FIRMS' INTERNAL CAPITAL ALLOCATIONS AND MARKET ENTRY DECISIONS: ADDING A "BEHAVIORAL-THEORY-OF-THE-FIRM" PERSPECTIVE

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ABSTRACT

This paper adds theoretical arguments from the Behavioral Theory of the Firm (BTF) to more traditionally-used ones to empirically infer the connection between existing firms' internal capital allocations and their market entry decisions. Using evidence from the generation segment of the U.S. electric power industry (1999-2010), the presented analysis shows that different types of available capital – working as different measures of organizational slack – have generally positive but nuanced associations with the probability of firm entry into a focal (geographic) market. Restrictions to the flow of internally-generated capital away from firms' current activities – due to regulation – work in the opposite direction. Furthermore, the analysis also reports that neither high opportunities in firms' current markets nor high opportunities in other potential target markets for firm entry are significantly negatively associated with the probability of firm entry into a focal market. This supports the notion in the BTF that different types of investment alternatives represent different organizational goals that enter a firm's capital budgeting process as more-or-less independent constraints.

KEYWORDS: *Capital Allocation; Market Entry; Behavioral Theory of the Firm*

Firm performance crucially depends on the strategic investment choices that a firm makes in domains such as capacity increases, market entry, or capability development (Haspeslagh 1982, Mitchell 1989, Noda and Bower 1996, Shaver 2011). Thus, from the standpoint of a firm, the allocation of capital among different considered investment alternatives is of paramount importance (Henderson 1979, Williamson 1975). Uncovering the mechanisms by which firms allocate capital among different investment alternatives can therefore improve our understanding of a central determinant of firm performance.

In general, existing scholarly approaches to the topic can be considered incomplete. Indeed, research that deals with firms' internal capital allocations among different investment alternatives mostly focuses on the internal allocation of capital between a firm's different existing businesses (*e.g.* Haspeslagh 1982, Williamson 1975), and makes no distinction between different types of investment alternatives that compete for a firm's capital – such as investments in current activities, entry into markets, or investments in R&D.[2] In addition, quantitative treatments of the topic tend to overlook aspects related to the structure and processes that underlie firms' capital budgeting decisions, and which can therefore better explain investment outcomes. Hence, an open area for exploration exists in this research domain.

This paper is a step toward filling this void. Leveraging some arguments from the Behavioral Theory of the Firm (BTF) (*e.g.* Cohen *et al.* 1972, Cyert and March 1963, Gavetti *et al.* 2012, Levinthal and March 1993, March 1991, March and Olsen 1976), it develops theory to empirically infer the connection between existing firms' internal capital allocations and their market entry decisions. In doing so, it draws a parallel between a firm's availability of capital and the notion of organizational slack (Bourgeois 1981, Bourgeois and Singh 1983) as an influencer of a firm's decision to enter a focal market. Furthermore, it also explicitly takes into account the role of different types of investment alternatives as representing different organizational goals that enter a firm's

[2] For instance, within finance, research that seeks to explain a firm's decisions to enter industries or markets using a resource-allocation lens does not explicitly address the internal competition for capital between investments in a firm's current activities and investments that entail entering industries or markets. The few prominent modeling attempts that have sought to explain a firm's entry decisions into industries or markets use rationales that are mainly anchored on either capabilities (Maksimovic and Phillips 2002, Matsusaka 2001), or operating synergies (Gomes and Livdan 2004). On the empirical front, Boutin, Cestone, Fumagalli, Pica, and Serrano-Velarde (2013) use data on French business groups, and connect industry entry decisions with the cash holdings of both entrant and incumbent groups, but also overlook the internal competition for capital within a firm.

capital budgeting process as more-or-less independent constraints (Cyert and March 1963, Pondy 1962).

To ensure proper inference, this paper takes the generation segment of the U.S. electric power industry from 1999 to 2010 as an empirical setting, and examines the entry decisions of existing firms into geographic markets therein. By looking at firm entries into geographic markets within a single mature industry, the applicability of competing explanations based on either firm capabilities or technological transitions is reduced (*e.g.* King and Tucci 2002, Tripsas 1997). Furthermore, this paper leverages the relative similarity of the different considered geographic markets – both those markets in which a firm might already be present, and those potential target markets for firm entry – to construct comparable metrics of the opportunities that a firm faces in across different markets. This makes it possible to empirically model a firm's internal competition for capital between different types of investment alternatives – *i.e.* investments to enter a focal market; investments in a firm's current markets; and investments to enter other potential target markets – and assess its influence on a firm's market entry decisions.

The empirical analysis shows general support for the theoretical predictions put forward. The analysis shows a general positive association between different types capital availability – envisioned as different measures of organizational slack (*e.g.* Bourgeois 1981, Bourgeois and Singh 1983) – and firms' market entry decisions. Specifically, a greater amount of internally-generated capital is found to be associated with a higher probability of firm entry into a focal market, and this effect is irrespective of opportunities in that market. Restrictions – due to regulation – to the flow of internally-generated capital away from firms' current activities show up as working in the opposite direction. In a somewhat contrasting way, the analysis also shows that a greater ability to borrow capital from external sources is associated with a higher probability of firm entry into a focal market, but that this effect is salient only when opportunities are high in that market. These results highlight the importance of insights from the finance literature (*e.g.* Fazzari *et al.* 1988, Graham *et al.* 2015, Kaplan and Zingales 1997) for explaining why different measures of organizational slack can have contrasting associations with firms' market entry decisions.

When assessing the effects of firms' internal competition for capital between different investment alternatives, the analysis shows that neither high opportunities in firms' current markets nor high opportunities in other potential target markets for firm entry are significantly associated with the probability of firm entry into a focal market. This result counters the idea of *direct* competition for capital between the different investment alternatives considered by a firm which is assumed in many traditional approaches that deal with firms' internal capital allocations. Instead, it supports ideas developed in the BTF, by which different types of investment alternatives represent different organizational goals that enter firms' capital budgeting processes as more-or-less independent constraints (Cyert and March 1963, Pondy 1962). This leads to situations in which a firm's investments to enter a focal potential market will not necessarily compete *directly* for a firm's capital with either investments in that firm's current markets or investments to enter other potential target markets. These ideas are further corroborated by a *post hoc* analysis which reveals that a firm's investments to enter a focal market actually co-move with its investments elsewhere.

