Preliminary
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"The *Death Sentence*, Organizations and Firm Performance"

Francisco Pérez-González [*]

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Abstract. This paper examines the importance of organizational form for firm performance. I exploit plausibly exogenous variation in organizational form that resulted from the implementation of the Public Utility Holding Company Act (PUHCA) of 1935. PUHCA, through the so-called "death sentence" clause (DSC) stipulated that holding companies (HC) could only retain businesses as long as their assets were geographically integrated and their organizational structures were simplified. Using hand-collected data, my main findings are five. First, PUHCA led to a drastic simplification of corporate ownership: over 40% of firms ceased to be group firms and the number of layers of corporate ownership was significantly reduced. Second, following the DSC, firms that in 1935 were part of regionally fragmented groups, were three times more likely to be independent in 1955 than those regionally integrated. Third, using measures of regional fragmentation as instrumental variables, I show that standalone firms are more productive and profitable, grow faster, and pay more dividends than firms affiliated to HCs. Fourth, I find evidence that is consistent with the idea that HCs were likely to extract rents from consumers and minority investors. Lastly, consistent with superior HC tax arbitrage capabilities, standalone firms are less aggressive at capturing the tax benefits of debt. In sum, the evidence casts doubt on the idea that HCs are superior organizational structures, and also challenges the notion that PUHCA's divestment requirements 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, pyramids, regulation, capital structure and holding companies

[*] Graduate School of Business, Stanford University and NBER. Email: francisco.perez@stanford.edu. I thank Shai Berstein, Dirk Jenter, Amit Seru, Kelly Shue, and Jeff Zwiebel, and participants at Stanford finance workshop and the AEA meetings in Philadelphia for comments. I thank 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." [1]

A central question in financial 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 many others). While there is a large and established literature analyzing the potential channels though which organizational form can matter for financial results and economic efficiency, 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. Multi-divisional or pyramidal holding companies possess several potential advantages relative to standalone firms. For example, they can lever financial, managerial, or other scarce 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 (Khanna and Palepu, 2000). Concentrating the power of independent firms in holding companies can, alternatively, exacerbate agency conflicts, informational frictions, and reduce competition, leading to inefficiencies or expropriation at the expense of consumers or minority investors.

In contrast to the prevalent view that corporate ownership in the United States is widely held at least since early in the last century (Berle and Means, 1932), in the 1930s, a large fraction of the electric and gas operating firms were dominated by multi-business and pyramidal holding companies, akin as 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 holding companies controlled 89% of the power output in the U.S. Similarly, an investigation of the House of Representatives (1935), documented that operating utilities with multi-layered corporate ownership were widespread, with some firms having an excess of 10 corporate layers of ownership above them.

[1] Troxel (1947).

In this paper, I exploit variation in organizational form that resulted from one of the most drastic regulations in U.S. history: the Public Utility Holding Company Act (PUHCA) of 1935. PUHCA was enacted in response to a large number of abuses by holding companies 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. The most controversial feature of PUHCA required holding companies to limit their operations to a single geographically interconnected system, and to simplify their organizational structures, effectively banning pyramidal ownership arrangements. Such provision was so far-reaching and controversial that industry executives referred to it as the "death sentence" to existing firms.[2]

While PUHCA was initially passed in 1935, the controversial "death sentence" provision was legally challenged by the holding companies. As a result, the Securities and Exchange Commission (SEC), which was entrusted with the enforcement of the Act, did not start affirmative proceedings against large holding companies until the spring of 1940 (SEC, 1945). Several large holding companies filed appeals from the ensuing SEC orders. Finally, the constitutionality of PUHCA was ultimately upheld by the Supreme Court in 1946 (SEC, 1947), and by 1952, the compliance with the controversial integration and simplification clause was almost complete (SEC, 1953).

Overall, PUHCA provides an attractive laboratory to assess the impact of organizational structures on efficiency *and* profitability for at least three reasons. First, it provided large time-series variation in the organizational choices of firms. Second, the death sentence clause required those firms to be retained by existing holding companies to by geographically close or adjacent to the main parent company. Hence, geographically fragmented holding companies were more likely to be forced to divest firms, relative to those that were nearby to their parent firms. As a result, many firms were forced to change their organizational structures *irrespective* of their investment opportunities, the key feature of the Act that I exploit in the analysis. Third, detailed production and financial data at the business unit level is available from the U.S. Federal Power Commission, which allows me to assess operating efficiency (output in units, energy losses, etc.) as well as, financial performance.

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

I assembled a hand-collected dataset with financial, and production information from 291 operating firms in the industry, and 2,754 firm-years from the 1937 to 1960 period filed before the Federal Power Commission. To capture the effect of PUHCA on organizational structures, I complement these data with detailed 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 organizational information that resulted from PUHCA's enforcement, completed by the early 1950s (SEC, 1953).

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 affiliated to a holding company, the share of holding company firms dropped to 40.8% in 1955. As a result, standalone firms became the majority of the operating firms in the industry. Similarly, while 64% of firms had more than two layers of corporate ownership in 1935, by 1955, the corresponding share was only 2.3%. In short, the data confirms the relevance of the active government policies in vanishing pyramidal organizations from the U.S. corporate ownership landscape.

Second, following the death sentence clause, I show that measures of parent-firm regional fragmentation are powerful predictors of standalone status. To test for PUHCA's regional proximity effects, I rely on three variables: (1) the distance in miles to the ultimate parent or head firm of a holding company (HC), (2) the distance to the direct parent firm, a firm that was often an intermediate organization in the holding group, and (3) the HC regional fragmentation ratio, or the fraction of firms in the HC that are located over 500 miles away from the ultimate parent. Irrespective of the measure used, I show that regional fragmentation is an economically and statistically important determinant of organizational change. For example, using (3), I show that firms that in 1935 belonged to a HC where 75% of the affiliates were distant to their parent-firm were three times more likely to become standalone businesses than other firms that integrated HCs where only 25% of the firms were regionally fragmented. The R-squared of a model that relies on regional fragmentation as measured by (3) to explain organizational change is 21%, with a first-stage F-test of 24. 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 standalone firms are more productive and profitable, and grow faster than firms affiliated to HCs. Consistent with sharpen incentives of standalone firms, independent firms have higher total factor productivity and lower energy losses that other firms. Interestingly, standalone firms are not associated to higher energy prices. Mapping real efficiency gains into financial results, enhanced efficiency translates into higher profits and lower production costs. Inconsistent with significant synergy gains, there is no evidence, at the margin, that firms that become independent increase overhead expenses or become less levered.

Fourth, I find evidence that is consistent with the idea that HCs were likely to extract rents from both minority investors and consumers. Consistent with the idea that holding companies limit the payout distributions to minority shareholders, I find that firms that become standalone increase dividend payouts. Moreover, to further investigate whether HCs' challenge to PUHCA was driven by justified economic efficiency arguments or by a motivation to preserve their abnormal economic rents, I split the analysis by whether those HCs legally challenged PUHCA. I do not find that firms that become independent underperform relative to those that remain affiliated to HC. In contrast, standalone firms improve their operating efficiency. Strikingly, standalone firms *reduce* not increase their electricity prices, which provides evidence that holding companies led to higher consumer prices.

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 to integrated HCs. I find that businesses operating in states with corporate income taxes decrease their leverage ratios and increase their cash holdings as they become independent.

Taken together, the evidence does not support the idea that holding companies are superior at the core business operations relative to standalone firms. Firms that become standalone consistently improve their operational and financial results. In contrast, the results are indicative that holding groups have a relative advantage at managing their capital structure. Moreover, the results stress some of the potential channels through which large holding groups can potentially enhance or protect their positions at the expense of other firm stakeholders. Firms affiliated to holding companies pay fewer dividends to shareholders, they also use their financing policies to pay fewer taxes, and in some settings, charge higher prices to consumers than standalone firms.

We complement the existing literature in at least three dimensions:

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

Second, by constructing a unique dataset that contains actual production information, pricing, as well as financial results, I can directly assess the impact of organizational form on variables that are inherently difficult to analyze using standard financial statements. For example, I can investigate the consequences of standalone firms on real operating efficiency in terms of units of output at the operating-firm level, as well as, to investigate the consequence of organizational form on pricing to consumers, both of which are economically relevant.

Third, by focusing on a large-scale government intervention that drastically revamped the organizational structure of firms, the paper provides a rich analysis of the many issues that such interventions need to consider beyond solely focusing on the interest of the firms' shareholders. Given the widespread use 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 received a fierce opposition by the industry leaders and lobbyist. The evidence of this paper highlights that forceful arguments for maintaining the status quo, such as referring to policy initiatives as "death" sentence provisions, may solely reflect the private benefits, and not the social consequences of those reforms.

Whether the results of this paper, which focuses on one historical episode affecting only one industry, and a specific empirical strategy, extend to other settings, are fascinating areas for further research.

