Is There Room For Growth?
Debt, Growth Opportunities and
The Deregulation of U.S. Electric Utilities

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Abstract

We investigate the impact of growth opportunities on the financing decisions of investor-owned electric utilities in the U.S. when the electricity sector was deregulated. We find that the relationship between leverage and growth opportunities can be positive or negative, depending on the nature of the growth opportunity. Despite these opposing effects on leverage ratios, we find that electric utilities are issuing new debt in response to the same growth opportunities. Our results highlight that financing choice is not a simple one-period decision but a dynamic occurrence and that conventional leverage regressions cannot fully capture this dynamic response.

Key Words: Debt, Capital Structure, Pecking Order Theory, Growth Opportunities, Deregulation, Electric Utility
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In this paper, we investigate firm financing behavior during the period of deregulation in the U.S. electricity sector. Specifically, we look at the relationship between growth opportunities and the use of debt financing by firms. We find that the relationship between leverage and growth opportunities can be positive or negative, depending on the nature of a firm's growth opportunities. On the other hand, when we look at net debt issuances over time, we find that electric utilities are issuing new debt in response to these same growth opportunities. Our findings highlight the complexities surrounding financing decisions and show that conventional leverage regressions cannot fully capture the dynamics of firm financing activities. Financing choice is not a simple one-period decision but a dynamic occurrence. Hence, both theoretical and empirical work needs to address this.

Existing theories predict that a firm's *growth opportunities*[1] are an important determinant of its capital structure. Myers (1977) contends that firms with high growth opportunities are more likely to suffer from debt overhang problems. Risky debt induces firms to forego some profitable investment opportunities, resulting in a suboptimal investment policy for the firm. On the other hand, Jensen and Meckling (1976) argue that the conflict of interest between debtholders and equityholders creates incentives to over-invest in risky projects that reduce firm value (the "asset substitution effect"). To mitigate these types of problems, one solution is to use more equity financing than debt financing[2]. Myers (1984) and Myers and Majluf (1984) advocate that firms resort to internal funds first, then debt, and equity last, to satisfy their financing needs. This pecking order of financing is driven by asymmetric information between investors and firm managers. Under a dynamic version of this theory, firms may also forego some

[1] Growth opportunities are defined as discretionary, future investments.
[2] Other solutions include the use of shorter maturity debt and protective covenants.

positive NPV projects if they have to issue equity in order to invest. To correct this, firms with high growth opportunities should accumulate financial slack[3] today in anticipation of new financing needs for these future investments. The common prediction from all these theories is a negative relationship between leverage and growth opportunities.

In this paper, we test this empirical prediction regarding leverage and growth opportunities. A widely used measure of growth opportunities in the literature is the firm's market-to-book ratio. Prior empirical work has documented a significant negative relationship between firm leverage and the market-to-book ratio (Kim and Sorensen (1986), Titman and Wessels (1988), Rajan and Zingales, (1995)). This has been viewed as evidence supporting the above theories.[4] However, several studies have documented that firms issue equity when their market valuations are high (Jalilvand and Harris (1984), Korajczyck, Lucas and McDonald (1991), Jung, Kim and Stulz (1996)). Baker and Wurgler (2002) have argued that the effect of market-to-book on leverage ratios is primarily driven by "attempts to time the equity market." These findings would also be consistent with the negative relationship between leverage and market-to-book. More recently, Chen and Zhao (2006) show that the relationship between leverage and the market-to-book ratio (as a measure of growth opportunities) is negative for firms with high market-to-book ratios and is positive for firms with low to medium values of the market-to-book ratio. Hence, while the market to book ratio is a widely accepted proxy for the firm's growth opportunities, in standard leverage regressions, it is difficult to make inferences about the impact of growth opportunities on leverage when using this

[3] Financial slack consists of cash and cash equivalents or excess debt capacity.
[4] Additionally, Lang, Ofek and Stulz (1996) find that leverage is negatively related to investment (capital expenditure) growth and employment growth among firms with low growth opportunities. Johnson (2003) and Billet, King and Mauer (2007) find that short-term debt and covenant protection, respectively, "attenuate" the negative relation between leverage and the market-to-book ratio.

measure. Our paper is different from prior work in that we identify growth opportunities that are independent of firm characteristics. Thus, we avoid complications in the use of market-to-book ratios in leverage regressions. More importantly, we identify a pure "demand-side" effect of growth opportunities on leverage because our measures of such opportunities are exogenous to the firm.

We use a novel data set to tease out the complex relationship between growth opportunities and leverage. Our data consists of investor-owned electric utilities (IOUs) in the U.S. over the period 1990-2000. This period is a time of transition in the U.S. electric utility industry from a regulated environment to a competitive one (deregulation). Regulation provided a stable environment for electric utilities where there was very little variability in earnings and new investments were quite limited. The onset of deregulation changed the investment climate completely. Deregulation was an exogenous event[5] that changed a firm's long-term strategy for creating value for its shareholders. The electric utility was no longer confined to a specific customer group or to a certain geographic region. In this new environment, the IOU now had the potential to capture a greater share of the market by expanding into neighboring states, i.e. the event of deregulation created new opportunities for growth that previously did not exist. Our focus on a single industry enables us to identify very specific firm and industry characteristics that pertain directly to a firm's growth opportunities. Thus, there are these unique prospects for growth that utilities can take advantage of. In addition, the pace of deregulation in the U.S. and its associated policies and implementation measures vary widely by state. We exploit this variation to get a more powerful test of the effect of growth opportunities on a firm's financing decisions, and the use of debt financing in particular.

