omitted. Each estimated coefficient corresponds to a different regression. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. Sample: 1937-1939 &amp; 1955-1960</b>													
Standalone firm	0.413 ** (0.177)	-0.126 ** (0.055)	-0.004 (0.013)	0.004 (0.003)	0.042 *** (0.016)	0.028 ** (0.011)	-0.026 (0.061)	-0.011 (0.011)	0.030 *** (0.010)	0.657 *** (0.252)	0.266 * (0.141)	-0.019 * (0.011)	-0.072 (0.083)
Number of observations	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
<b>Panel B. Sample: 1937-1939 &amp; 1955-1960, firm controls</b>													
Standalone firm	0.153 * (0.090)	-0.122 ** (0.050)	0.000 (0.013)	0.003 (0.003)	0.049 *** (0.017)	0.031 *** (0.012)	-0.010 (0.054)	-0.011 (0.009)	0.014 * (0.008)	0.271 * (0.153)	0.271 * (0.153)	-0.019 * (0.010)	-0.026 (0.083)
Number of observations	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
<b>Panel C. Sample: 1937-1960</b>													
Standalone firm	0.278 ** (0.134)	-0.067 ** (0.032)	-0.009 (0.007)	0.003 * (0.002)	0.035 *** (0.011)	0.024 *** (0.008)	0.006 (0.045)	-0.006 (0.007)	0.023 *** (0.008)	0.464 *** (0.176)	0.195 ** (0.091)	-0.006 (0.004)	-0.035 (0.050)
Number of observations	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357
<b>Panel D. Sample: 1937-1960, firm controls</b>													
Standalone firm	0.123 * (0.071)	-0.070 ** (0.030)	-0.006 (0.007)	0.003 (0.002)	0.038 *** (0.012)	0.026 *** (0.008)	0.031 (0.042)	-0.005 (0.007)	0.011 ** (0.006)	0.205 ** (0.097)	0.205 ** (0.097)	-0.008 (0.005)	-0.046 (0.053)
Number of observations	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357	2,357

**TABLE VIII. ORGANIZATIONAL EFFECTS ON PROFITABILITY, LEVERAGE AND EFFICIENCY BY INITIAL OPERATIONAL OUTCOMES**

This table examines the effect of organizational form on (1) firm profitability, (2) leverage and payout policies, and (3) efficiency and pricing, when the sample firms are sorted as a function of their 1937 to 1939 average levels of operational efficiency. The measure of operational efficiency used to sort the sample firms is input adjusted output, which is the residual from an OLS regression that uses the natural logarithm of assets and total expenses as controls for the total value of energy produced by the firm, and proxies for total factor productivity. *High* or relatively more efficient firms (Panel A) are those with above median levels of input adjusted output; alternatively, firms may be *low* output or efficiency (Panel B). The table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone* status using: *holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from their ultimate parent company, *distance of each operating firm to the direct parent firm in 1935*, and *after*, a post-PUHCA indicator variable (first stage is omitted). *Standalone* is an indicator variable equal to one for a firm that in 1935 was affiliated with a holding company and became standalone by 1955, and zero for non-switching firms and for the pre-PUHCA period. All specifications include data from the years 1937, 1939, 1955, 1958, and 1960, and include year dummies as controls. Each estimated coefficient corresponds to a different regression. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. High input adjusted output before 1940</b>													
Standalone firm	0.334 *	-0.113 *	-0.009	0.002	0.051 **	0.033 **	0.113	-0.008	0.057 ***	0.632 **	0.357 *	-0.045 **	-0.052
	(0.182)	(0.062)	(0.013)	(0.005)	(0.023)	(0.015)	(0.080)	(0.011)	(0.016)	(0.257)	(0.214)	(0.018)	(0.126)
Number of observations	538	538	538	538	538	538	538	538	538	538	538	538	538
<b>Panel B. Low input adjusted output before 1940</b>													
Standalone firm	0.390 *	-0.143 **	0.002	0.002	0.029 **	0.024 ***	-0.097 **	-0.009	0.016 *	0.531 **	0.159	-0.005	-0.075
	(0.219)	(0.058)	(0.017)	(0.003)	(0.014)	(0.009)	(0.049)	(0.013)	(0.009)	(0.270)	(0.104)	(0.010)	(0.084)
Number of observations	460	460	460	460	460	460	460	460	460	460	460	460	460

**TABLE IX. SYSTEMS THAT CHALLENGED PUHCA AND STATE-LEVEL TAX OBLIGATIONS**

This table examines the effect of organizational form on (1) firm profitability, (2) leverage and payout policies, and (3) efficiency and pricing when the sample firms are sorted as a function of whether they contested PUHCA, following Zentz (1952). Panel A shows results for firms that in 1935 belonged to holding companies that challenged PUHCA, while Panel B reports results for those that did not. This table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone* status using: *holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from their ultimate parent company, *distance of each operating firm to the direct parent firm in 1935*, and *after*, a post-PUHCA indicator variable (first stage is omitted). *Standalone* is an indicator variable equal to one for a firm that in 1935 was affiliated with a holding company and became standalone by 1955, and zero for non-switching firms and for the pre-PUHCA period. All specifications include data from the years 1937, 1939, 1955, 1958, and 1960, and include year dummies as controls. Each estimated coefficient corresponds to a different regression. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. Firms from holding companies that challenged PUHCA</b>													
Standalone firm	0.232 (0.414)	-0.140 * (0.075)	0.026 (0.034)	-0.009 ** (0.004)	0.026 ** (0.013)	0.014 ** (0.007)	0.227 (0.168)	-0.011 (0.019)	0.048 (0.033)	0.587 (0.508)	0.518 ** (0.212)	-0.057 *** (0.009)	-0.352 ** (0.168)
Number of observations	434	434	434	434	434	434	434	434	434	434	434	434	434
<b>Panel B. Firms from holding companies that did not challenge PUHCA</b>													
Standalone firm	0.459 ** (0.185)	-0.120 ** (0.049)	-0.005 (0.009)	0.005 (0.003)	0.042 *** (0.014)	0.025 *** (0.009)	-0.037 (0.055)	-0.009 (0.010)	0.031 *** (0.011)	0.695 ** (0.284)	0.295 * (0.151)	-0.019 (0.011)	-0.090 (0.092)
Number of observations	567	567	567	567	567	567	567	567	567	567	567	567	567