The rest of the paper is organized as follows. Section I describes the determinants and the enforcement of PUHCA. Sections II and III introduce the empirical strategy and describe the data, respectively. Section IV presents the results examining the impact of organizational form on firm performance. Section V concludes.

I. PUHCA, and Existing Literature (Incomplete)

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

At the turn of the 19th and the beginning of the 20th centuries, the electric industry was one of the fastest growing sectors in the United States. From 1882, when Edison built the first electricity central lighting station in New York, to 1930 when 70% of the U.S. population lived in electrically lighted homes, the industry underwent a rapid period of innovation, growth and eventual consolidation.[3]

While the genesis of the industry was extremely local in nature, each firm serving an individual franchise-granting municipality, several factors played a role in inducing industry consolidation into large holding companies. First, relative to others the industry required relatively 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 relatively inefficient firms. Second, the growth in energy applications both across business segments (industrial, transportation, etc.) and geographically, made expansion and interconnection of existing firm attractive. The fact that several municipalities and later states had differential contractual agreements made the actual merger of companies relatively costly compared to common ownership under a holding group structure (Bonbright and Means, 1932). 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.

In the 1920s, the speed of consolidation in the industry accelerated. While the number of residential customers was still rapidly increasing, the number of generating companies fell by 63% from roughly 4,300 to around 1,600 companies.[4] Most of the merger activity involved relatively small firms integrating into a relatively small number of large holding companies. By 1931, the 40 largest holding companies controlled 89% of the power output in the U.S. (Bonbright and Means, 1932) and of the 57 holding companies in 1935, 41were chartered from 1922 to 1932 (Anderson, 1947). Massive consolidation was triggered by two factors. First, further technological change made efficient systems relatively larger and more interconnected.

[3] See Hyman (1983) for a detailed account of the early evolution of the industry. See also Appendix A1. This section relies on Hyman (1983), and the final report of the U.S. Federal Trade Commission (1935).
[4] McDonald (1957).

For example, high-voltage technology made it possible to transmit electricity to nearby communities without significant losses, improving the case for organizational integration. Second, financial innovation and the growth of pyramidal ownership structures during the 1920s accelerated integration efforts. The boom in financial markets allowed financial sponsors to rely on external resources, especially debt financing, to fuel acquisitions at an unprecedented speed.

By 1928, concerns with massive integration by HCs and alleged abuses by these firms triggered a U.S. Federal Trade Commission (FTC) on the topic. Some of these concerns included the risks of pyramidal ownership structures for both consumers and minority investors, as well as the inability of state-level commissions in regulating firms that performed transactions across states (FTC, 1935). From the perspective of consumers, HCs exposed consumer to higher rates resulting from transfer pricing: intra-group loans, engineering services, equipment, etc. HCs were in an ideal position to extract rents from consumers given state-level cost-recovery rate regulation. From the perspective of minority investors, HCs were controversial because the enlarged separation of ownership and control made tunneling increasingly profitable (Johnson, *et al.* 2000; Bertrand, Mehta, and Mullainathan, 2002). Moreover, the acquisition of target independent companies, and the resulting write-up of assets, was labeled as inflated and deceptive for minority investors and bondholders who were financing the downstream firms. Lastly, the vast concentration of assets among relatively few hands raised concerns about the vitality of the U.S. economy going forward (Roosevelt, 1942)

The Great Depression and the associated reduction in economic activity, unemployment and firm failure, made the case for federal regulation of electric utilities potentially more appealing. Contraction in consumer demand hurt firm profitability, and in consequence, several highly levered firms and HCs defaulted, including and the Midwest Utilities group, led by Samuel Insull. As those firms defaulted and curtailed dividend payments, 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 had argued that the overall concentration of assets in the hands of relatively few individuals, and HCs in particular, were primary determinants of the economic problems facing the U.S. Upon the completion of the FTC investigation, which documented a large number of abuses by HCs, the Public Utility Holding Company Act was presented to Congress in 1935.

I. B. PUHCA: Main Features and Enforcement Challenges

The main objective of PUHCA was to regulate the operations of companies involved in interstate commerce. It sought to prevent the alleged abuses to consumers and minority shareholders that were associated to large HCs. The Securities and Exchange Commission (SEC) was charged with the administration and enforcement of the Act.[5]

To achieve its objectives, PUHCA introduced several provisions: HCs had to register; issuance of securities had to be cleared with the SEC prior to be offered to investors; acquisition of securities were limited and were also subject to prior approval by the SEC; companies were required to file annual reports; and the political activity of HCs was also limited.

Since PUHCA was first presented to Congress, however, the most controversial provision of the Act was the so-called death sentence (DS) 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. The DS clause effectively banned pyramidal 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 discovered that HCs were using funds from operating firms (subject to rate recovery) to launch the aggressive lobbying campaign against the Act. Upon enactment, the SEC was instructed to enforce the DS provision 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 March of 1938, the Supreme Court upheld the constitutionality of the registration provision and thereafter, HCs registered with the SEC. Subsequently, the commission invited each of the HCs to voluntarily file their proposed compliance plans. As recognized by the SEC, such plans sought to "justify the retention of existing scattered holdings" (SEC, 1945). Given the limited progress with the voluntary approach to DS enforcement, in 1940, the SEC initiated formal affirmative proceedings against the largest HCs. Such proceedings led to controversial decisions, such as the order to the North American Company (one of the largest HCs) to divest itself and all properties other than those in one location. North American resisted the SEC order and took it to the courts. Eventually, the Supreme Court upheld the constitutionality of the DS clause in 1946. By 1953, most systems were in compliance with PUHCA (SEC, 1955).

[5] This section relies primarily on the SEC annual reports to Congress, available online at the following address: http://www.sec.gov/about/annual_report.

In the typical outcome of Section 11 proceedings, the main holding company as it was known prior to 1935, ceased to exist. The largest integrated system was retained as one company, commonly with a holding company structure with operating assets. Regionally fragmented assets were paid to investors as dividends, or sold to the public. Smaller assets were sold or liquidated.

In sum, while PUHCA was enacted in 1935, the SEC did not start the process of enforcing its controversial death sentence clause until 1940. Moreover, HCs were not forced to comply with the DS provision until after the Supreme Court upheld the constitutionality of the ACT in 1946. Enforcing PUHCA implied a massive transformation of the ownership structure of electric utility firms. Lastly, while PUHCA was eventually enforced by the SEC, the debate of its consequences on efficiency and electricity rates ensued. Where HCs the scapegoats of a severe economic 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 necessarily imply that the operating firms were inefficient. In fact, prominent corporate finance models (e.g. Jensen (1986), suggest that debt is a disciplinary force that drives economic efficiency. In the subsequent sections, I examine the impact of holding companies and of the changing ownership landscape that followed PUHCA on firm operating efficiency, profitability and capital structure.

I describe the empirical challenges and the empirical strategy to overcome them 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 valuation, profitability or productivity as a function of the firms' ownership characteristics. For example:

$$y_{it} = \alpha + \beta * ORG_{it} + \psi_{\chi} X_{it} + \varepsilon_{it} \qquad (1)$$

Where y_{it} is the outcome variable of interest for firm i at time t (ex. firm productivity, profits, etc.). ORG_{it} is a firm organizational variable (conglomerate, pyramidal structure, 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 β to be positive and statistically different from zero. If ORG_{it} was uncorrelated with other

determinants with other determinants of y_{it}, β 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, higher valued organizations can potentially become holding groups even when these structures are irrelevant for firm performance. Whenever holding firms are the result of higher performance, it is difficult to establish the causal effect of organizational form on outcomes, using cross-sectional tests. Similarly if omitted variables drive both higher performance and complex organizational form, the estimated coefficients in (1) may capture the indirect effect of such variables and not the causal impact of organizations. Hence, a significant β 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 firm is so valuable for efficiency, why would other identical firms select another organizational form? Normally, they wouldn't, and there would be no variation in (1). It follows that firms that deviate from the optimal organizational choice would either face an offsetting cost (or benefit) that would tilt their decisions. To the extent that such offsetting cost is not observable and controlled for in (1), the estimated coefficients would tend to be biased. Second, whenever organizational form is irrelevant for firm outcomes, but β is significant, then (1) is prone to report the effect of omitted variables. In consequence, the concern with the estimates from (1) is both its economic relevance and its interpretation.

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

$$y_{it} = \alpha + \beta * Standalone_{it} + \psi_{\chi} X_{it} + \upsilon_i + \varepsilon_{it} \qquad (2)$$

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

outcomes. For example, a revealed-preference argument would imply that group firm status was optimal from the perspective of the insiders' of the holding companies. Yet, whether such preference resulted from an actual operating superiority or from the ability of holding companies to extract financial or other rents from consumers or minority investors is difficult to know ex-ante. As such, the empirical tests in this paper try to disentangle some of these competing forces.

An additional advantage of using time-series specifications in organizational status is that such models allow us to introduce firm fixed-effects (v_i), which allow us to rule out the confounding effect of time-invariant firm characteristics on firm outcomes. To the extent that becoming a standalone firm induces changes in profits, efficiency or leverage, time-invariant firm characteristics cannot explain those effects.