[5]As regulated monopolies, electric utilities had no financial incentive to support deregulation. The move towards deregulation was largely driven by: 1) price differences between neighboring U.S. states, and 2) the desire of regulators to reduce prices. See Joskow (1997).

Previous empirical work on firm financing has often ignored utilities due to the nature of their regulated environment. For regulated firms, the incentives for using debt financing can be quite different when compared to non-regulated firms.[6] In particular, regulation can be viewed as the utility's financial safety net since earnings are very stable under such a regime and the probability of financial distress is practically zero.[7] The period we are looking at is a time of transition from a regulated to a deregulated environment. Thus, it can be argued that the utility's incentives for using debt that are related to regulation are no longer present.

Moreover, our data allows us to investigate financing decisions from a unique perspective – that of firms reacting to competitive forces for the very first time. Sanyal and Bulan (2008) show that the regulatory and legislative changes that occurred during this period have had a significant impact on firm leverage ratios. In particular, they document that firm leverage exhibited a steady decline over this decade. They attribute the decline in leverage ratios to the increased uncertainty in both the deregulation process and the impending competitive environment, consistent with firms adjusting to a lower leverage target. We take a different approach and focus on the opportunities for growth brought about by deregulation.

The remainder of the paper is organized as follows. In Section 1 we briefly discuss the deregulation of the electric utility industry and the resulting opportunities for growth. Section 2 describes the data and variables used in our analysis. Our results are presented in Section 3 while Section 4 concludes.

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[6] See for example, Taggart (1981, 1985), Dasgupta and Nanda (1993), and Spiegel and Spulber (1994, 1997).

[7] This translates into a greater debt capacity for the regulated utility compared to non-regulated firms. In fact, Bradley, Jarell and Kim (1984) document that regulated industries have the highest debt-to-value ratios with electric and gas utilities second only to airlines.

1. The Deregulation of U.S. Electric Utilities and Growth Opportunities

The primary purpose of regulating electric utilities (IOUs) was to set prices. This was the responsibility of the public utility commission (PUC) in each state. The price setting mechanism was the "cost of service ratemaking" and the rates were fixed and could not be changed without PUC authorization. The regulators determined the "revenue requirement" of utilities based on their operating costs, depreciation, taxes, its "rate-base" (total net investment) and a regulator-determined rate of return that was considered a 'fair' return on investment. Then, based on the total revenues required by the utility, retail rates were set for different groups of customers.[8] In addition to price setting, the PUC also regulated the IOUs capacity investments and non-utility business ventures.

In the 1990s, the federal government, along with the Federal Regulatory Commission (FERC) had issued orders intended to introduce competition in the electricity market (deregulation). A typical electric utility is engaged in the production, transmission and distribution of electricity. In 1992, the passing of the Energy Policy Act (EPAct) gave impetus to wholesale power competition[9] and paved the way for the subsequent transition to retail competition. In 1996, FERC Orders 888 & 889[10] provided

[8] This procedure involved five main steps. The first four taken together determined the total revenue that a utility may earn – this was termed the "revenue requirement". The revenue requirement equation was given by: Revenue Requirement = Operating Costs + Depreciation + Taxes + (Rate Base)*(Regulator Determined Rate of Return). The fifth step was the "rate structure" – that determined how much different customers would be charged such that the "revenue requirement is fulfilled."

[9] Wholesale transactions are sales of electricity between utilities. FERC took several steps to ensure increased competition on the wholesale side. It required utilities to provide a detailed account of their transmission capacities, it expanded the range of services that the utilities were required to provide to wholesale traders and it made it clear that approval of application for mergers or charging competitive rates by IOUs were subject to their filing open access transmission tariffs with comparable service provisions.

[10] FERC Order 888 – "Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Service by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities" and Order 889 – "Open-Access Same-Time Information System". Order 888 stated that utilities which own transmission networks must provide transmission services to other power generators at cost-based non-discriminatory prices. Provisions were also laid out governing the recovery of stranded costs by utilities. Order 889 required each public utility to participate in an open Access Same-Time Information

an effective groundwork to begin retail wheeling, whereby retail consumers could shop around for the best rates when purchasing power. The actual deregulation procedures and implementation policies, however, were left to the discretion of individual state governments. In this paper, our focus is on full deregulation, i.e. retail competition at the state level.

We hypothesize that the primary source of growth for electric utilities under deregulation is a larger customer base. Opportunities for growth under the regulated environment were limited because the IOU was restricted to provide service to a specific state and in some instances, to specific customer groups. These restrictions were lifted with deregulation whereby utilities now had to operate in a competitive environment. IOUs had the opportunity to increase not only their market share, but the size of their potential market as well. That is, the utility had the opportunity to, one, gain more customers within its home state (original market), and two, gain customers from other states (new markets). We focus on the latter for two reasons: First, it represents growth opportunities that were non-existent under regulation. Deregulation clearly defines the onset of these new growth opportunities. This allows us to analyze the dynamic behavior of firms around the event of deregulation. Second, it represents discretionary investment opportunities. Firms did not have to enter these new markets whereas in their home market, firms were forced to make critical decisions and strategic investments if they wanted to remain in the industry. Thus, we argue that these opportunities to enter neighboring markets represent pure (demand-driven) growth opportunities.[11]

System (OASIS). This was done to facilitate wheeling by third parties that did not own transmission capacities. For a detailed provision of the orders please refer to the Department of Energy/EIA (1997).