On the whole, this paper's findings suggest that scholarly understanding of firms' internal capital allocation decisions can be improved through the integration of the BTF with more traditional theoretical approaches. In particular, whereas contributions from the finance literature can help refine predictions of the BTF regarding the role played by different types of organizational slack (Bourgeois and Singh 1983, Sharfman *et al.* 1988) on firms' investment decisions; the BTF can be a good complement to more traditionally-used rationales, due to its insights on the structure and processes that underlie capital budgeting within firms.

This paper is structured in the following way: the next section introduces the readers to the empirical setting – the U.S. electric power industry and, in particular, its generation segment; theory and hypotheses are developed in the subsequent section; the data and methods section comes after and is then followed by the results section. The paper closes with the discussion and conclusion sections.

THE U.S. ELECTRIC POWER INDUSTRY

Focusing on a single mature industry to study the connection between firms' internal capital allocations and their decisions to enter geographic markets was a conscious choice. Doing so made it possible to isolate internal capital allocation mechanisms by reducing the applicability of explanations

anchored mainly on firm capabilities or technological transitions (*e.g.* King and Tucci 2002, Tripsas 1997). In the end, the selected empirical context was the generation segment of the U.S. electric power industry from 1999 to 2010.

The U.S. electric power industry is made up of three vertical segments: generation, transmission, and distribution (corresponding mainly to retail) of electricity. The legacy business model of the industry – ubiquitous until the 1970s and 1980s – was fully regulated. The three segments were vertically-integrated within investor-owned electric utilities, which operated as regulated natural monopolies in exclusive franchised areas (typically within states). These utilities were subject to cost-of-service regulation, which determined the bundled rates – one single price for electricity generation, transmission, and distribution – that they were allowed to charge to the end users of electricity. Under cost-of-service regulation, the bundled rates were calculated by state-level regulators (called Public Utility Commissions) and aimed at guaranteeing that utilities could both recover their operating costs and reap a fair rate of return on investment (Joskow and Schmalensee, 1986). In order to facilitate the regulatory process, the Public Utility Holding Company Act (PUHCA) has been in place since 1935 to ensure transparency in regulated activities. In essence, the PUHCA requires individual state-level regulated businesses to have separate accounting statements from those of their holding companies, and to fulfil stringent reporting requirements.[3]

The fully-regulated industry depicted above progressively started to change from the early 1990s onward, mostly through federal policies that introduced competition in the generation segment. In this context, the Energy Policy Act (EPACT) of 1992 is the landmark legislative piece. The EPACT of 1992 effectively opened wholesale electricity markets to competition between eligible generators. The Federal Energy Regulatory Commission (FERC) followed up soon after the EPACT of 1992, with the enactment of orders aimed at establishing clear wholesale market rules and also at reforming the working of the transmission segment, both essential measures to support the working of competitive electricity wholesale markets.[4] Overall, this deregulation process has led to two business

[3] At the time of its enactment, one of the main targets of the PUHCA was the dismantlement of the large pyramidal trusts that controlled utility systems in the U.S. Due to their complex structures, these trusts were under suspicion for abusive intra-firm practices – such as transfer-pricing, or intra-firm loans on unfair terms – potentially aimed at extracting extra (unduly) rents from those firms' regulated activities (EIA 2000).
[4] The FERC website provides a detailed description of these orders (www.ferc.gov).

models currently co-existing in the U.S. electric power industry: the legacy regulated business model remains the norm in transmission and in most of the distribution segment; while competition has become more prevalent in the generation segment (see Joskow (2006)).

The generation segment

For a few reasons, the generation segment of the U.S. electric power industry is an appropriate context to identify the link between firms' internal capital allocations and their market entry decisions. First, the generation segment is split geographically between different but comparable electricity wholesale markets, and firms have diverse footprints across those markets. The considered markets are officially designated North American Electric Reliability Corporation (NERC) regions, which correspond to ten mutually exclusive regions that comprise the whole of the U.S. territory, with the overwhelming majority of wholesale electricity trade happening within each of them.[5] Thus, in order to effectively trade in a given wholesale market, a firm must enter that market by investing in generation capacity therein.

Second, investments in the generation segment are materially and strategically very relevant for firms: power plant equipment routinely reaches billions of U.S. dollars in cost,[6] typically lasts for multiple decades, and capacity additions take time to implement. These characteristics make market entry decisions markedly important capital commitments for firms.

Third, the nature of electricity and its wholesale trade are quite appropriate for the construction of meaningful metrics of market opportunity. Electricity is a homogeneous product whose storage in large amounts cannot be done economically. Hence, demand needs to be matched by supply at all times, which is difficult because weather changes and economic fluctuations can make demand very volatile and cyclical. In addition, both wholesale electricity demand and supply are very rigid: wholesale demand by utilities is very inelastic given the pre-existing commitments of those utilities to supply retail customers downstream; and wholesale supply can also be very inelastic in its highest ranges because of the high marginal costs of *peak-load* power plants. As a result, the tightness of

[5] The same market definition is used by Zhang and Gimeno (2010) and Kim (2013). More information on the NERC regions is presented in the appendix.

[6] In 2008 the generation segment was the largest individual component of capital spending in the U.S. electric power industry with a share of 36 percent, in front of distribution, transmission, and other components (source: EEI - Edison Electric Institute, www.eei.org).

supply capacity relative to demand in a given market is a very telling metric of the degree of market opportunity, because it is reflective of the returns that can accrue to generation capacity in that market (*e.g.* Borenstein and Bushnell 2015, Credit Suisse 2013, SNL Energy 2013).[7] Given the relative similarity in the way different geographic wholesale markets work, using the tightness of supply capacity relative to demand in different markets makes it possible to build comparable metrics of the opportunities faced by firms – both in those markets in which firms are currently present and in those potential target markets for firm entry.

Finally, since some firms are present in both regulated and non-regulated activities, one can also study the possible role of the ownership and reporting requirements of the PUHCA – placed upon regulated activities – in restraining a firm's ability to channel internally-generated capital to fund market entry investments.

THEORY AND HYPOTHESES

For the following set of hypotheses, the perspective taken is the one of firms that are already present in one or more (geographic) markets of the generation segment of the U.S. electric power industry, and have the option of entering a given focal market.

The baseline

Market entry decisions are pivotal in firms' quests for growth (Chandler 1962, Penrose 1959). In Penrose's (1959) seminal book, *external inducements* for expansion such as "growing demand for particular products, changes in technology (…), discoveries and inventions (…), special opportunities to obtain a better market position (…)" (Penrose 1995 (3rd ed.), p. 65) are put forward as important stimuli for firms' market entry decisions. A large body of work has focused on firms' market entry decisions as a function of many of these external inducements (*e.g.* Baum and Haveman 1997, de Figueiredo and Silverman 2007, Gimeno 1999, King and Tucci 2002, Levinthal and Wu 2010).