The challenge with (2) above is that while PUHCA introduced plausibly exogenous variation in *Standalone* status, other concurrent events, can complicate inference. For example, PUHCA introduced several new regulations to the industry. To the extent that aggregate characteristics around PUHCA's implementation also change, β in (2) would also be biased.

I seek to overcome the inference challenges in (2) by implementing an instrumental variables empirical strategy, where I am explicit about the source of variation used to evaluate the impact of *Standalone* status on firms' operating efficiency, profits and leverage. I motivate the empirical strategy on PUHCA's restriction that ensuing group firms in the electric utility needed to be geographically integrated in terms of their electricity infrastructure to their parent companies. 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* than others: regionally integrated affiliates were prone to remain group firms while those that were fragmented were more likely to become independent. To implement the IV empirical strategy, I first run the following first-stage specification:

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

Where $Standalone_{it}$ is a dummy equal to one if the formerly group 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, i.e. 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 relative to regionally integrated firms. The second stage equation investigates the impact of standalone status on firm efficiency, profitability and capital structure:

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

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

In the paper, I use three measures of regional fragmentation:

(1) The distance in miles to the *ultimate* parent company in 1935. This variable captures the distance between the main office of a group firm and the central location of its ultimate parent firm. The ultimate parent is the corporation at the apex of the holding company. 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.

(2) 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. The intuition for using (2) is the same as for (1).

(3) 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) to the ultimate parent. 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.

An example:

I illustrate the empirical strategy of the paper using a simple example.[6] For simplicity, assume that: (i) firms remain stand-alone whenever they enjoy superior investment opportunities, and (ii) the econometrician cannot perfectly control for those conditions.

Graphically:

[6] The example is similar to the one in Bennedsen et. al (2007), which is omitted in the published version of the paper but can be found in the longer working paper draft at http://www.stanford.edu/~fperezg/insidethefamilyfirm.pdf.

Fig 2.1

Investment Opportunities	Period
	Pre-PUHCA
Great	Stand-alone firm
Normal	Division of Holding Co
Weak	Division of Holding Co

To the extent that investment opportunities are not perfectly controlled for, a cross-sectional specification cannot separate the direct effect of the organizational structures from the effect of investment opportunities.

In this paper, I seek to overcome this challenge by exploiting variation in organizational choice that resulted from PUHCA's regulatory drive towards standalone status. The idea is that PUHCA would push some firms to shift their organizational choice *irrespective* of their investment opportunities. Graphically:

Fig. 2.2

Investment Opportunities	Period			Difference
	Pre-PUHCA		Post-PUHCA	
Great	Stand-alone firm	minus	Stand-alone firm	…
Normal	**Division of Holding Co**	**minus**	**Stand-alone firm**	**Causal Estimate**
Weak	Division of Holding Co	minus	Division of HC	…

The shaded area would allow me to estimate the causal effect of organizational choice on firm outcomes, while ignoring the non-shifting observations.

To the extent that organizational change and no other effects changes over time, we are able to recover the estimate of interest. In practice, however, it is likely that the pre-versus post PUHCA regime affected firms in several dimensions. For example, PUHCA introduced new regulation specific to the electric utility firms that would bias the estimated coefficients in the example in Fig 2.2.

To address this added challenge, I rely on the fact that PUHCA only allowed holding groups to retain geographically integrated assets: in practice, geographically dispersed firms were more likely to become standalone firms relative to others that were geographically close. Using geographical dispersion as an IV also allows me to address the confounding effect of other common variables that, like regulation are changing over time. Graphically:

Fig 2.3

Holding Co	Period			Difference	
	Pre-PUHCA		Post-PUHCA		
Regionally Integrated	Holding Co	minus	Holding Co + Reg	Reg	(A)
Regionally Fragmented	Holding Co	minus	Standalone + Reg	ORG effects + Reg	(B)
Differences-in-Difference ("Causal") = (B) minus (A)				**ORG effects**	

I am able to recover the causal effect of organizational form on performance by benchmarking the analysis relative to other firms that were subject to the same time-varying regulatory changes but that they differed in their probability of being treated by their standalone status as a result of PUHCA.

Naturally, the crucial assumption in Figure 2.3 is that other than through the changes in organizational structure PUHCA or other government regulation did not differentially affect investment opportunities for regionally fragmented or integrated firms. That is the critical identifying assumption in this paper.

III. Data Description

To test the impact of the organizational changes that resulted from PUHCA on firm performance, I aimed at constructing a dataset that contained firm and ownership information both before and after the Act was implemented. Additionally, and given that the implementation of the death sentence required that continuing group firms needed to be geographically integrated to their parent company, I also collect information on each of the firms –parent and operating units– main business location.

A. U.S. Pyramidal Structures

Figures 1 to 3 motivate the importance of: (a) complex organizational and pyramidal ownership structures, in the United States prior to 1935, and (b) regional fragmentation for the application of PUHCA.

Figures 1 and 2 present the organizational chart of two large holding companies prior to PUHCA: the Electric Bond and Share and the Associated Gas and Electric Co systems. For example, Electric Bond had over 150 subsidiaries operating in 16 states with at least seven layers in the pyramidal structure. The organizational chart of Associated Gas and Electric Co, involved over 170 subsidiaries with even a large number of corporate layers (Zentz, 1952). Both Figures stress that complex organizational charts and pyramidal ownership structures were prevalent in the electric utility industry before 1935. These figures are at odds with the widespread perception that the U.S. corresponds to a system of widely held firms. In other words, if pyramids ceased to exist in the U.S. after 1935, it is important to understand the determinants of such change (see for example, Kandel, et al. 2013).

Figure 3, plots the geographical dispersion of Electric Bond and Share. Figure 3 highlights two main issues: first, Electric Bond had operations in several regions of the U.S. Second, the geographic distance across locations implied that it was not economically feasible to physically integrate the electric utility infrastructure across regions. As such, the enforcement of PUHCA necessarily implied the creation of new standalone firms. In contrast, HCs such as International Hydro-Electric System with dozens of operating firms but mostly concentrated in New England, were more likely to be retained as integrated operating firms.

I describe the actual data used in the analysis next.

B. Firm Level data

Firm level data is from the U.S. Federal Power Commission (FPC). Starting in 1937, the FPC reports annual financial and operating information from privately owned electric utilities. The primary source of the data is the FPC form 1, which utilities have to report to the FPC by all firms with annual electricity revenue of $250,000 or more. The data discloses balance sheet, income accounts, operating results, as well as, physical quantity information for each operating electric utility in the U.S.

Given that the FPC data are available in book format and to economize in data collection costs, I only 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.

C. Ownership Information

Given the interest in assessing the impact of PUHCA on the ownership characteristics of firms, I proceed to collect ownership data from: (a) 1935, which corresponds to data prior to the introduction of the Act, and (b) 1955, a year by which its implementation was complete.

Ownership information from 1935 is from the Report of the Committee on Instate and Foreign Commerce to the House of Representatives (1935), or Moody's Manual of Investments (1935), respectively, whenever the first source did not report it. Ownership information from 1955 is from the Moody's Manual of Investments (1955).

For each operating firm, I rely on ownership sources to collect: (i) the name of the direct parent HC and (ii) the ownership stake held in the firm. For each owning firm, I repeat the data collection exercise and collect (i) and (ii) until I identify the ultimate parent company of HC. Using those data, I compute the number of corporate layers used to control each of firm.

D. Holding Company and Operating Firm Location

I rely on the FPC 1940 Directory of Electric Utilities in the United States, as well as in ownership sources to identify the address of the main location of each of the operating and parent firms. Using zip code locations, I compute the geodesic or shortest distance between each of the operating firms and their direct and ultimate parent companies.

E. Sample Selection

To focus on the most relevant firms in terms of productive capacity and those with available information around the introduction of PUHCA, I additionally impose the following five selection filters. First, that each of the operating firms has non-missing values of total assets, operating and net income, and assets and sales values of at least one million dollars. Second, that each firm is reported in at least three of the FPC reports and that at least one of them is prior to 1945. Third, that the relevant ownership information is available for 1935.

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

F. Summary Statistics

Table I presents the summary statistics. The mean operating return on asset and net income ratios are 9.3% and 3.7%, respectively. Not surprisingly, the bulk of the sample firm assets are in the electric utility industry (83%) and the majority of their clients are residential users (74.7%). Table I reports detailed cost structure information broken into the following exclusive categories: production, transmission and distribution, marketing and selling, administrative and general expenses. Relative to revenue, the largest cost components are, respectively, generation costs (29.5%), followed by transmission (8.8), administration (6.9%) and marketing expenses (5%). Mean long-term debt ratios are 35%, while average cash balances and dividend-equity ratios are 2.6% and 4.9%, respectively. Using all non-equity liabilities, the net-debt ratio of the sample firms is 40.7%.