[11] It should be noted that as a whole, industry demand is relatively stable over our time period. Our data covers only the largest utilities in the industry. Entering new markets thus means that these firms are increasing their own capacity while eroding the market share of other utilities.

2. Data

Firm level data for the paper is primarily from two sources – the FERC Form 1 that regulated IOUs had to file with the Federal Energy Regulatory Commission and various Energy Information Administration (EIA) publications from 1990-2003. Form 1 includes the firm's balance sheet, income statement and statement of cash flows. It also contains exhaustive data on all operational aspects of the utility such as electricity generation and the share of revenue from residential, commercial and industrial customers. Data on regulation and competition is from EIA's "Status of State Electric Industry Restructuring Activity as of February 2003"[12] and state regulatory bodies.

2.1 Firm Characteristics

From the financial statements and following previous work, we require the following variables for each firm in each year: total assets; sales revenue; return on assets or ROA (EBITDA / total assets); tangible assets (net plant and nuclear fuel / total assets); asset growth (annual growth rate in total assets); book leverage ratio (total debt / total assets where total debt equals long-term debt plus short-term debt); net debt, net preferred stock and net common stock issued; and the financing deficit (net debt issued plus net equity issued). We use book leverage as our key dependent variable.[13]

Many companies in our sample are wholly-owned by a holding company. Hence, we do not observe their stock price and cannot construct a market leverage ratio as other studies do.[14] We control for a firm's holding company structure by constructing two

[12] This publication outlines the regulatory orders, legislations and the investigative studies that have been undertaken by each state till 2003.

[13] This is the relevant leverage measure for our analysis for two reasons: 1) this is the definition of leverage used in the FERC manuals and 2) the variation in non-debt liabilities is minimized due to our single industry focus. For a more detailed discussion on this second point and on alternative leverage measures, see Rajan and Zingales (1995).

[14] See for example, Bradley, Jarrell and Kim (1984), Titman and Wessels (1988), Fama and French (2002).

variables: a *holding company dummy* that equals one if the utility is part of a holding company and a *holding company size measure* that equals the number of utilities in the holding company structure of the IOU. Table 1 provides the summary statistics for these key variables used in the regression analysis. Our full estimation sample includes 1618 observations and 190 utilities over the period from 1991-2000[15].

2.2 Regulatory Characteristics and Growth Opportunities

We identify various state regulatory factors specific to this period of deregulation that we believe may have a significant impact on leverage. The passing of EPAct in 1992 marks the beginning of deregulation. To control for this regime shift, we construct an *EPAct dummy variable* that equals one for the post-1992 period. Subsequent transition to retail competition was left to the discretion of individual state governments. We construct a *deregulation legislation* (DL) dummy variable to capture this transition at the state level. This variable equals one if there has been "Legislation Enacted to Implement Retail Competition"[16] and is zero otherwise. We use this variable to control for the various risks associated with deregulation. Sanyal and Bulan (2008) show that deregulation resulted in an overall decline in IOU leverage ratios. They attribute this decline to the increased risks in the emerging deregulated market environment. Recall that regulation practically ensured earnings stability and a zero-likelihood of bankruptcy. The uncertainty in both the deregulation process and the impending competitive environment resulted in more conservative financial policies (i.e. lower leverage) in anticipation of losing the safety net of regulation.

[15] We exclude the post-2000 period due to suspensions in deregulation activity across many states -- a result of the 2001 California energy crisis.
[16] This classification is taken from the EIA's "Status of State Electric Industry Restructuring Activity", May, 2000.

Our main premise is that the primary source of growth for electric utilities under *deregulation* is a potentially larger customer base. As we mention earlier in the paper, there are two potential sources for growth: 1) new customers within the IOU's home state (original market), and 2) new customers from other states that are also undergoing deregulation (new markets). Although the utility can increase its market share within its home state, competition from other utilities may also erode its existing market share. Moreover, home state deregulation created much uncertainty in the short run and it will be difficult to untangle this risk effect from "pure" growth opportunities. In neighboring states, however, where deregulation is also ongoing, the opportunity of capturing new markets should not suffer from these complications. We focus on neighboring states because these investment opportunities are discretionary and deregulation clearly defines their onset.

It is certainly the case that these two sources of growth opportunities that we identify need not exist simultaneously. There are instances where a utility's home state is still regulated while some of its neighbors are already deregulated. In such a situation, the opportunities for growth are asymmetric, i.e. the utility in the regulated environment can enter the deregulated market but the utilities in the deregulated market cannot enter the regulated market.[17] The alternative scenario is one where two neighboring states have both deregulated and hence we would expect cross border competition to complicate the matter. To control for this, we generate a *cross border competition* (CBC) dummy variable that equals 1 if a utility's home state and at least one neighboring state have

[17] This is because state regulatory bodies only have jurisdiction over the ownership of generation assets located within their home state.

enacted deregulation legislation.[18] Correspondingly, we generate a *home state deregulation* (HSD) dummy variable that equals one if the state has enacted deregulation legislation and has no neighboring state that has done the same.

Next, we identify growth opportunities due to deregulation activity in neighboring states. A neighboring state is defined as a state that shares a common border with the utility's home state.[19] We use a *neighboring state legislation* (NSL) measure that equals the number of neighboring states that have enacted legislation in support of deregulation (retail competition). This is an indicator of the actual viability of the neighboring state(s) as a new market for the utility.

To capture possible size effects of neighboring markets, we construct a *potential market due to legislation in neighboring states* (PML) variable that equals the total number of customers of IOUs in neighboring states where deregulation legislation has already been passed. A larger potential market should increase incentives for capturing that market. In terms of market size, we argue that this measure represents more valuable growth opportunities for the firm.