Following directly from the previous description of the empirical setting, in this paper the relevant external inducements for firm entry into a focal market are termed market opportunities, and are associated with the tightness of supply relative to demand in that market. This leads to the

[7] Also because of this, the Cournot model of quantity competition has been used by theoretical modelling papers in economics to approximate how competition plays out in electricity wholesale markets (*e.g.* Borenstein and Bushnell 1999).

straightforward baseline prediction that, *all else being equal*, high opportunities in a focal market will be associated with a higher likelihood of firm entry into that market.

Hypothesis 1: High focal market opportunities will be associated with a higher likelihood of firm entry into a focal market.

A firm's availability of capital

Because market entry entails costly investments, a firm's decision to enter a focal market will also be fundamentally influenced by that firm's availability of capital. Even if entry into a focal market is considered profitable in expectation (*i.e.* positive net present value (NPV)), a firm will only be able to make the required investments if it has available capital to do so, irrespective of whether this capital is internally-generated or borrowed from external sources. Thus, entry into a focal market is likely to be positively associated with a firm's availability of capital.

A firm's availability of capital can be related to the concept of *organizational slack* (*e.g.* Cohen *et al.* 1972, Cyert and March 1963, March and Olsen 1976), defined in Cyert and March's (1963) seminal book on the Behavioral Theory of the Firm (BTF) as the difference that exists ordinarily between the total resources available to an organization and the payments required to maintain the coalition that supports that organization (Cyert and March 1963, p. 36).[8] Both internally-generated capital from a firm's current activities, and its ability to borrow capital from external sources have been considered to be organizational slack in the form of uncommitted financial resources (Bourgeois 1981, Miller and Leiblein 1996, Sharfman *et al.* 1988, Singh 1986). Following Bourgeois and Singh's (1983) classification, a firm's internally-generated capital may be termed *available slack*, defined as resources that have not yet been assimilated into the technical design of a firm's organization; whereas a firm's ability to borrow capital from external sources may be considered *potential slack*, defined as the capacity of a firm to garner extra resources from the environment.[9]

[8] Albeit not formally defined as *organizational slack*, the first appearance of the general concept occurred indirectly in Barnard (1938), when he discussed how to attract and sustain the membership of organizational participants through the management of those participants' inducement-contribution ratio. March and Simon (1958), in their subsequent discussion of the same inducement-contribution ratio, were the first to use the term *slack resources* to describe the source of inducements by which an organization might pay an employee more than would be required to retain that employee's services (*i.e.* by which the inducement-contribution ratio for that employee might exceed a value of one).

[9] Bourgeois and Singh (1983) also defined the notion of *recoverable slack* as resources that have already been absorbed into an organization as excess costs but may be recovered during adverse times. Examples of recoverable slack include excess

Slack is generally seen in the management literature as a source of funds for a firm to undertake innovations and creative risk-taking behavior that would not be approved in its absence (Cyert and March 1963, Singh 1986), and thus as an enabling factor for autonomous strategic behavior (Burgelman 1991). It has been argued that slack will allow a firm to compete in its environment more boldly (Bourgeois 1981), allowing it to experiment with new strategies, such as introducing new products and entering new markets (Hambrick and Snow 1977), or engaging in internal corporate venturing initiatives (Burgelman 1984). Thus, the literature is consistent with the idea that a firm's availability of capital will be positively associated with its likelihood of entering a focal market. This prediction is made as well by literature in the resource-based view (RBV) tradition, which puts forward the idea that excess capacity in resources – of which available capital can be a particular instance – will provide firms with the incentive to use those resources more fully, and can lead to diversifying moves as a result (Chatterjee and Wernerfelt 1991, Penrose 1959).

In addition, some literature has also pointed out that slack can improve firms' abilities to take advantage of environmental opportunities (Thompson 1967, p. 150). This will happen since firms with slack resources will have more available strategic options than firms with fewer resources (Bromiley 1991). This further suggests that a firm's availability of capital will also be associated with a higher likelihood of entry into a focal market when opportunities in that focal market are high.

In spite of these general predictions, the aforementioned distinction between *available slack* and *potential slack* in the BTF tradition (Bourgeois and Singh 1983) suggests that there are differences between a firm's internally-generated capital and its ability to borrow capital from external sources, namely in the degree of discretion and flexibility they allow managers (Sharfman *et al.* 1988). In turn, such differences between these two types of capital availability may lead to somewhat contrasting effects on firms' market entry decision.

Along the same lines, some research in finance has highlighted fundamental differences between a firm's internally-generated capital and its ability to borrow capital from external sources.[10]

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inventory or excess overhead costs, which are more distant from the idea of a firm's availability of capital than the notions of available and potential slack, and therefore are arguably less relevant for a firm's decision to enter a focal market.

[10] Nonetheless, the general arguments and findings in the finance literature still point in the general direction of a positive association between capital availability and investment (*e.g.* Fazzari *et al.* 1988, Hoshi *et al.* 1991, Kaplan and Zingales

In essence, the argument has been made that information asymmetries make it either impossible or very costly for potential external providers of capital to fully understand and accurately evaluate the nature of the investment alternatives considered by a firm's managers (Fazzari *et al.* 1988, Myers and Majluf 1984). As a result, the external capital market is an imperfect substitute for a firm's internally-generated capital, since the cost of external funds can be much higher than the cost of internal funds. Due to these external financing constraints, it is likely that firms without enough internally-generated capital may have to forego some investments with positive NPV (Froot *et al.* 1993, Hoshi *et al.* 1991, Kaplan and Zingales 1997), especially those on which information is more difficult to retrieve by potential external capital providers (Myers and Majluf 1984). If so, managerial discretion in a firm's investment choices is likely to be constrained by a firm's lack of internally-generated capital.[11] In particular, compared to the case of a firm's internally-generated capital, the positive association between a firm's ability to borrow capital from external sources and its investments will always be more contingent on the existence of salient information on the returns of those investments, to be transmitted to potential external capital providers. Supporting this idea, Graham, Harvey, and Puri (2015) surveyed top executives on capital allocation decisions and found that, while project NPV was considered a very important factor in around 80 percent of the cases, the same was true for whether a project required external capital in 45 percent of the cases.