A unique feature of these data is the availability of physical quantity information about each firm. In particular, the total value of the energy generated, as well as the value of the energy lost by each operating entity. Using these variables we can compute two straightforward measures of operating efficiency: (a) the loss ratio measured in terms of quantities, and (b) an input-adjusted measure of production (using total assets and total expenses in a least-squared specification), that proxies for total factor productivity. Table 1, shows that mean energy loss ratios are 10.7% and that there is substantial variation in terms of input-adjusted output: firms in the 10^{th} percentile produce 46 percent less output than the average firm, while firms in the 90^{th} 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 the regional and client-base differences, it within-firm variation is likely to be more informative about the pricing behavior of each of the operating firms.

Based on 1935 ownership, 86% of the sample firms are affiliated to a holding company, i.e. 250 firms are group firms while only 41 firms are standalone entities. Consistent with the notion that electric firms were held through complex ownership structures, the mean number of corporate layers between the ultimate parent firm and the sample firms is 2.1 (2.5 for group

firms), with firms in the 90th percentile having 4 (5 for group firms), corporate layers. The group firm data corresponds to 48 ultimate holding companies, with an average number of operating firms of 5.21 per system.

Table 1 shows that the average distance from the firms to the ultimate parent companies was 640 miles, and with substantial variation. The corresponding mean distance to the direct parent company is 537 miles, but with slightly larger variation: a standard deviation of 626 versus 594 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 clause. The mean ratio is 47%, and crucial for this paper, with substantial variation. The 10th percentile firm belongs to a business group where all firms are nearby their ultimate parents, while the 90th percentile firms belong to holding companies where 90% of the member firms are geographically distant from the ultimate parent firm.

Lastly, Table 1, reports the ownership characteristics for the 213 firms with matching information in 1955. The share of group firms was 41% or 87 firms, while the majority of firms or 126 firms were standalone. The average number of layers used to control firms in 1955 was 0.43 (1.06 for group firms). Remarkably, the 90th percentile had only one layer of corporate ownership above them. In words, these numbers confirm that there was a substantial change in the ownership patterns in the electric utility industry between 1935 and 1955.

IV. Results

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

As a first pass on the importance of organizational structures for firm profitability, leverage and efficiency, 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 only focus on those two years only because they precede the implementation of PUHCA. Panel A, only 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 highlight the following three correlations. First, operating units across ownership structures are no different in terms of sales. While the total revenue number for holding companies is naturally higher, the sales levels at the operating firm level do not systematically differ. Second, on average group firms have higher OROA ratios that are mostly explained by lower overhead costs. Those differences are consistent with the economies of scale or synergetic advantages of holding groups. Third, net income ratios do not systematically differ across organizational forms. Such 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 stress the potential advantage of group firms at raising capital or they may be driven by a group firm preference of 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, indicates that firms affiliated to holding companies were more efficient both in terms of total output per unit of input, lower energy losses and lower prices. The evidence is suggestive of substantially large output effects: group firm status is correlated with 25 more output and 16% lower energy losses (2 percentage points evaluated at the mean), than other firms. Similarly, group firms charge prices that are 23% lower than those of the independent producers.

The cross-sectional evidence of Table II, Panel A is consistent with the idea that holding companies are superior in terms of operational efficiency and financial performance, relative to standalone firms. The results, however, are potentially confounded with other omitted variables that are hard to control form empirically. As such, inference is complicated.

In Table II, Panel B, I test whether group firms with distinct number of layers of corporate ownership behave differentially. These latter tests are motivated by the spirit of PUHCA, which is not to ban holding companies but to simplify the corporate structure of those in existence. In other words, to the extent that multi-layered group 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 group firms are relatively less efficient than others. In particular, multi-layered group firms with four or more layers of corporate ownership are significantly less productive than other group firms. The input-adjusted output differences are significant: in the 32% range, making the net productivity of these firms indistinguishable from those of standalone firms. Similarly, the energy losses of multi-layers firms are larger and the prices are higher than those of single-layered group firms, eroding the bulk of the advantages in terms of efficiency and prices of group firm status.

In sum, Table II highlights both the potential advantages and shortcomings of business group affiliation. By levering unique assets or economies of scale, group firms can potentially become more profitable and productive than standalone organizations. Yet, 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 direct or causal effect of organizational forces. Clearly, cross-sectional specifications are prone to a number of omitted variables and endogeneity concerns, which in this paper we seek to overcome in the subsequent empirical tests.

IV. B. Ownership Patterns and Determinants of Organizational Change between 1935 and 1995.

In this section, I first describe the basic organizational characteristics of electric utilities in 1935 and 1955, and subsequently explore their determinants. In essence, this section provides a direct test of the basic features of PUHCA's death sentence clause, which sought to dismantle non-geographically integrated holding groups and simplify the ownership structures of those group firms that continue to operate after its implementation.

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 to a holding company to standalone status.

Table III, Columns V to VIII investigates whether the provision that no operating firm could be controlled by a holding company 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 single corporation had more than two layers of corporate ownership. Therefore, by 1955 all operating firms in the industry were in compliance with 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 to 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 in 1955. Namely, firms that are geographically close to the parent firm could make the case to the SEC to remain integrated. In contrast, firms that do business far away from the parent firm would find it challenging to remain integrated.

Table IV, Column I, provides strong empirical support for the idea that distance from the ultimate parent affects the decision of whether the group firm becomes standalone in 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 in 1955 than a firm that is nearby its parent firm, an effect that is significant at the 1% level. Standard errors are clustered at the parent firm level, which is the main source of variation for each parent-firm match. Interestingly, the distance from the parent firm explains, by itself, 12% of the variation in the ownership changes between 1935 and 1955. Table IV, Columns II and III explore the functional form relationship between ultimate parent distance and organizational change using indicator variables for firms that are located over 100 or 500 miles away from the parent firm. The evidence shows that firms only become 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 as affiliated group firms, while those that were located at large distances from the parent firm were prone 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 father than 500 miles from the parent company on the decision to become a standalone firm. The idea behind this test is that a group firm in 1935 would be more likely to become independent in 1955 if: (a) the parent company is located at a distance of at least 500 miles and (b) other group firms are located 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 located at a distance of 500 miles or more to their parent firm is 31% more likely to become standalone than another group firm where only 25% of the firms were at a distance of 500 miles or more 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, also I examine the functional form of the effect of group fragmentation ratio on standalone status by first splitting the sample firms into terciles, and subsequently testing for differences in the estimated coefficients. The results, shown in Column V, stress that firms that belong to the second tercile and third terciles in terms of regional fragmentation are 31 and 52 percentage points, respectively, more likely to be independent in 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 time more likely to be standalone than those in the first group. 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 to 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 to the ultimate parent reported in Column I.

In Table IV, Columns VII to X, 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 regional fragmentation ratio dominates the distance to the ultimate parent firm. Including both variables renders the latter control insignificant. Second, relative to the holding group regional fragmentation ratio, the distance to the direct parent company captures incremental predictive information in 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. Namely, that relative simple regional fragmentation variables help to explain a substantial (15% to 22%) of the ownership variation experienced by firms that belonged to holding companies in 1935. I examine the economic consequences on 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 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. In consequence, I can examine whether those regional fragmentation variables predict changes in firm performance (reduced form analysis), or test whether the predicted changes in standalone status explained by those variables affects firm outcomes (2SLS-IV tests). If the orthogonality assumption is met, the latter tests allow us to identify the causal effect of standalone status on firm performance.

IV.C.1. Reduced Form Analysis.

To further facilitate inference, 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 presents the results.

Table V, Panel A, presents the reduced form correlation between the holding group fragmentation ratio using 1935 information (i.e. the fraction of group firms that are located over 500 miles away from the ultimate parent company) and the changes in the measures of firm profitability, capital structure and operating efficiency. Similarly, Table V, Panels B and C show the reduced for correlation between the distance to the ultimate (direct) parent firm in 1935 and the differences in the variables of interest.

The regional fragmentation variables provide three consistent empirical patterns. First, fragmented firms correlate with significant increases in profitability: production costs fall and operating and net income increase. Second, fragmented systems correlate with increases in dividend payouts. Third, and arguably most interestingly, they also correlate with significant improvements in efficiency: higher total 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. Yet, 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 that results from firms located over 500 miles from their parent company as IV, while Panels B and C, respectively, rely on distance to the ultimate or direct parent firm as instruments. Lastly, Panel D relies on both the holding group fragmentation ratio and the distance to the direct parent firm as IVs.

As anticipated in Table V, 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 ownership. In terms of magnitudes, 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 very large considering that the mean sample OROA is in the 9% range.