In order to pin down more concrete sources of growth opportunities, we look at two specific policy instruments that were widely used in implementing deregulation.[20] First, many states adopted policies on which company can be the default provider, i.e. if the customer does not actively choose an electricity provider, which company gets to supply power to this customer. Being under a regulated monopoly for decades, with all

[18] Related to this point is the possibility that utilities in deregulated neighboring states are owned by the same holding company. If this were the case, then we would expect that the impact of growth opportunities on leverage would be biased towards zero, weakening our results.

[19] We focus on bordering states since they are clearly defined geographic and regulatory areas that serve as potential markets that IOUs can more easily access.

[20] We also considered other measures of growth opportunities (potential markets) based on customer growth in neighboring states and the average price difference between the home state and neighboring states. However, these variables were not significantly related to leverage.

charges consolidated under a single bill, switching to a new provider may prove difficult for customers (especially residential customers) due to inertia. Thus, we construct a measure of the *potential market due to a lack of default provider policies in neighboring states* (PMDef). This variable equals the total number of customers of IOUs in neighboring state(s) that have decreed that any company, including non-utilities, can be default providers. Thus, a utility has a higher likelihood of penetrating these new markets compared to states where there is a mandated default provider. This variable turns on when at least one neighboring state has already passed legislation on deregulation and is zero otherwise.

Second, to spur market competition after EPAct, regulators promoted the divestiture of generation assets by utilities that wanted to remain in the transmission and distribution segments of the business. It was felt that the simultaneous ownership of generation and transmission capacity within the same state and by the same company could lead them to discriminate against third parties who wanted to use their transmission networks. Thus, utilities from outside the state (including utilities that are still in regulated environments) had the opportunity to acquire these generation assets and capture the incumbent's market share in these neighboring states. Hence, we construct the *potential market due to divestiture policies in neighboring states* (PMDiv). This variable equals the total number of customers of IOUs in neighboring state(s) where regulators have given incentives for utilities to divest or where utilities are required by law to sell off their generation assets if they choose to stay in the transmission and distribution segments of the business. Again, this variable turns on when at least one neighboring state has already passed deregulation legislation and is zero otherwise. The summary statistics for these regulatory variables are shown in Table 2.

3. Empirical Analysis

3.1 Leverage and Growth Opportunities

In this section, we examine the impact of growth opportunities on the capital structure of IOUs. The pace of deregulation in the U.S. electricity sector and its associated policies vary widely by state. We exploit this variation by using a difference-in-difference methodology to isolate the effect of growth opportunities on leverage. Our measures of growth opportunities vary both in the cross-section (due to differences across states) and through time (since different states deregulated at different times). We estimate our difference-in-difference model using fixed effects panel data estimation. We regress a firm's leverage ratio on basic determinants of leverage (Rajan and Zingales, 1995), holding company measures, EPAct, DL, HSD and CBC dummies, and our measures of growth opportunities. The coefficients on the growth opportunities variables represent the treatment effects in this difference-in-difference specification, i.e. the net effect of these growth opportunities on leverage, controlling for other external factors affecting all IOUs at the same time[21]. All standard errors are corrected for first-order autocorrelation and firm-level heterogeneity. We control for autocorrelation because there is strong persistence in leverage ratios over our sample period.

3.1.1 Basic Determinants of Leverage

We begin our analysis by presenting "conventional" regressions of leverage on our basic control variables. Rajan and Zingales (1995) identify four *firm-level* factors

[21]In our regression model, there are two levels of differences: 1) the difference in leverage pre- and post-neighboring state deregulation for firm *i*, and 2) the difference in leverage between firm *i* and firm *j*, where firm *i* has at least one deregulated state neighbor while firm *j* does not have any deregulated state neighbors. This methodology is similar to Bertrand and Mullainathan (1999).

that have significant explanatory power for leverage. These are firm size (log(sales)), profitability (ROA), tangible assets and growth opportunities. We use asset growth as an initial proxy for growth opportunities[22]. These variables are lagged by one year to minimize simultaneity issues. Due to the prevalent holding company structure within this industry, we also include the holding company dummy and the holding company size measure. Finally, we include the EPAct, DL, HSD and CBC dummy variables to control for the utility's home state deregulation activity and its associated risks. These regressions are presented in Table 3.

Profitability (ROA) has a negative correlation with leverage, consistent with the pecking order theory: profitable firms accumulate more internal funds and hence use less debt finance. Tangible assets are positively correlated with leverage since their collateral value enables a firm to borrow more.[23] Asset growth is insignificant in our model. Since we are using lagged values, asset growth is likely a weak proxy for growth opportunities.[24] Firm size measured by log sales is insignificant in these basic regressions. However in later regressions where we include our measures of growth opportunities it is significant with a positive coefficient – consistent with prior work.