The preceding argument suggests several implications for the role of capital availability in firms' market entry decisions. In particular, *all else being equal*, it suggests that both a firm's greater amount of internally-generated capital and a firm's greater ability to borrow capital from external sources will have *standalone* associations – irrespective of market opportunities – with a higher likelihood of entry into a focal market; but that the association will be stronger for the former type of capital availability.

Hypothesis 2a: A firm's greater amount of internally-generated capital will be associated with a higher likelihood of firm entry into a focal market.

1997) and, more specifically, a positive association between firms' cash holdings and their likelihood of entry into different industries (Boutin *et al.* 2013, Jensen 1986).

[11] On the flipside, agency theorists argue that the managerial discretion associated with large cash flows can also destroy shareholder value. This is because it increases managerial incentives for rent-seeking activities (*e.g.* political maneuvers for payroll raises and perks); and because it propitiates investments in low-return pet projects, which are often related to diversification attempts (Jensen 1986).

Hypothesis 2b: A firm's greater ability to borrow capital from external sources will be associated with a higher likelihood of firm entry into a focal market, but less strongly than the amount of internally-generated capital.

Moreover, the foregoing argument also suggests that both types of capital availability will be positively associated with firm entry into a focal market when opportunities in that market are high. *All else being equal,* it is likely that both a firm's greater amount of internally-generated capital and a firm's greater ability to borrow capital from external sources will be associated with a higher likelihood of entry into a focal market when opportunities in that focal market are high.

Hypothesis 3a: A firm's greater amount of internally-generated capital will be associated with a higher likelihood of firm entry into a focal market when opportunities in that focal market are high.

Hypothesis 3b: A firm's greater ability to borrow capital from external sources will be associated with a higher likelihood of firm entry into a focal market when opportunities in that focal market are high.

A firm's ability to channel internally-generated capital

It is also likely that the characteristics of a firm's current activities will influence its ability to channel the capital generated by those activities to invest in entering a focal market. In the U.S. electric power industry, the stringent reporting and ownership requirements imposed by the PUHCA on a firm's regulated activities may influence the channeling of capital within a firm. More specifically, by imposing an almost autonomous structure on each of a firm's regulated activities, the PUHCA requirements are likely to establish barriers to the intra-firm channeling of the capital generated by those regulated activities.[12] Because of this, *all else being equal,* one may expect that firms with high shares of their current activities that are regulated will be more constrained in their abilities to channel internally-generated capital to fund entry into a focal market, compared to firms with lower shares of their current activities that are regulated. Thus, as a counterpoint to Hypothesis

[12] In line with this phenomenon, some authors have shown empirically that rules and regulations from governments can influence firms' organizational structures and strategies (*e.g.* Zey and Swenson 1998), as well as their internal capital allocations (*e.g.* Natividad 2013).

2a, it is likely that a firm's higher share of regulated activities will have a *standalone* association – irrespective of market opportunities – with a lower likelihood of entry into a focal market.

Hypothesis 4: A firm's higher share of regulated activities will be associated with a lower likelihood of firm entry into a focal market.

By the same token, these constraints to intra-firm channeling of internally-generated capital are also likely to impair firms' abilities to invest in entering a focal market when opportunities in that market are high. Hence, as a counterpoint to Hypothesis 3a, it is also likely that a firm's higher share of regulated activities will be associated with a lower likelihood of entry into a focal market when opportunities in that focal market are high.

Hypothesis 5: A firm's higher share of regulated activities will be associated with a lower likelihood of firm entry into a focal market when opportunities in that focal market are high.

A firm's internal competition for capital

From a firm's perspective, entering a focal market is one of several investment alternatives: a firm can also choose to invest in its current markets, or choose to enter other potential target markets. Given that there are limits to a firm's internally-generated capital and to a firm's ability to borrow from external sources (Fazzari *et al.* 1988, Myers and Majluf 1984), there will be limits to the capital that a firm will have available to make investments. Thus, a firm's choice to enter a focal market is likely to compete internally for capital with a firm's other investment alternatives, especially when focal market opportunities would be limited and the availability of external funds would be constrained.[13] This is in accordance with the general logic used in different strands of research that deal with firms' internal capital allocations, such as the economics- and finance-based literature on internal capital markets (*e.g.* Rajan *et al.* 2000, Stein 1997, Williamson 1975),[14] the portfolio planning

[13] This rationale implicitly assumes that the expected returns of a firm's considered investment alternatives are not perfectly correlated, which is reasonable.
[14] See Stein (2003), Gertner and Scharfstein (2013), and Maksimovic and Phillips (2013) for comprehensive reviews of this literature.

tradition in business policy (*e.g.* Haspeslagh 1982, Henderson 1979), or the resource allocation process literature in management (*e.g.* Bower 1970, Burgelman 1994, Christensen and Bower 1996).[15]

Bearing this in mind, it is *a priori* to be expected that high opportunities in other markets – both markets in which a firm is currently present and other potential target markets for firm entry – will make a firm more likely to invest in those other markets, potentially crowding out a firm's investments to enter a focal market (*e.g.* Stein 1997, Williamson 1975).[16] *All else being equal*, this suggests that high opportunities in other markets will be associated with a lower likelihood of firm entry into a focal market.

Hypothesis 6a: High opportunities in a firm's current markets will be associated with a lower likelihood of firm entry into a focal market.

Hypothesis 6b: High opportunities in other potential target markets for firm entry will be associated with a lower likelihood of firm entry into a focal market.

The theoretical rationale for the two previous hypotheses focused on the relative ranking between any two investment alternatives as a determinant of firms' capital allocation decisions, and did not explicitly consider elements of the structure and processes by which firms reach those decisions. In contrast, influential lines of research in the management literature argue that a firm's decisions are crucially affected by structure and process (*e.g.* Bower 1970, Burgelman 1983, Cohen *et al.* 1972, Mintzberg *et al.* 1976). In particular, Cyert and March (1963) contend that scholarly approaches to firms' internal capital allocations that do not consider the roles of structure and process are necessarily incomplete.[17]

[15] Furthermore, albeit not focusing on financial resources *per se*, research in the resource-based view tradition uses an analogous logic to justify market entry decisions on the basis of the relative growth prospects of a firm's current markets and the opportunity cost of a firm's *non-scale-free* resources (Levinthal and Wu 2010, Penrose 1959).