In terms of capital structure and payout policies, the evidence from Table V stresses two results. First, standalone firms do not systematically affect capital structure. Such finding is consistent with the idea that assets in place may be the dominant driver of debt capacity of firms and not 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 comparable 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 are presented in Table V, 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. As it is common with IV specifications, the standard errors are large, however, which does not allow us to rule out that the increases in operational efficiency are in the single-digits levels. Consistent with higher levels of efficiency, energy losses drop by 2.2 percentage points, which in economic terms translate to 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 to the idea that standalone firms enhance economic 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 to address the project evaluation concerns raised by Bertrand et al (2004). The evidence suggests that the efficiency gains are driven by superiority in the operational side of businesses. In other words, the higher performance of standalone firms is not explained by higher prices; it is driven by an advantage in lowering production costs and loss rates, and enhancing output efficiency. Moreover, the evidence casts doubt that the operational synergies or the financial advantages of holding groups 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 to the direct parent firm in 1935) and a dummy equal to one for the post-PUHCA period, which is one in 1946 and after, i.e. after the Supreme Court decision that upheld the Act.

Table VII, Panel A and B, shows results for the panel of firm-years that correspond to the collapsed data used in Table VI. Not surprisingly, the results without controls are virtually identical as 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 from the analysis. The major difference is that 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. Yet, the main finding that standalone firms are both more productive and efficient in terms of input-adjusted output continues to hold. 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 Table VII, Panels C and D 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 OROA, 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 start to examine the potential channels for the organizational advantages of standalone firms. To this end, I split the sample firms into two groups based on their relative efficiency before PUHCA was implemented. In particular, I sort firms into two groups based on their input-adjusted output levels, which captures total factor productivity in terms of quantities. The idea behind this test is that by focusing on the top and bottom performing firms prior to 1940 we can potentially shed light into the heterogeneity of the organizational effects of standalone relative to large business groups.

The results in Table VIII, Panel A, suggest that top performing group firms that were forced to become standalone with PUHCA become even better after the Act is implemented. Productivity increases and the energy losses decline is a sharp fashion. In contrast, the efficiency gains by those firms with below average productivity before the PUHCA are not different from

zero at conventional levels. Such evidence is consistent with the notion that large holding companies would tend to hold back promising business units 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 firms. Such results suggest 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. Such correlation is potentially consistent with group firms imposing high leverage ratios to the group firms despite their relatively weak operating position. Yet, such 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. Based on 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 would be consistent with the idea 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 forces dominates in practice.

The results presented in Table IX, cast doubt on the idea that those firms belonging to holding companies that argued severe economic losses as a result of the death sentence clause were indeed superior to standalone firms. In contrast, 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 to the holding systems. Arguably more revealing, Column XIII shows 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 from this paper. This result is motivated by recent evidence by Panier, Pérez-González and Villanueva (2013), who show that the capital structure of large business groups is more responsive to tax incentives than the financing decisions of 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 (increase) 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 environment sharply increase their dividends after they become standalone firms.

Overall, the evidence shows that large holding companies use their multi-location status to minimize their 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 is suggestive that holding groups have a relative advantage at minimizing tax obligations.

V. Conclusions

In this paper, I use a detailed dataset from an important historical episode in terms of government regulation in the United States to assess the impact of organizational form for 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, effectively banning pyramidal ownership. The primary objective of the paper is to establish the arguably causal effect of subsidiaries on production efficiency, profits, capital structure, and pricing to consumers.

I show that PUHCA led to a radical change in the ownership characteristics of electric utilities. While in 1935 only 14% of firms were standalone, by 1955 the fraction of independent firms grew to 59%. More relevant for the analysis, I show that which firms became standalone was largely determined by PUHCA's death sentence provision. In particular, I show that firms that in 1935 were part of regionally fragmented groups were three times more likely to be independent in 1955 than those regionally integrated. Using the idea that a fraction of regionally dispersed firms were more likely to be subject to a standalone "treatment", irrespective of their changing investment opportunities, I proceed to examine the effect of organizational form on firm performance.

This paper provides robust empirical support to the idea that standalone or independent firms are more efficient than comparable corporations that are affiliated to a large holding or business group. Firms that become independent are more productive and profitable, grow faster, and pay more dividends than firms affiliated to HCs. Moreover, I do not find evidence of significant operating synergies that result from group affiliation. In contrast, I find evidence that through their multi-entity structures, large business groups may have a relative advantage at minimizing the tax obligations or at charging higher prices to consumers.

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 countries or industries are fascinating areas for further research.

References (incomplete, to be completed and integrated)

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. *Ferreting 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

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., Part84A (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 in Power and Gas Affecting Control, Part I, 73rd Congress, 2nd 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).

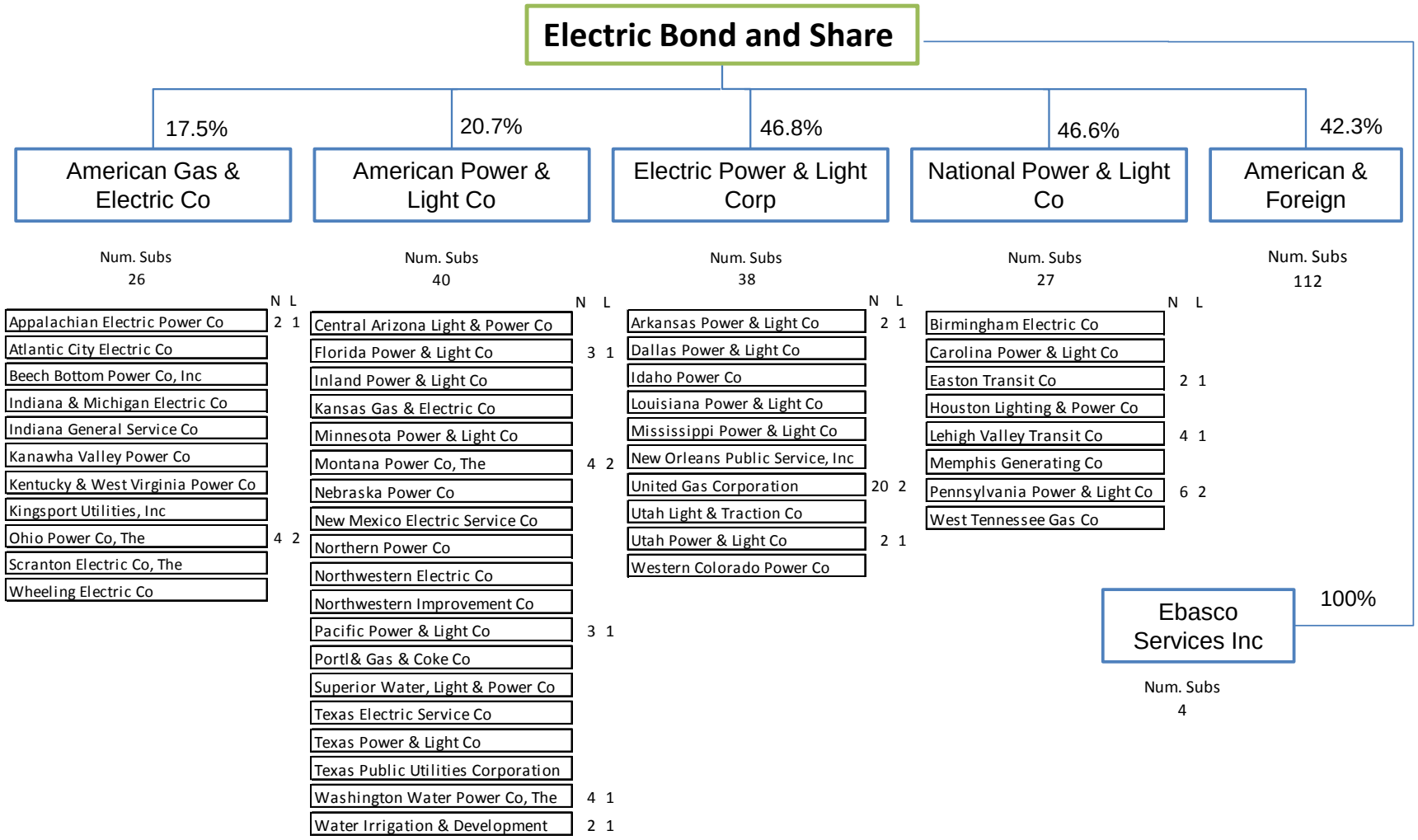
Williamson, Oliver E. *Markets and Hierarchies: Analyses and Antitrust Implications*, (New York: The Free Press. 1975),

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)