Many electric utilities are constituents of large holding companies. This may allow them greater access to financing sources both from within and outside the holding company structure, consequently altering their debt capacity, i.e. a utility may be able to borrow more as its holding company serves as its "guarantor". Moreover, a greater

[22] We are unable to construct the more commonly used market to book ratio as a proxy for growth opportunities for the same reason we cannot construct a market leverage ratio, as discussed earlier.
[23] These are consistent with past findings: Titman and Wessels (1988), Barclay, Smith and Watts (1995), Rajan and Zingales (1995), Fama and French (2002)). See Harris and Raviv (1991) for a comprehensive review of this literature and Rajan and Zingales (1995) for a more detailed discussion on the effects of these four variables on leverage.
[24] In later regressions, we drop asset growth from our specification for two reasons: 1) it is insignificant in these basic regressions; and 2) to preserve sample size since by construction, lagged asset growth demands two lags of the data.

number of utilities under a holding company could potentially provide some diversification benefits, resulting in a great debt capacity overall. On the other hand, the holding company structure also permits the use of net operating losses of one utility to offset positive income of another utility, resulting in lower (federal) taxes overall at the holding company level. Thus, a greater number of utilities under the holding company could dampen the tax shield benefits of debt. As Table 3 shows, the coefficient on the holding company dummy is positive and significant implying that belonging to a holding company allows a firm to hold more debt. The holding company size measure is negative and significant, implying that a larger holding company (in terms of number of subsidiaries) reduces the incentives for holding debt. This is consistent with the use of net operating losses, as opposed to debt, for generating tax shields.

The significance of the EPAct dummy confirms our expectation of the general decline in leverage at the onset of deregulation due to the uncertainties associated with this regime shift. The coefficient on the deregulation legislation (DL) dummy is negative and significant, consistent with Sanyal and Bulan (2008). Firms in states that have enacted deregulation legislation have lower leverage ratios due to the increased risks associated with the restructured environment. To account for the impact of impending competitive forces, we replace the DL dummy with the home state deregulation (HSD) dummy and the cross-border competition (CBC) dummy. We find that CBC has a significant negative coefficient. This indicates that competition across states is an important aspect of deregulation that IOUs care about. We believe that the increased risks in the new competitive environment leads firms to reduce their leverage ratios to more conservative levels. We now turn to our measures of growth opportunities

3.1.2 Growth Opportunities

Table 4 presents the regressions with regulatory factors that represent growth opportunities for the IOU. Column 1 shows that the neighboring state legislation measure (NSL) negatively impacts leverage, indicating that firms are reducing their leverage once their state neighbors have enacted deregulation legislation. Enacted legislation usually includes a "start date" for retail competition.[25] This implies that, conditional on deregulation activity in a firm's home state, it is only when firms know for certain that their state neighbors are potential markets that they are responding by lowering their leverage. In column 2, we substitute NSL with the potential market due to legislation in neighboring states (PML) to capture the size of these viable markets. Consistent with NSL, the coefficient on PML is negative and significant. One million potential new customers in neighboring states results in a 0.1 percentage reduction in leverage. Given the mean asset size for our sample, this is equivalent to a debt reduction of 3.3 million dollars.

We now turn to measures of growth opportunities due to specific policy instruments. In columns 3 and 4, we find that the effect of PMDef (*potential market due to a lack of default provider policies in neighboring states*) on leverage is positive. This means that among those firms with neighboring states that have deregulation legislation in place, the subset of firms whose state neighbors have no mandated default provider have higher leverage ratios compared to those with state neighbors that DO have a mandated default provider. In terms of economic significance, one million potential new customers in markets with NO default provider results in a $9.9 million *increase* in leverage.

[25]The median (mean) time to retail competition from December of the year legislation is passed to the start date is 13 (27) months.

On the other hand, PMDiv (*potential market due to divestiture policies in neighboring states*) has a negative coefficient. Thus, among those firms with neighboring states that have deregulation legislation in place, the subset of firms whose state neighbors have divestiture policies have lower leverage ratios compared to those with state neighbors that DO NOT have divestiture policies. In terms of economic significance, one million potential new customers in markets with divestiture policies results in a $6.6 million *decrease* in leverage.

Our priors are that PMDef and PMDiv both represent growth opportunities where the larger the potential market, the more valuable the growth opportunity. Existing theories predict leverage and growth opportunities to be negatively correlated. To explain these different results, we need to consider the exact nature of these growth opportunities.

We mentioned earlier that a lack of a default provider policy means that any company, including non-utilities, can be default providers of electricity. Thus, in states where there is no mandated default provider, the likelihood of penetrating the market is higher than when a mandated default provider exists. A larger potential market (captured by the number of potential customers in PMDef) and a greater likelihood of capturing these markets are enough incentives to act right away. Deregulation created incentives for being the first-mover due to the onset of competition. In anticipation of the opening of these markets, firms are taking steps to capture these markets and they are using debt finance in the process. We posit that this is one reason for the observed positive relationship between leverage and PMDef.

On the other hand, anecdotal evidence during this period shows that acquisitions of generation assets across states occurred frequently and rather quickly. The existence of

divestiture policies in a state allowed for more of these transactions to take place. Moreover, once a utility acquired generation capacity in a new market, it automatically inherited the target firm's customers which made these generation assets even more attractive. The uncertainty in these transactions stemmed from firms competing for the same acquisitions. In order for a successful acquisition to take place, firms needed to maintain their financial flexibility, i.e. maintaining lower leverage ratios today in order to easily raise debt finance in the future when the need arises. We believe this is the reason we observe a negative relationship between leverage and PMDiv. Moreover, this scenario is more consistent with the dynamic version of the pecking order theory or Myers' (1977) debt-overhang argument.

3.2 Financing Activity and Growth Opportunities

Thus far, we have found that certain measures of growth opportunities in neighboring states have either a positive or a negative relationship with leverage. In this section, we investigate whether an IOU's financing *activity* can shed further light on these findings. We examine the dynamics of debt financing in the years surrounding deregulation.