[16] Contributions from the finance literature have indicated that informational problems within firms could distort and undermine the dynamics of internal competition for capital described here, by making it more difficult for a firm to rank its competing investment alternatives according to their expected returns. These informational problems could stem from diverse sources: from adverse selection issues in the relative assessment of investment alternatives (Stein 1997), to agency problems related to managerial rent-seeking behavior (Scharfstein and Stein 2000), and to other agency problems related to conflicts between a firm's different businesses (Rajan, Servaes, and Zingales 2000). However, the finance literature also suggests that these problems are more likely to exist in the case of widely and unrelatedly-diversified firms (*e.g.* Rajan *et al.* 2000, Stein 1997). Thus, the applicability of these concerns is reduced in this paper, given that the empirical setting is focused on firms that are geographically diversified within a single industry.

[17] This idea is also put forward by Bower (1970), in the resource allocation process literature. In the BTF vein, Pondy (1962) goes even further on this point, and suggests that some classical approaches to capital allocation decisions are altogether inappropriate, because they overlook aspects related to the administrative process.

Cyert and March (1963) depict capital allocation decisions as being made up of three activities: the determination of the target total project capital budget; the internal allocation of that capital budget to specific projects or subunits; and the actual implementation of the determined allocations with expenditures. The determination of a firm's target total project capital budget is characterized by Cyert and March as a calculation of what the organization "can afford to spend" during the next budget period (p. 272). This calculation is made by top management partially as a function of multiple existing organizational goals, which enter a firm's capital allocation decision process as more-or-less independent constraints.

The internal allocation of capital to specific projects or organizational subunits is depicted by Cyert and March (1963) as a sequential process. In this process, the top management of the firm first allocates an approximate share of its capital budget to major types of projects or major project classes, as pointed out by Pondy (1962). The definition of the different major project classes and the shares of the budget allocated to them are contingent – to varying degrees – on the definition of multiple organizational goals, on the historical legitimacy of organizational subunits or managers, and on expected performance.[18] This major allocation is taken mostly as given to the next steps of the capital allocation process, in which other approximate allocations are made at lower levels of the organization, to more refined project classes.[19] This sequential process continues until "the number of projects within a class is small enough and goals are shared enough to allow an explicit, complete ranking of individual projects" (Cyert and March 1963, p. 273). Given this process, Cyert and March (1963) suggest that investment alternatives which aim to reach different organizational goals will belong to different project classes for internal capital allocation, and therefore should not necessarily *directly* compete for capital between themselves.

[18] In agreement with this rationale, Cyert and March (1963) also underscore the importance of distinguishing between allocation decisions involving specific projects and decisions involving established organizational subunits. Among other things, historical precedents, complicated mixtures of activities, and existing intra-organizational political coalitions (March 1962) are likely to make the process of capital allocation to organizational subunits more convoluted.

[19] Along these lines, Pondy (1962) portrays the determination of budget targets by top management as establishing guidelines to direct the successive lower levels of an organization in their search for investment project proposals. This rationale is also akin to the perspective taken by the accounting discipline, which sees budgeting as a means for top management to communicate its plans through all levels of an organization, with management at each successive level below adding more detailed information for the guidance of subordinates (Anthony 1970, p. 499).

In the context of this paper, the consolidation of a firm's current market activities and the expansion of a firm's scope of activities represent markedly different organizational goals. If the above argument is correct, investment alternatives that entail entering potential target markets will not compete *directly* for capital with investments in a firm's current markets. This leads to a counterpoint prediction to Hypothesis 6a by which, *all else being equal*, high opportunities in a firm's current markets will not be associated with a lower likelihood of firm entry into a focal market.

Hypothesis 7a: High opportunities in a firm's current markets will not be associated with a lower likelihood of firm entry into a focal market.

Within a firm's broad goal to expand its scope, it can also be argued that investment alternatives that contemplate entering different potential target markets embody different organizational sub-goals. Following this rationale, investment alternatives that entail entering different potential target markets will not compete *directly* between themselves for a firm's capital. *All else being equal*, this leads to the expectation that high opportunities in other potential target markets for firm entry will not be associated with a lower likelihood of firm entry into a focal market, countering Hypothesis 6b.

Hypothesis 7b: High opportunities in other potential target markets for firm entry will not be associated with a lower likelihood of firm entry into a focal market.

DATA AND METHODS

Sample

The empirical setting for this study is the generation segment of the U.S. electric power industry from 1999 to 2010. 1999 is taken as the starting point because it was when the Federal Energy Regulatory Commission (FERC) issued Order No. 2000 at the federal level, which instituted Regional Transmission Organizations (RTOs). RTOs are independent governing bodies that administer large regions of the transmission grid throughout North America in a non-discriminatory manner. The introduction of RTOs improved the functioning of wholesale electricity markets, by enhancing the access to transmission for all firms involved in wholesale electricity trade – both generators and purchasers of electricity – and, in this way, increasing their ability to transact

electricity (www.ferc.gov). Thus, 1999 is a natural starting point for the analysis of firm market entry decisions.

The main data source for this study is a database provided by SNL. This database includes a dataset on power plant operations in North America that is aggregated mainly from the U.S. Energy Information Administration (EIA) and the FERC. The SNL database also includes plant ownership information at multiple levels (from immediate to ultimate parent firms), as well as financials at the level of the ultimate parent firm.

This database was complemented with publically-available data sources. To operationalize the notion of market opportunities, data on market-level energy loads (electricity demand levels) and available supply capacity resources was obtained from EIA's 411 data file. Data was also collected from the EIA website (www.eia.gov) to construct measures of firm-level and market-level exposure to state-mandated or advised generation asset divestitures. Finally, data was obtained from the Database of State Incentives for Renewables & Efficiency (www.dsireusa.org) to build measures of firm-level and market-level exposure to state-mandated renewable generation portfolio standards.

The final dataset brings together all of these data sources, and takes the ultimate parent firm as the relevant firm definition. The final dataset construction process started with taking operational data on power plants and aggregating them at the firm-market-year level. These data were then merged with firm-year level financial variables and regulatory indicators. The sample was mostly restricted to firms whose reported major SIC codes were in electric power (4911, 4931, or 4991).[20] The focus was exclusively on U.S. firms, since the data coverage of those firms was more consistent than that of foreign firms.[21] Of the ten NERC regions, the two corresponding to Hawaii and Alaska were dropped, because they are too small and concentrated – each with only one large electric utility – to be considered properly functioning markets. This led to an interim sample made up of an unbalanced panel with 1,752 firm-market-year observations, and 57 distinct firms that are present from 1999 to 2012 in eight different markets.