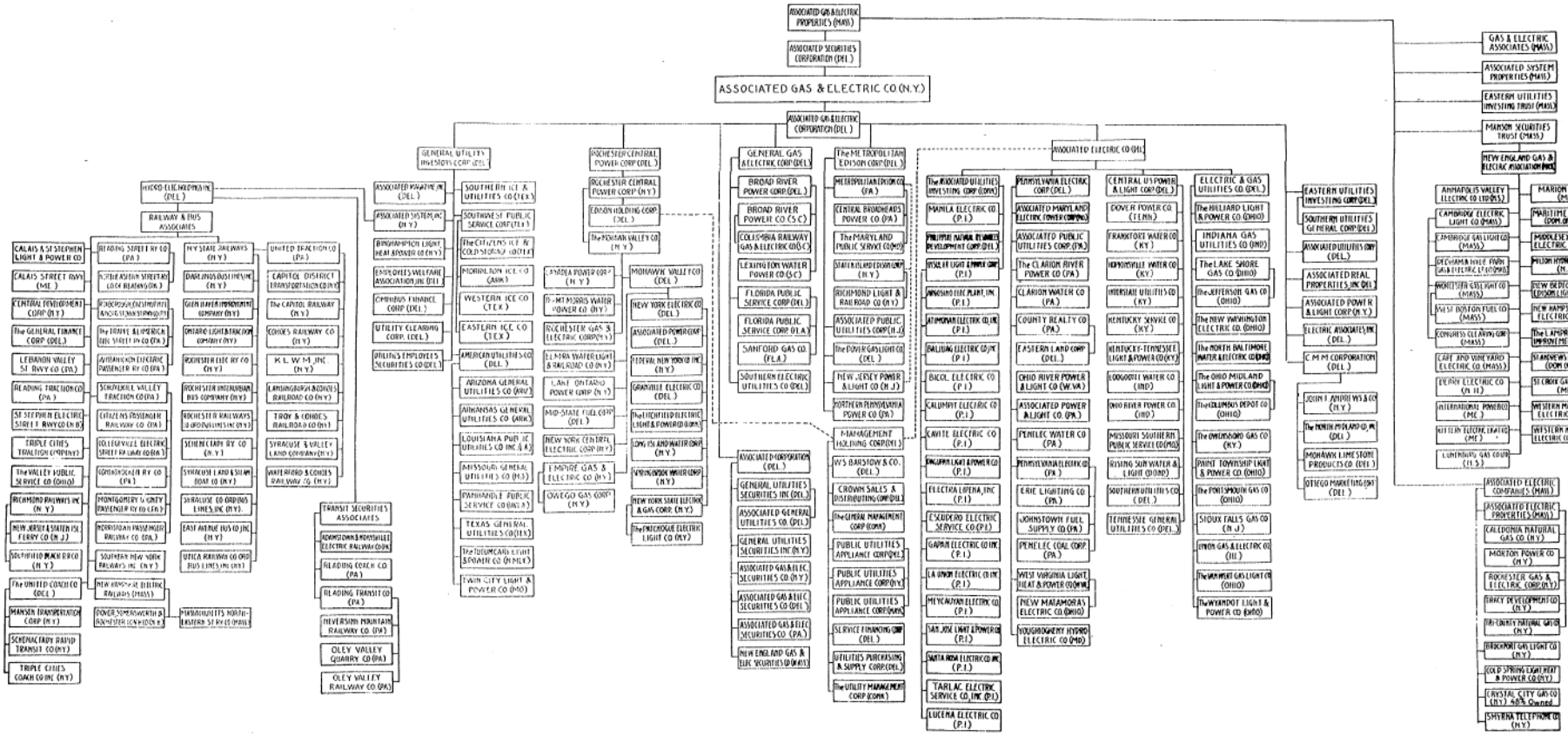
Zentz, Wiliam, M. "The Economic Effects of Forced Geographic Integration of Electric Utility Holding Companies," unpublished Ph.D. thesis, University of Michigan, 1952.

FIGURE 1. ELECTRIC BOND AND SHARE: ORGANIZATIONAL CHART



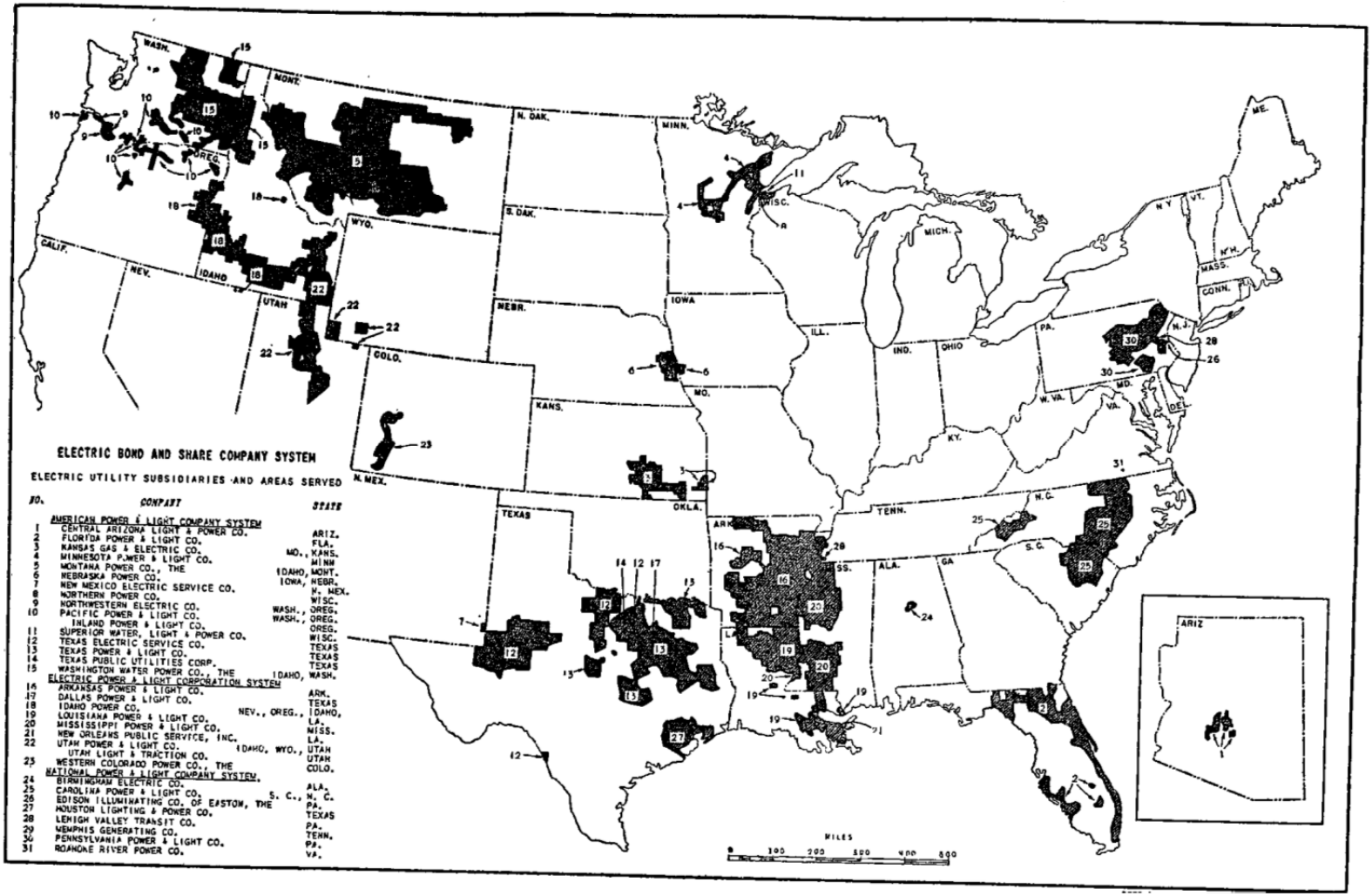
Source: Author's based on ownership information from the SEC, 1941. N refers to the number of subsidiaries below the firm. L refers to the number of corporate ownership layers below the firm.