3.2.1 Growth Opportunities in Deregulation Year

We estimate a model of net debt issued as a function of PML, PMDef or PMDiv in *deregulation year* (Table 5). The dependent variable is the net debt issued by the utility over a calendar year. Net debt issued is defined as new debt issuance less debt retirement. We define a utility's neighboring state *deregulation yea*r as follows: We identify the earliest calendar year in which a firm has a neighboring state that has passed deregulation

legislation. This is defined as year 0. Years prior (-1, -2 , -3) and post (+1, +2, +3) neighboring state deregulation legislation are thus defined accordingly, centered on year 0. Next, we separately identify PML according to deregulation year. For example, in years -3, -2, and -1, the potential market due to deregulation in neighboring states (PML) is the total number of customers in neighboring states that are in the process of either deliberating statewide deregulation or are expected to enact deregulation legislation. In years 0 through 3, this measure equals the total number of customers in neighboring states that have actually passed legislation on deregulation. PMDef and PMDiv in deregulation year are defined similarly. Thus, in years -3 through -1, we are measuring the potential market in neighboring states that are expecting to enact legislation, while in years 0 through +3, we measure the potential market in neighboring states that have already enacted legislation. This specification enables us to pinpoint the timing of debt financing in response to these growth opportunities within the seven year period around neighboring state deregulation.

We also control for a firm's financing deficit (Shyam-Sunder and Myers (1999); Kayhan and Titman (2007)). The financing deficit measures the firm's demand for external finance (uses of funds less internal funds, or net debt plus net equity issued). As a first order approximation, this empirical model estimates the proportion of the deficit that is financed with debt, where the deficit proxies for the firm's demand for external financing. Thus, we are interested in whether our measures of growth opportunities have any *additional explanatory power* for net debt issuances after controlling for the deficit. We include the following variables as additional controls: firm size, profitability, tangible assets, holding company dummy, holding company size measure and PMDiv (column 2) or PMDef (column 3). We employ fixed effects panel data estimation with bootstrapped

standard errors. The estimation sample is restricted to the seven years around neighboring state deregulation, resulting in 186 firms and 1031 observations.

Table 5 presents these regressions. We first find that almost 90 % of IOU financing deficits is filled with debt. This is consistent with the heavy reliance of the industry on debt financing. Next, we find significant debt activity with regards to over-all deregulation in neighboring states (column 1). One million potential new customers results in 0.038 % more debt issued in year +1 and 0.059 % more debt issued in year +2. These effects are 21 % and 33 %, respectively, of the mean net debt issued in our sample (0.18 %). In columns 2 and 3, we find that larger potential markets due to either policy instrument in neighboring states (PMDef or PMDiv) result in more debt issued in years +1 and +2. The effects are an order of magnitude larger for PMDef compared to PMDiv. Specifically, firms with deregulated state neighbors that do not have mandated default provider policies are issuing 4.25 million dollars of new debt in each of years +1 and +2. This is 72 % of mean debt issues in the sample. On the other hand, firms with deregulated state neighbors that have divestiture policies in place are issuing one-fourth of this total amount in year +2.

Thus, even though we find a negative relationship between leverage and PMDiv, we find that in terms of debt issuances, firms are issuing more debt in response to this particular growth opportunity, i.e. the potential acquisition of generation capacity (and more customers) in neighboring states with divestiture policies. On the other hand, we find a positive relationship between leverage and PMDef and this is supported by even greater debt issuances by firms who face this type of a growth opportunity, i.e. the potential market due to a lack of default provider policies. It is also worth mentioning that we do not find significant debt issuance prior to neighboring state legislation

enactment. It is only when the potential growth opportunities are considered viable, i.e. only when deregulation legislation is enacted do firms begin to respond to these new opportunities for growth.

3.3 Robustness Tests

For our leverage specification in Table 4, we perform the following robustness tests with no significant change in our results: 1) leverage regression estimation by feasible generalized least squares and Prais-Winsten with firm fixed effects, both with AR(1) errors; 2) a logit transformation of the dependent variable since the leverage ratio, by definition, is a share, and hence is bounded between zero and one; 3) substitute log(assets) for log (sales); and 4) include the following additional control variables: the number of states operated in by the parent holding company, a dummy variable for non-utility parent holding companies, a dummy variable for parent holding companies that operate internationally, and a dummy variable for a non-US parent holding company.

For our analysis of net debt issued in Table 5, we also control for heterogeneity in a firm's debt capacity by including either the leverage gap or the square of the financing deficit. The leverage gap is the difference between actual leverage and a leverage target. For regulated firms, target leverage is the sample mean leverage in 1990 and 1991 (36.4 %). For deregulated firms, target leverage is the mean leverage in a subsample of deregulated firms at least three years after deregulation legislation enactment (29.7 %). An alternative to the leverage gap is to allow for a non-linear relationship between a firm's financing deficit and net debt issues. Lemmon and Zender (2007) show that this specification detects binding debt capacity constraints. Under these alternative specifications, our results remain unchanged.

4. Conclusion

In this paper, we investigate the impact of growth opportunities on the financing decisions of investor-owned electric utilities (IOUs) in the U.S when the industry was deregulated. Deregulation was an exogenous event that created new opportunities for some firms to capture a greater share of the market. Our results show that conventional leverage regressions cannot fully capture the dynamics of firm financing activities. Using leverage regressions, we find that growth opportunities may have opposing effects on leverage, depending on the exact nature of the growth opportunity. More specifically, we find that different types of growth opportunities can have a positive or a negative relationship with leverage.