[20] A few exceptions exist for firms with different major reported SIC codes (4900, 4932, or no code reported). Those firms were individually checked to make sure that electricity was not a negligible component of their businesses.
[21] Mostly Canadian firms were dropped in the process.

Since the focus of this study is on existing firms' decisions to enter a focal market, the unit of analysis should be the firm-"market-at-risk"-year, with a "market-at-risk" being a focal market in which a firm is not present but can potentially enter. Because of this, the firm-market-year level interim sample was reshaped to the firm-"market-at-risk"-year level. This reshaping led to an initial consolidated sample of 4,273 firm-"market-at-risk"-year observations, with 57 ultimate parents followed from 1999 to 2012 as potential entrants in eight different "markets-at-risk."

Dependent variable

Given the focus on market entries by existing firms, the dependent variable encompasses only market entries from firms that were already present in other markets in the sample. The dependent variable is called *Firm entry into the focal market* and it is a categorical measure, coded 1 if a firm entered a focal market in a given year, and coded 0 otherwise.

Independent variables

As mentioned previously, the tightness of overall supply capacity relative to demand in a given wholesale electricity market is a very salient indicator of the returns that can accrue to generation capacity that market (*e.g.* Credit Suisse 2013, SNL Energy 2013). For this reason, the *Focal market opportunity* variable is based on the tightness of supply capacity relative to demand in a focal market.

For market m and year t, the following *Focal market capacity tightness* ratio is first calculated:

$$Focal\ market\ capacity\ tightness_{mt} = \frac{Market\ average\ hourly\ net\ energy\ for\ load\ (MW)_{mt}}{Market\ total\ summer\ capacity\ (MW)_{mt}}$$

In the above ratio, the numerator (*Market average hourly net energy for load*) is a proxy for the average demanded electricity in market m and year t. This value corresponds to the sum of the average hourly net generation of that market's generating units, plus energy receipts, minus energy deliveries (in MW). The denominator (*Market total summer capacity*) works as a proxy for available supply capacity in market m and year t, and corresponds to the sum of the existing net generation capacity in that market plus or minus the capacity that either enters or leaves that market via purchases, sales, ownership, or entitlements (in MW).

The *Focal market opportunity* variable for market m and year t is a moving average of the *Focal market capacity tightness* ratio over the prior 2 years. It thus equals the following expression:

$$Focal\ market\ opportunity_{mt} = \frac{\sum_{\tau \in \{t-1, t-2\}} Focal\ market\ capacity\ tightness_{m\tau}}{2}$$

This moving average of prior years is used to make the profile of the variable smoother, and to reflect typical lags in the effective implementation of capacity investments.

Opportunities in the markets in which a firm is currently present are operationalized as the *Index of opportunities that a firm faces in its current markets*. For each firm i in year t, the construction of this variable starts with the following expression:

$$\sum_{m \in M_{it}} share_{imt} * Focal\ market\ capacity\ tightness_{mt}$$

In the above expression, M_{it} is the set of markets in which firm i is present in year t, and $share_{imt}$ is the share of firm i's capacity in market m relative to its total capacity in the set M_{it} in year t. The measures of *Focal market capacity tightness* for each market in which a firm is present are the same measures that are used as bases for the *Focal market opportunity* variable. For firm i in year t, the above expression is just the weighted mean of the *Focal market capacity tightness* measure in firm i's current markets. Analogously to the *Focal market opportunity* variable, the final *Index of opportunities that a firm faces in its current markets* for firm i in year t is the moving average of the above expression over the prior 2 years.

The variable that captures opportunities in other potential target markets for entry (excluding a focal market) is called *Average opportunities in other potential target markets*. For each firm i, "market-at-risk" m, and year t, it starts with the following expression:

$$\sum_{m\prime \in M_{im\prime t}} \frac{Focal\ market\ capacity\ tightness_{m\prime t}}{|M_{im\prime t}|}$$

In this expression, $M_{im\prime t}$ is the set of markets that firm i could potentially enter in year t excluding the focal market m, and $|M_{im\prime t}|$ represents the cardinality of that set. Thus, for each "market-at-risk" m, the above expression is the unweighted mean of the *Focal market capacity tightness* measure in other markets (excluding market m) that firm i could potentially enter. For each firm i, "market-at-risk" m, and year t, the final *Average opportunities in other potential target markets* variable is just a moving average of the above expression over the prior 2 years (analogous to the *Focal market opportunity* variable). This variable is not defined for firms that do not have other

potential target markets for entry besides market m (*i.e.* firms present in all but the focal "market-at-risk"). To solve this, *Average opportunities in other potential target markets* is set equal to 0 in those cases; and the models include a dummy variable set equal to 1 if firms do not have other potential target markets for entry, and equal to 0 otherwise (*Single potential target market dummy*).

To operationalize a firm's availability of capital, two measures were selected to work as proxies for a firm's internally-generated capital and for its ability to borrow capital from external sources, respectively. These measures are:

- *Cash flow from operations:* A firm's yearly cash flow from operations (in million US$). *Cash flow from operations* is a direct proxy for a firm's ability to internally generate capital. Accordingly, cash-flow-based metrics have been used in the management literature as measures of financial slack (*e.g.* Davis and Stout 1992); and have been positively associated in the finance literature with lower levels of financial constraints faced by firms (*e.g.* Boutin *et al.* 2013, Fazzari *et al.* 1988, Hoshi *et al.* 1991, Kaplan and Zingales 1997).
- *Cost of debt:* A firm's yearly interest expenses over its total debt. This measure reflects the overall cost of debt capital to a firm (Arrfelt *et al.* 2015). It is a proxy for a firm's (in)ability to borrow capital from external sources because firms with low costs of debt will be able to borrow more capital on better terms from external sources than firms with higher costs of debt (*e.g.* Bourgeois 1981).

The *Share of a firm's overall capacity that is regulated* variable is aimed at operationalizing a firm's relative share of regulated activities, and thus the degree of constraints faced by that firm in channeling its internally-generated capital to invest in entering a focal market. For each firm i and year t, this variable is calculated through the following expression:

$$\frac{\sum_{p \in P_{it}} Plant\ capacity_{pit} * I[if\ regulated]_{pit}}{\sum_{p \in P_{it}} Plant\ capacity_{pit}}$$

In this equation, P_{it} is the overall set of firm i's plants in year t; $Plant\ capacity_{pit}$ is plant p's capacity in year t; and $I[if\ regulated]_{pit}$ is an indicator variable, coded 1 if plant p is regulated and 0 otherwise.