**TABLE X. FIRMS BY STATE-LEVEL TAX OBLIGATIONS**

This table examines the effect of organizational form on (1) firm profitability, (2) leverage and payout policies, and (3) efficiency and pricing when the sample firms are sorted as a function of whether the firm's main office was in a state in which corporate income or franchise taxes were levied on corporations in 1930, based on Penninman (1980). Panel A shows results for firms that operated in states with corporate income or franchise taxation as of 1930, while Panel B reports results for firms located in states that did not have such taxes. The table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone* status using: *holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from their ultimate parent company, *distance of each operating firm to the direct parent firm in 1935*, and *after*, a post-PUHCA indicator variable (first stage is omitted). *Standalone* is an indicator variable equal to one for a firm that in 1935 was affiliated with a holding company and became standalone by 1955, and zero for non-switching firms and for the pre-PUHCA period. All specifications include data from the years 1937, 1939, 1955, 1958, and 1960, and include year dummies as controls. Each estimated coefficient corresponds to a different regression. Standard errors clustered at the ultimate parent company level are reported in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	Profitability						Leverage and Payout			Efficiency and Pricing			
	<i>Ln Sales</i>	<i>Prod. Costs</i>	<i>Overhead</i>	<i>Depr. ratio</i>	<i>OROA</i>	<i>Net income</i>	<i>Debt ratio</i>	<i>Cash ratio</i>	<i>Div. ratio</i>	<i>Ln Output</i>	<i>Output Adj.</i>	<i>Energy loss</i>	<i>Ln Price</i>
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
<b>Panel A. Firms incorporated in states with corporate income taxation</b>													
Standalone firm	0.297 (0.196)	-0.148 *** (0.050)	-0.004 (0.017)	0.006 (0.005)	0.049 ** (0.021)	0.047 *** (0.015)	-0.115 * (0.067)	0.004 (0.011)	0.050 *** (0.016)	0.473 (0.291)	0.235 (0.222)	-0.033 (0.022)	-0.079 (0.167)
Number of observations	397	397	397	397	397	397	397	397	397	397	397	397	397
<b>Panel B. Firms incorporated in states with no corporate income taxation</b>													
Standalone firm	0.467 * (0.250)	-0.090 (0.057)	-0.001 (0.016)	-0.001 (0.003)	0.031 ** (0.016)	0.010 (0.007)	0.109 * (0.066)	-0.019 * (0.010)	0.022 (0.015)	0.838 ** (0.375)	0.352 * (0.211)	-0.029 ** (0.012)	-0.114 (0.113)
Number of observations	604	604	604	604	604	604	604	604	604	604	604	604	604

**APPENDIX A1. ABBREVIATED TIMELINE OF EVENTS RELATED TO THE PUBLIC UTILITY HOLDING COMPANY ACT OF 1935, AND THE SUPREME COURT’S DECISION TO UPHOLD IT IN 1946**

Year	Description
1882	Edison builds the first electricity central lighting station in New York
1886	First electric street railway, over 150 systems within four years
1887-1912	Industrial demand grew from 6 percent of total energy demand to 26 percent
1902-1930s	Rapid growth: (1) Electricity generation grew from 6 to 101 Kwh millions; (2) Fraction of the population in electrically lighted homes increased from 2 to 70 percent, (3) Rise of electric utilities: (a) gains from merging industrial, transportation and lighting demand to smooth total demand and match it with generation, and (b) economies of scale, financing needs, etc.
1920s	<b>Consolidation:</b> (1) holding companies and pyramids, (2) Of the 57 holding companies in 1935, 41 were chartered from 1922 to 1932 (Anderson, 1947), (3) Acquisitions relied heavily on debt financing
1928	The <b>Federal Trade Commission began an investigation on the abuses by holding companies:</b> (a) minority investors (expropriation by controlling shareholders), (b) consumer abuses (increased costs to increase rates: services, price fixing agreement, onerous loan terms, among others).
1930s	Great Depression: Electricity sales slowed, several operating firms defaulted and several holding groups collapsed
1935	Summary findings of Federal Trade Commission and House of Representative Investigation are presented. <b>Public Utility Holding Company Act. Most controversial feature: the “Death Sentence” Clause. PUHCA to be implemented in 1938.</b>
1938	PUHCA is effective. 58 cases were brought challenging the constitutionality of the law.
1940s	SEC start enforcing PUHCA with “due process” (due notice and opportunity for hearing): initial resistance and delay by holding companies.
1942	SEC issued order requiring the North American Company to divest itself and all properties other than those in the St. Louis area. North American legally appeals the order.
1945	North American case is argued before the Supreme Court.
1946	<b>Supreme Court decision 6-0 upholding the death sentence clause</b>
Post-1946	Large increase in enforcement actions.
1953	SEC reports that compliance with the "death sentence" provision is basically complete.