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*, *total expenses* are the natural logarithm of the value of total assets, sales, and total expenses. *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 share* is the ratio of electric plant 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* 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 Moody's *Manual of Investments* (1935), respectively, whenever the first source did not report it. Ownership information from 1955 is from the 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 the affiliated to another firm that is also affiliated to an ultimate corporate owner, the number of firms or layers is 2. *Distance to ultimate (direct) parent*, is the distance from the firms' 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 a distance of 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
Ln total assets	2,754	17.171	1.595	14.990	17.232	19.232
Ln sales	2,754	15.732	1.530	13.706	15.704	17.752
EBIT to assets ratio (OROA)	2,754	0.093	0.029	0.058	0.092	0.130
Net income to assets ratio	2,754	0.037	0.015	0.018	0.037	0.055
Electric plant ratio	2,754	0.833	0.256	0.541	0.962	1.000
Ln total expenses	2,754	14.858	1.483	12.926	14.799	16.856
Residential client ratio	2,754	0.747	0.206	0.585	0.817	0.883
Production costs to sales ratio	2,754	0.295	0.126	0.153	0.275	0.465
Transmission & distribution costs to sales ratio	2,754	0.088	0.030	0.055	0.088	0.123
Marketing and selling costs to sales ratio	2,754	0.050	0.020	0.027	0.050	0.074
Administrative and general expenses to sales ratio	2,754	0.069	0.024	0.042	0.067	0.098
Depreciation to assets ratio	2,754	0.021	0.007	0.012	0.021	0.031
Long-term debt to assets ratio	2,754	0.352	0.176	0.000	0.401	0.520
Cash to assets ratio	2,754	0.026	0.022	0.007	0.020	0.050
Net debt to assets ratio	2,754	0.326	0.181	-0.013	0.377	0.500
All net debt to assets ratio	2,754	0.407	0.168	0.127	0.448	0.574
Dividends to equity	2,754	0.049	0.027	0.010	0.050	0.080
Energy loss to total energy available	2,754	0.107	0.044	0.055	0.105	0.164
Ln total energy	2,754	12.729	1.733	10.383	12.711	15.017
Ln price	2,754	3.003	0.495	2.446	3.050	3.544
Input adjusted output	2,754	0.000	0.484	-0.463	-0.053	0.537
Group firm, 1935	291	0.859	0.349	0.000	1.000	1.000
Number of ownership layers, 1935	291	2.148	1.537	0.000	2.000	4.000
Distance to ultimate parent company, 1935	250	0.640	0.594	0.043	0.475	1.546
Distance to direct parent company, 1935	250	0.537	0.626	0.001	0.299	1.454
Holding company regional fragmentation ratio	250	0.467	0.360	0.000	0.587	0.904
Group firm, 1955	213	0.408	0.493	0.000	0.000	1.000
Number of ownership layers, 1955	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 the firm is reported as such by another corporation; otherwise it is classified as *standalone*. Panel B, also examines the differential characteristics of group firm with different number 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**		
	Ln Sales	**Prod. Costs**	**Overhead**	**Depr. ratio**	**OROA**	**Net income**	**Debt ratio**	**Cash ratio**	**Div. ratio**	***Ln Output***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)
Panel A. Standalone vs. group firm												
Group firm	**0.048**	**0.012**	**-0.021** ***	**-0.002**	**0.008** **	**0.001**	**0.097** ***	**-0.003**	**0.002**	**0.253** ***	**-0.020** **	**-0.229** ***
	(0.066)	***(0.017)***	***(0.005)***	***(0.001)***	***(0.004)***	***(0.004)***	***(0.033)***	***(0.003)***	***(0.002)***	***(0.078)***	***(0.010)***	***(0.074)***
Ln assets	0.854 ***	-0.036 ***	-0.005 ***	-0.001 ***	-0.005 ***	-0.003 **	0.035 ***	-0.000	0.004 ***	0.554 ***	0.007	-0.168 ***
	(0.032)	*(0.006)*	*(0.001)*	*(0.000)*	*(0.001)*	*(0.001)*	*(0.012)*	*(0.001)*	*(0.001)*	*(0.077)*	*(0.005)*	*(0.017)*
Electric plant share		0.008	-0.002	0.003 **	0.015 ***	0.017 ***	-0.031	0.001	0.011 **	0.402 ***	-0.014	-0.194 *
		(0.019)	*(0.006)*	*(0.001)*	*(0.004)*	*(0.004)*	*(0.037)*	*(0.004)*	*(0.005)*	*(0.138)*	*(0.013)*	*(0.104)*
Residential client ratio		-0.066 *	0.017 **	0.010 ***	0.032 ***	0.015 ***	-0.009	-0.001	-0.010 **	-1.320 ***	0.086 ***	1.452 ***
		(0.035)	*(0.007)*	*(0.002)*	*(0.005)*	*(0.004)*	*(0.060)*	*(0.007)*	*(0.004)*	*(0.158)*	*(0.016)*	*(0.183)*
OROA							-2.846 ***	0.158 ***	0.821 ***			
							(0.564)	*(0.050)*	*(0.077)*			
Ln expenses										0.617 ***	-0.013 **	
										(0.092)	*(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
Panel B. Standalone vs. group firm, and multilayer group firm												
Group firm	**0.031**	**0.005**	**-0.021** ***	**-0.001**	**0.008** *	**0.002**	**0.071** *	**-0.000**	**-0.001**	**0.367** ***	**-0.034** ***	**-0.324** ***
	(0.083)	***(0.017)***	***(0.005)***	***(0.001)***	***(0.004)***	***(0.004)***	***(0.039)***	***(0.004)***	***(0.003)***	***(0.105)***	***(0.010)***	***(0.098)***
Group firm, 2 layers	-0.006	0.004	0.002	-0.000	-0.001	-0.003	0.037	-0.002	0.004	-0.106	0.019 ***	0.071
	(0.068)	*(0.011)*	*(0.005)*	*(0.001)*	*(0.003)*	*(0.002)*	*(0.029)*	*(0.003)*	*(0.003)*	*(0.097)*	*(0.006)*	*(0.087)*
Group firm, 3 layers	-0.007	-0.003	-0.001	-0.002 **	0.000	-0.002	0.058 *	-0.004	0.006	-0.108	0.018 **	0.118
	(0.069)	*(0.015)*	*(0.005)*	*(0.001)*	*(0.005)*	*(0.004)*	*(0.034)*	*(0.004)*	*(0.004)*	*(0.098)*	*(0.008)*	*(0.097)*
Group firm, 4 or more layers	**0.144**	**0.048** **	**-0.003**	**-0.003** ***	**0.001**	**0.002**	**-0.017**	**-0.007** *	**0.006**	**-0.322** ***	**0.021** *	**0.258** ***
	(0.147)	***(0.023)***	***(0.013)***	***(0.001)***	***(0.008)***	***(0.008)***	***(0.075)***	***(0.004)***	***(0.004)***	***(0.087)***	***(0.011)***	***(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 Moody's *Manual of Investments* (1935), respectively, whenever the first source did not report it. Ownership information from 1955 (Row (ii)) is from the 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 firm 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 over 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, periods. ***, **, 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)
Panel A. Unbalanced panel								
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)
Panel B. Balanced panel								
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 to the parent company. The dependent variable is an indicator variable equal to one for firms that became a standalone firm in 1955, but that were reported as group firms affiliated to a holding company in 1935, zero otherwise. The data is collapsed at the firm level and it only includes 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 (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 firms' 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 such threshold, zero otherwise. (3) *Firms over 500 miles from ultimate parent in 1935*, is the ratio of firms that belong to a business group 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, indicator variables 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 firms' main office is located. Size, profitability and population controls are firm averages for the 1937-1939 years. 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)
Distance to ultimate parent firm in 1935, miles (thousands)	0.279 ***						0.056			
	(0.079)						*(0.062)*			
Distance to ultimate parent firm in 1935, over 100 miles		0.108	-0.063							
		(0.160)	*(0.194)*							
Distance to ultimate parent firm in 1935, over 500 miles			0.294 *							
			(0.165)							
Holding company regional fragmentation ratio				**0.627** ***			**0.565** ***	**0.515** ***		**0.442** ***
				(0.127)			***(0.161)***	***(0.143)***		***(0.138)***
Firms over 500 miles from ultimate parent in 1935, indicator 2					0.305 **					
					(0.133)					
Firms over 500 miles from ultimate parent in 1935, indicator 3					0.516 ***					
					(0.150)					
Distance to direct parent firm in 1935, miles (thousands)						0.275 ***				0.084 *
						(0.070)				*(0.044)*
Ln assets									0.102 ***	0.092 ***
									(0.023)	*(0.027)*
OROA									-0.014	1.183
									(1.651)	*(1.574)*
Ln state population									-0.123 ***	-0.056
									(0.028)	*(0.038)*
Constant	0.332 ***	0.429 ***	0.429 ***	0.211 **	0.269 **	0.361 ***	0.204 **	0.202 **	0.543	-0.571
	(0.093)	*(0.131)*	*(0.131)*	*(0.081)*	*(0.108)*	*(0.085)*	*(0.084)*	*(0.082)*	*(0.633)*	*(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) the 1937 to 1939, and (b) 1955 to 1960, periods. 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, 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. It seeks 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 XI); 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj.***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. Holding company regional fragmentation ratio													
Firms over 500 miles from parent, ratio	**0.274** **	**-0.082** **	**-0.003**	**0.002**	**0.027** ***	**0.017** **	**-0.010**	**-0.008**	**0.019** ***	**0.422** ***	**0.171** **	**-0.014** **	**-0.049**
	(0.123)	***(0.033)***	***(0.009)***	***(0.002)***	***(0.009)***	***(0.007)***	***(0.037)***	***(0.007)***	***(0.006)***	***(0.141)***	***(0.070)***	***(0.006)***	***(0.051)***
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
Panel B. Distance to 1935 ultimate parent firm, miles (thousands)													