Control variables

The regression models include a series of control variables to take into account other relevant dimensions that can influence firm entry into a focal market. These are described in detail in Table 1.

- Insert Table 1 about here -

Methods

Event-history methods constitute a standard approach in the empirical management literature on firm entry decisions (*e.g.* de Figueiredo and Silverman 2007, Mitchell 1989), and are thus used in this paper. These methods are particularly appropriate because, when estimating the probability of firm entry into a focal market in a given period, they take into account the fact that a firm has not entered that focal market in previous periods. In the following empirical analysis, the estimated models are piece-wise hazard rate models of the probability of *Firm entry into the focal market* in a given year, assuming a year-specific exponential baseline hazard of entry. This semi-parametric methodology controls for year-specific effects that might influence the probability of firm entry into a focal market, without assuming any particular functional form of time dependence.

Given that *Firm entry into the focal market* (the dependent variable) implicitly represents investments in capacity, the independent and control variables in the presented specifications are lagged to take into account the fact that those investments take time to be implemented. This way, there is a clear time ordering from the covariates to the dependent variable. Specifications with 2-year lags applied to most covariates – with the exception of the market opportunity and demand growth variables – ended up being chosen because they yielded the most consistent results, even though models with 1-year and 3-year lags were qualitatively similar. In general, this resonates with reports from interviewed industry insiders, stating that the time lag between a firm's decision to invest in new power plant capacity and the time at which that plant starts operating is on average 2 years.

The final sample used is smaller than the initial consolidated sample due to data availability issues and the implemented estimation procedures. Specifically, the sample started by dropping to 3,689 observations (but still the same 57 firms) since the time frame for the empirical analysis ends in 2010 instead of 2012. This happens because the market load and capacity metrics – on which market opportunity variables are built – stop being reported by the EIA after 2009 for some markets. Moreover, the set-up of the event-history panel with starting time in 1999 further reduced the sample.

As a result, the final sample has 2,940 firm-"market-at-risk"-year observations, with 55 distinct firms followed from 2000 to 2010 in eight potential target markets ("markets-at-risk").

RESULTS

Descriptive statistics

Variable summary statistics and correlations are presented in Table 2. The *Firm entry into the focal market* variable has a final sample mean of 0.015, which means that there is an incidence of entry into a focal market in 1.5% of the firm-"market-at-risk"-year observations. This (apparently) small number is just a consequence of the firm-"market-at-risk"-year structure of the dataset. On the whole, the final sample accounts for 43 market entries; and the average number of markets in which a firm is present increases from 1.98 in 1999 to 2.45 in 2010.

- Insert Table 2 about here -

The correlations among the main variables are mostly within moderate ranges. The only notable exception is the correlation between *Focal market opportunity* and the *Share of focal market generation that is regulated*, at 0.523. This correlation reflects structural differences across markets as a function of their respective overall shares of regulated capacity: compared to non-regulated plants, regulated plants are more concentrated in technologies with higher average capacity utilization levels (*i.e. base-load* technologies, such as coal and nuclear), which can contribute to higher levels of *Focal market opportunity*. This is why an interaction between *Share of focal market generation that is regulated* and *Focal market opportunity* is included in the regression models.

Figure 1 is presented to demonstrate the face validity of the *Focal market opportunity* variable as an operationalization of stimuli for investment in general, and market entry in particular. For each of the eight markets during the final sample period (2000-2010), Figure 1 plots the evolutions of both the sum of total gross capacity additions (in MW) by all firms in a year, and the *Focal market opportunity* variable (the moving average of the *Focal market capacity tightness* metric for the prior 2 years).[22] In the graphs, the right vertical axes measure *Focal market opportunity*, and the left ones measure total gross capacity additions. As seen there, capacity additions in a market co-move with

[22] Figure 1 used the interim sample at the firm-market-year level restricted to the final sample period (2000-2010), with 1,396 observations and 57 firms. That sample was then collapsed to the market-year level to construct the graphs.

Focal market opportunity, a fact corroborated by a 0.3228 correlation between the two variables. This indicates that *Focal market opportunity* is a good proxy for investment stimuli in a market.

- Insert Figure 1 about here -

As an additional validation of the *Focal market opportunity* variable, it was important to establish a connection between it and firms' financial returns. For the final sample period (2000-2010), the obtained market-year-level correlations of the *Focal market capacity tightness* metric – the yearly component that enters the *Focal market opportunity* variable, as shown before – with both average return-on-assets and average return-on-equity for firms with at least 50 percent of their overall capacity in a market[23] were 0.4233 and 0.3266, respectively. This result validates the *Focal market capacity tightness* metric as a good indicator of market returns.

Regression estimates

Table 3 displays the regression models, with standard errors clustered at the firm level. The four regression models (1 to 4) have explanatory variables sequentially added to them, such that Model 4 constitutes the full model.

- Insert Table 3 about here -

Hypothesis 1 predicted that high opportunities in a focal market would be associated with a higher likelihood of firm entry into a focal market. Corroborating this, the estimated coefficient for *Focal market opportunity* is positive and statistically significant across all models (at the 5% level). The estimated magnitude of the effect is also sizable: for Model 4, a 1-standard-deviation increase in the *Focal market opportunity* variable is associated with an average estimated 100 percent increase in the hazard of *Firm entry into the focal market*.[24] This evidence suggests that high opportunities in a focal market work as stimuli for entries into that market, reinforcing what had been indicated by the descriptive statistics presented before.

Hypothesis 2a predicted that a greater amount of internally-generated capital would be associated with a higher likelihood of firm entry into a focal market. Supporting this, the estimated

[23] These correlations were calculated for the subset of firms with 50 percent or more of their capacity in a market because the financial performance of those firms will depend more on the conditions verified in those specific markets than the performance of firms that are relatively more spread out across other markets.

[24] This marginal effect is reached through the following formula (for a given explanatory variable x_1): $Marginal\ effect\ x_1 = 100\% \times \left(\exp(coef.x_1)^{\triangle x_1} - 1\right)$, with $coef.x_1$ being the estimated coefficient for x_1, and $\triangle x_1$ being the variation in x_1. All marginal effects are calculated in this way, unless mentioned otherwise.

coefficient for *Cash flow from operations* is positive and statistically significant across all models (at the 5% level). For Model 4, a 1-standard-deviation increase in this variable is associated with a predicted increase of 43 percent in the hazard of *Firm entry into the focal market*. Similarly, Hypothesis 2b predicted that a greater ability to borrow capital from external sources would be associated with a higher likelihood of firm entry into a focal market, but less strongly than the amount of internally-generated capital. Corroborating this prediction, even though the estimated coefficient for *Cost of debt* is negative across all models, it never reaches statistical significance. Furthermore, for Model 4, a 1-standard-deviation decrease in *Cost of debt* is (only) associated with a 13 percent increase in the hazard of *Firm entry into the focal market*.