By focusing on a single industry around an exogenous shock, we are able to examine the dynamics of financing decisions related to these new opportunities for growth. We look at net debt issuances over time and find that electric utilities are, in fact, issuing new debt in response to each of these different growth opportunities despite their opposing effects on leverage. Our findings highlight the complexities surrounding financing decisions. Financing choice is not a simple one-period decision but a dynamic occurrence. Hence, both theoretical and empirical work needs to address this.

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TABLE 1: Summary Statistics
Firm Characteristics 1991-2000

Variable	Mean	Median	Std. Dev.	Max.	Min.	Obs.
Total Assets ($ `000)	3,294,623	1,734,308	4,422,213	21,900,000	5,664	1618
Sales Revenue ($ `000)	1,197,444	667,400	1,541,842	7,553,079	4,425	1615
Book Leverage (%)	33.76	32.75	11.23	77.15	0.86	1618
Return on Assets (%)	14.06	14.50	4.24	27.79	-0.74	1614
Tangible Assets/Total Assets (%)	67.36	71.80	17.99	95.78	2.36	1618
Asset Growth (%)	3.28	1.98	10.62	61.78	-36.79	1618
Net Debt Issued/L.Total Assets (%)	0.18	0	4.39	18.14	-14.60	1618
Net Preferred Stock Issued/L.Total Assets (%)	-0.16	0	0.68	2.44	-3.06	1618
Net Common Stock Issued/L.Total Assets (%)	0.22	0	1.10	7.00	-3.06	1618
Financing Deficit/L.Total Assets (%)	0.25	0	4.81	20.15	-16.07	1618
Holding Company Dummy	0.73	1	0.45	1	0	1618
Holding Company Size Measure	2.96	2	3.33	15	0	1618

Notes: Book Leverage = (Short-Term Debt + Long-Term Debt)/Total Assets. Return on assets is EBITDA/Total Assets. Tangible assets is net plant and fuel. Asset growth is the annual growth in total assets. Net debt issued = total debt issued – total debt repurchased. Net preferred (common) stock issued = total preferred (common) stock issued – total preferred (common) stock repurchased. Financing deficit = net debt issued + net preferred stock issued + net common stock issued. The holding company dummy equals one if the firm is part of a holding company. The holding company size measure equals the number of firms that belong to the holding company. L = lag operator.

TABLE 2: Summary Statistics
State Deregulation Characteristics 1991-2000

Variables	Mean	Median	Std. Dev.	Max.	Min.	Obs.
Deregulation Legislation Dummy (DL)	0.17	0	0.37	1	0	472
Home State Deregulation Dummy (HSD)	0.03	0	0.18	1	0	472
Cross Border Competition Dummy (CBC)	0.13	0	0.34	1	0	472
Neighboring State Legislation Measure (NSL)	0.61	0	1.07	6	0	472
Potential Market Due to Legislation in Neighboring States* (PML)	2.27	0	4.32	20.08	0	472
Potential Market Due to a Lack of Default Provider Policy in Neighboring States* (PMDef)	0.33	0	1.24	5.63	0	472
Potential Market Due to Divestiture Policy in Neighboring States* (PMDiv)	1.52	0	3.53	13.91	0	472

Notes: *Millions of customers. DL equals one if the state has passed deregulation legislation. HSD equals one if the state has enacted deregulation legislation and has no neighboring state that has done the same. CBC equals one if both home state and at least one neighboring state have enacted deregulation legislation. NSL equals the number of neighboring states that have enacted deregulation legislation. PML equals the total number of customers in neighboring states that have enacted deregulation legislation. PMDef equals the total number of customers in neighboring states that have enacted deregulation legislation and have no mandated default provider policy. PMDiv equals the total number of customers in neighboring states that have enacted deregulation legislation and have divestiture policies in place. These variables vary across states and across time.

Table 3: Basic Determinants of Leverage
Dependent Variable: Total Debt / Total Assets

	(1)	(2)	(3)
L.Log Sales	0.000004	0.00001	0.00002
	(0.00004)	(0.00004)	(0.00004)
L.Return on Assets	-0.169**	-0.170**	-0.167**
	(0.069)	(0.069)	(0.069)
L.Tangible Assets/Total Assets	0.081***	0.080***	0.079***
	(0.022)	(0.022)	(0.022)
L.Asset Growth	0.00015	0.00015	0.00015
	(0.0001)	(0.0001)	(0.0001)
Holding Company Dummy	0.015*	0.016**	0.017**
	(0.008)	(0.008)	(0.008)
Holding Company Size Measure	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)
EPAct Dummy	-0.022***	-0.024***	-0.025***
	(0.005)	(0.006)	(0.006)
Deregulation Legislation Dummy (DL)		-0.009**	
		(0.004)	
Home State Deregulation Dummy (HSD)			-0.003
			(0.006)
Cross Border Competition Dummy (CBC)			-0.013***
			(0.005)
Relevant Statistics			
Observations	1244	1244	1244
Number of firms	177	177	177
R-Square	0.040	0.044	0.047
Rho (autocorrelation coefficient)	0.629	0.620	0.617

Notes: Fixed effects panel data estimation with standard errors (in parenthesis) adjusted for first order autocorrelation. * significant at 10%; ** significant at 5%; *** significant at 1% . All columns include a constant term. L = lag operator. Return on assets is EBITDA/Total Assets. Tangible assets is net plant and fuel. Asset growth is the one year growth rate in total assets. The holding company dummy equals one if the firm is part of a holding company. The holding company size measure counts the number of firms that belong to the holding company. EPAct dummy equals one if year >1992. DL equals one if the state has passed deregulation legislation. HSD equals one if the state has enacted deregulation legislation and has no neighboring state that has done the same. CBC equals one if both home state and at least one neighboring state have enacted deregulation legislation.