Distance to 1935 ultimate parent firm, miles (thousands)	0.132	-0.041 ***	-0.004	-0.000	0.008	0.007 **	0.019	0.001	0.009	0.222 **	0.094 **	-0.012 ***	-0.041
	(0.084)	*(0.015)*	*(0.004)*	*(0.001)*	*(0.005)*	*(0.003)*	*(0.017)*	*(0.003)*	*(0.005)*	*(0.095)*	*(0.039)*	*(0.003)*	*(0.028)*
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
Panel C. Distance to 1935 direct parent firm, miles (thousands)													
Distance to 1935 direct parent firm, miles (thousands)	0.107	-0.039 **	-0.001	-0.000	0.010 **	0.008 **	0.021	-0.001	0.012 ***	0.184 **	0.097 ***	-0.013 ***	-0.054 **
	(0.072)	*(0.015)*	*(0.004)*	*(0.001)*	*(0.004)*	*(0.003)*	*(0.017)*	*(0.003)*	*(0.004)*	*(0.078)*	*(0.033)*	*(0.002)*	*(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) *the holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from the ultimate parent company (Panels A and D), (ii) the *distance of each operating firm to the ultimate parent firm* in 1935 (Panel B), and (iii) *the distance of each operating firm to the direct parent firm* in 1935 (Panels C and D). A standalone firm is a firm that in 1935 was affiliated to a holding company firm that 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) the 1937 to 1939, and (b) 1955 to 1960, periods. 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, 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. It seeks 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 XI); 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj.***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. Instrumental variable: Holding company regional fragmentation ratio													
Standalone firm	0.437 **	-0.130 **	-0.005	0.004	0.044 ***	0.027 **	-0.017	-0.012	0.031 ***	0.673 **	0.273 *	-0.022 **	-0.078
	(0.194)	*(0.054)*	*(0.013)*	*(0.003)*	*(0.015)*	*(0.011)*	*(0.058)*	*(0.012)*	*(0.011)*	*(0.262)*	*(0.142)*	*(0.011)*	*(0.083)*
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
Panel B. Instrumental variable: Distance to 1935 ultimate parent firm, miles (thousands)													
Standalone firm	0.472	-0.146 ***	-0.014	-0.001	0.030 *	0.025 **	0.068	0.003	0.032 *	0.794 **	0.338 *	-0.045 **	-0.148
	(0.297)	*(0.055)*	*(0.016)*	*(0.003)*	*(0.017)*	*(0.011)*	*(0.070)*	*(0.010)*	*(0.017)*	*(0.379)*	*(0.184)*	*(0.018)*	*(0.111)*
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
Panel C. Instrumental variable: Distance to 1935 direct parent firm, miles (thousands)													
Standalone firm	0.389	-0.141 **	-0.005	-0.002	0.037 **	0.030 ***	0.075	-0.002	0.044 **	0.670 **	0.351 **	-0.048 ***	-0.196 *
	(0.261)	*(0.056)*	*(0.014)*	*(0.003)*	*(0.015)*	*(0.009)*	*(0.073)*	*(0.009)*	*(0.018)*	*(0.319)*	*(0.172)*	*(0.015)*	*(0.107)*
Number of observations	179	179	179	179	179	179	179	179	179	179	179	179	179
Panel D. Instrumental variables: (a) Holding company regional fragmentation ratio, (b) Distance to 1935 direct parent firm, miles (thousands)													
Standalone firm	0.426 **	-0.133 **	-0.005	0.002	0.042 ***	0.027 ***	0.004	-0.010	0.034 ***	0.673 ***	0.291 **	-0.028 **	-0.105
	(0.192)	*(0.053)*	*(0.013)*	*(0.003)*	*(0.014)*	*(0.010)*	*(0.058)*	*(0.011)*	*(0.011)*	*(0.256)*	*(0.143)*	*(0.012)*	*(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) *the holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from the ultimate parent company, (ii) the *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 and 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 to 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj.***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. Sample: 1937-1939 & 1955-1960													
Standalone firm	0.413 **	-0.126 **	-0.004	0.004	0.042 ***	0.028 **	-0.026	-0.011	0.030 ***	0.657 ***	0.266 *	-0.019 *	-0.072
	(0.177)	*(0.055)*	*(0.013)*	*(0.003)*	*(0.016)*	*(0.011)*	*(0.061)*	*(0.011)*	*(0.010)*	*(0.252)*	*(0.141)*	*(0.011)*	*(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
Panel B. Sample: 1937-1939 & 1955-1960, firm controls													
Standalone firm	0.153 *	-0.122 **	0.000	0.003	0.049 ***	0.031 ***	-0.010	-0.011	0.014 *	0.271 *	0.271 *	-0.019 *	-0.026
	(0.090)	*(0.050)*	*(0.013)*	*(0.003)*	*(0.017)*	*(0.012)*	*(0.054)*	*(0.009)*	*(0.008)*	*(0.153)*	*(0.153)*	*(0.010)*	*(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
Panel C. Sample: 1937-1960													
Standalone firm	0.278 **	-0.067 **	-0.009	0.003 *	0.035 ***	0.024 ***	0.006	-0.006	0.023 ***	0.464 ***	0.195 **	-0.006	-0.035
	(0.134)	*(0.032)*	*(0.007)*	*(0.002)*	*(0.011)*	*(0.008)*	*(0.045)*	*(0.007)*	*(0.008)*	*(0.176)*	*(0.091)*	*(0.004)*	*(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
Panel D. Sample: 1937-1960, firm controls													
Standalone firm	0.123 *	-0.070 **	-0.006	0.003	0.038 ***	0.026 ***	0.031	-0.005	0.011 **	0.205 **	0.205 **	-0.008	-0.046
	(0.071)	*(0.030)*	*(0.007)*	*(0.002)*	*(0.012)*	*(0.008)*	*(0.042)*	*(0.007)*	*(0.006)*	*(0.097)*	*(0.097)*	*(0.005)*	*(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 the input-adjusted output, where input adjusted output 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 *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: *the holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from the ultimate parent company, (ii) the *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 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj. Energy loss***		***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. High input adjusted output before 1940													
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
Panel B. Low input adjusted output before 1940													
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 CHALLENGE 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 based on 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. The table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone status* using: *the holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from the ultimate parent company, (ii) the *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 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj.***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. Firms from holding companies that challenged PUHCA													
Standalone firm	0.232	-0.140 *	0.026	-0.009 **	0.026 **	0.014 **	0.227	-0.011	0.048	0.587	0.518 **	-0.057 ***	-0.352 **
	(0.414)	*(0.075)*	*(0.034)*	*(0.004)*	*(0.013)*	*(0.007)*	*(0.168)*	*(0.019)*	*(0.033)*	*(0.508)*	*(0.212)*	*(0.009)*	*(0.168)*
Number of observations	434	434	434	434	434	434	434	434	434	434	434	434	434
Panel B. Firms from holding companies that did not challenge PUHCA													
Standalone firm	0.459 **	-0.120 **	-0.005	0.005	0.042 ***	0.025 ***	-0.037	-0.009	0.031 ***	0.695 **	0.295 *	-0.019	-0.090
	(0.185)	*(0.049)*	*(0.009)*	*(0.003)*	*(0.014)*	*(0.009)*	*(0.055)*	*(0.010)*	*(0.011)*	*(0.284)*	*(0.151)*	*(0.011)*	*(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 taxed them. The table reports results from two-stage least-squares fixed effects specifications, where I instrument for *standalone status* using: *the holding company regional fragmentation ratio*, or the fraction of firms in the holding group that are located over 500 miles away from the ultimate parent company, (ii) the *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 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**			
	Ln Sales	***Prod. Costs***	***Overhead***	***Depr. ratio***	***OROA***	***Net income***	***Debt ratio***	***Cash ratio***	***Div. ratio***	***Ln Output***	***Output Adj.***	***Energy loss***	***Ln Price***
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
Panel A. Firms incorporated in states with corporate income taxation													
Standalone firm	0.297	-0.148 ***	-0.004	0.006	0.049 **	0.047 ***	-0.115 *	0.004	0.050 ***	0.473	0.235	-0.033	-0.079
	(0.196)	*(0.050)*	*(0.017)*	*(0.005)*	*(0.021)*	*(0.015)*	*(0.067)*	*(0.011)*	*(0.016)*	*(0.291)*	*(0.222)*	*(0.022)*	*(0.167)*
Number of observations	397	397	397	397	397	397	397	397	397	397	397	397	397
Panel B. Firms incorporated in states with no corporate income taxation													
Standalone firm	0.467 *	-0.090	-0.001	-0.001	0.031 **	0.010	0.109 *	-0.019 *	0.022	0.838 **	0.352 *	-0.029 **	-0.114
	(0.250)	*(0.057)*	*(0.016)*	*(0.003)*	*(0.016)*	*(0.007)*	*(0.066)*	*(0.010)*	*(0.015)*	*(0.375)*	*(0.211)*	*(0.012)*	*(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	**Consolidation**: (1) holding companies and pyramids, (2) Of the 57 holding companies in 1935, 41were chartered from 1922 to 1932 (Anderson, 1947), (3) Acquisitions relied heavily on debt financing
1928	The **Federal Trade Commission began an investigation on the abuses by holding companies**: (a) minority investors (expropriation by controlling shareholders), (b) consumer abuses (increased costs to increae 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.
	Public Utility Holding Company Act. Most controversial feature: the "Death Sentence" Clause. PUHCA to be implemented in 1938.
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	Noth American case is argued before the Supreme Court.
1946	**Supreme Court decision 6-0 upholding the death sentence clause**
Post-1946	Large increase in enforcement actions.
1953	SEC reports that compliance with the "death sentence" provision is basically complete.