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TABLE 4: Impact of Growth Opportunities
Dependent Variable: Total Debt/Total Assets

	(1)	(2)	(3)	(4)
Controls				
L.Log Sales	0.0001***	0.0001***	0.0001***	0.0001***
	(0.00003)	(0.00003)	(0.00003)	(0.00003)
L.Return on Assets	-0.137**	-0.133**	-0.140**	-0.140**
	(0.060)	(0.060)	(0.060)	(0.060)
L.Tangible Assets/Total Assets	0.058***	0.060***	0.063***	0.064***
	(0.020)	(0.020)	(0.020)	(0.020)
Holding Company Dummy	0.017**	0.016**	0.015**	0.015**
	(0.007)	(0.007)	(0.007)	(0.007)
Holding Company Size Measure	-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
EPAct Dummy	-0.028***	-0.027***	-0.027***	-0.027***
	(0.004)	(0.004)	(0.004)	(0.004)
Home State Deregulation Dummy (HSD)	-0.005	-0.005	-0.005	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)
Cross Border Competition Dummy (CBC)	-0.007	-0.009*	-0.009*	-0.010**
	(0.005)	(0.005)	(0.005)	(0.005)
Measures of Growth Opportunities				
Neighboring State Legislation Measure (NSL)	-0.006***			
	(0.002)			
Potential Market Due to Legislation in Neighboring States^{+} (PML)		-0.001***	-0.0004	
		(0.0005)	(0.001)	
Potential Market Due to a Lack of Default Provider Policy in Neighboring States^{+} (PMDef)			0.003*	0.003*
			(0.002)	(0.002)
Potential Market Due to Divestiture Policy in Neighboring States^{+} (PMDiv)			-0.002**	-0.003***
			(0.001)	(0.001)
Relevant Statistics				
Observations	1428	1428	1428	1428
Number of firms	180	180	180	180
R-Square	0.076	0.073	0.080	0.079
Rho (autocorrelation coefficient)	0.654	0.658	0.657	0.657

Notes: Fixed effects panel data estimation with standard errors (in parenthesis) adjusted for first order autocorrelation. * significant at 10%; ** significant at 5%; *** significant at 1%. All columns include a constant term. L = lag operator. Return on assets is EBITDA/Total Assets. Tangible assets is net plant and fuel. The holding company dummy equals one if the firm is part of a holding company. The holding company size measure equals the number of firms that belong to the holding company. EPAct Dummy equals one if year > 1992. HSD equals one if the state has enacted deregulation legislation and there are no neighboring states that have done the same. CBC equals one if both home state and at least one neighboring state have enacted deregulation legislation. NSL equals the number of neighboring states that have enacted deregulation legislation. PML equals the total number of customers in neighboring states that have enacted deregulation legislation. PMDef equals the total number of customers in neighboring states that have enacted deregulation legislation and have no mandated default provider policy. PMDiv equals the total number of customers in neighboring states that have enacted deregulation legislation and have divestiture policies in place. $^{+}$Millions of customers.

Table 5: Impact of Potential Markets from Neighboring States in Deregulation Year
Dependent Variable: Net Debt Issued/L.Total Assets (%)

	(1)	(2)	(3)
Financing Deficit/L.Total Assets (%)	0.895**	0.896***	0.896***
	(0.023)	(0.023)	(0.022)
Potential Market[+] in *Deregulation Year*	Due to PML	Due to PMDef	Due to PMDiv
Year -3	-0.007	-0.027	-0.026
	(0.036)	(0.037)	(0.035)
Year -2	-0.001	-0.023	-0.022
	(0.036)	(0.036)	(0.035)
Year -1	0.027	0.012	0.014
	(0.019)	(0.017)	(0.017)
Year 0	0.022	0.009	0.010
	(0.016)	(0.015)	(0.015)
Year +1	0.038*	0.129*	0.010
	(0.017)	(0.067)	(0.020)
Year +2	0.059*	0.127***	0.066**
	(0.026)	(0.048)	(0.031)
Year +3	0.021	0.041	0.004
	(0.015)	(0.042)	(0.020)
Additional Controls	Yes	Yes	Yes
Relevant Statistics			
Number of Observations	1031	1031	1031
Number of Firms	186	186	186
R-Square	0.858	0.862	0.862
Chi-Square	1929	2665	2433

Notes: Fixed effects panel data estimation with bootstrapped standard errors (500 repetitions) in parenthesis. *significant at 10%; ** significant at 5%; *** significant at 1%. L = lag operator. Financing deficit = net debt issued + net preferred stock issued + net common stock issued. PML equals the total number of customers in neighboring states that have enacted deregulation legislation. PMDef equals the total number of customers in neighboring states that have enacted deregulation legislation and have no mandated default provider policy. PMDiv equals the total number of customers in neighboring states that have enacted deregulation legislation and have divestiture policies in place. Year 0 is the earliest year that at least one neighboring state passes deregulation legislation. Potential markets in years -3, -2 and -1 represent states where deregulation deliberations are ongoing or legislation is expected to be passed. Additional controls include: L.Log Sales, L.Return on Assets, L.Tangible Assets/Total Assets, Holding Company Dummy, Holding Company Size Measure, PMDiv (column 2) and PMDef (column 3). The estimation sample includes the seven year period centered on neighboring state deregulation (Year 0). [+]Millions of customers.