Hypotheses 3a and 3b respectively predicted that a greater amount of internally-generated capital and a greater ability to borrow capital from external sources would moderate positively the relationship between *Focal market opportunity* and *Firm entry into the focal market*. Hypothesis 3a is not supported since the estimated coefficient for the interaction between *Cash flow from operations* and *Focal market opportunity* switches signs and is never statistically significant.[25] There is, however, some empirical support for Hypothesis 3b, with the estimated coefficient for the interaction between *Cost of debt* and *Focal market opportunity* being negative and statistically significant (at the 10% level) for Models 3 and 4. For Model 4, a simultaneous decrease of one standard deviation in *Cost of debt*, an increase of one standard deviation in *Focal market opportunity*, and the corresponding change in their interaction are associated with a predicted increase of 163 percent in the hazard of *Firm entry into the focal market*. This simultaneous effect on the hazard of *Firm entry into the focal market* is larger than the sum of the standalone effects of a 1-standard-deviation decrease in *Cost of debt* and a 1-standard-deviation increase in *Focal market opportunity* (13 percent plus 100 percent, respectively), which underscores the magnitude of this moderating relationship.[26]

[25] For the interaction terms that include continuous variables (as in this case), those continuous variables were centered to their sample mean values, following the standard in the literature (Aiken and West 1991). As a result, the main effect of each interacting variable can be read as its effect on the dependent variable at the mean level of the other interacting continuous variable(s).

[26] The marginal effect for an interaction (between given explanatory variables x_1 and x_2) is calculated in the following way: $Interaction\ marginal\ effect\ x_1 \times x_2 = 100\% \times \left(\exp(coef.x_1)^{\triangle x_1} * \exp(coef.x_2)^{\triangle x_2 \cdot} * \exp(coef.x_1 \times x_2)^{\triangle x_1 \times x_2} - 1\right)$, with $coef.x_i$ being the estimated coefficient for x_i, $\triangle x_i$ being the variation in x_i, $coef.x_1 \times x_2$ being the estimated coefficient for the interaction variable, and $\triangle x_1 \times x_2$ being the variation in the interaction variable.

Hypothesis 4 predicted that a higher share of regulated activities would be associated with a lower likelihood of firm entry into a focal market. Corroborating this, the estimated coefficient for the *Share of a firm's overall capacity that is regulated* is negative and statistically significant for Models 2 to 4. For Model 4, the estimated coefficient for the *Share of a firm's overall capacity that is regulated* is statistically significant at the 1% level and a 1-standard-deviation increase in this variable is associated with a decrease of 42 percent in the hazard of *Firm entry into the focal market*.

Following up on Hypothesis 4, Hypothesis 5 predicted that a higher share of regulated activities would negatively moderate the relationship between *Focal market opportunity* and *Firm entry into the focal market*. However, this prediction is not supported by the data: the estimated coefficient for the interaction between the *Share of a firm's overall capacity that is regulated* and *Focal market opportunity* is always positive for Models 2 to 4, albeit never reaching statistical significance.

Hypotheses 6a and 6b respectively predicted that high opportunities in a firm's current markets and high opportunities in other potential target markets for firm entry would be associated with a lower likelihood of firm entry into a focal market. In a contrasting way, Hypotheses 7a and 7b respectively predicted that high opportunities in a firm's current markets and high opportunities in other potential target markets for firm entry would not be significantly associated with a lower likelihood of firm entry into a focal market. Supporting the predictions of Hypotheses 7a and 7b, the estimated coefficient for the *Index of opportunities that a firm faces in its current markets* in Models 3 and 4 is always positive and never statistically significant; and the estimated coefficient for the *Average opportunities in other potential target markets* variable in Models 3 and 4 is never statistically significant, albeit negative.

Of course, the lack of evidence found for Hypotheses 6a and 6b could in principle be due to highly-positive correlations between *Focal market opportunity*, the *Index of opportunities that a firm faces in its current markets*, and the *Average opportunities in other potential target markets* variable. Such highly-positive correlations would dampen a firm's internal competition for capital between different investment alternatives since, when opportunities in a firm's current markets or in other potential target markets for entry would be high, the co-existence of high focal market opportunities would enable a firm to borrow capital to enter that focal market anyway. However, this conjecture is

not verified in the sample: albeit positive, the correlation between *Focal market opportunity* and the *Index of opportunities that a firm faces in its current markets* is very low (0.009); the correlation between *Focal market opportunity* and the *Average opportunities in other potential target markets* variable is actually negative (-0.127); and, finally, the correlation between the *Index of opportunities that a firm faces in its current markets* and the *Average opportunities in other potential target markets* variable is positive but very low (0.002).

Some of the included control variables have significant estimated coefficients. Across all models, the estimated coefficient for the *Focal market HHI index* variable is negative and statistically significant (at the 0.1% level for Model 4). For Model 4, a 1-standard-deviation increase in the *Focal market HHI index* is associated with an estimated 63 percent decrease in the hazard of *Firm entry into the focal market*. The estimated coefficients for the *Share of focal market generation that is regulated* were negative and statistically significant across all models (at the 1% level for Model 4). For Model 4, a 1-standard-deviation increase in the *Share of focal market generation that is regulated* is associated with an estimated 61 percent decrease in the hazard of *Firm entry into the focal market*. In addition, the estimated coefficient for the interaction between *Focal market opportunity* and the *Share of focal market generation that is regulated* is negative and statistically significant at the 5% level across all models. For Model 4, simultaneous 1-standard-deviation increases in the *Share of focal market generation that is regulated* and in *Focal market opportunity*, together with the corresponding change in their interaction are associated with a predicted decrease of 60 percent in the hazard of *Firm entry into the focal market*. Lastly, the coefficient for the *Index of overall firm exposure to state-mandated/-advised divestitures* is negative and statistically significant (at the 10% level) for Model 4.

***Post hoc* analysis**

In the foregoing analysis, high opportunities in a firm's current markets and high opportunities in other potential target markets for firm entry were found as not having negative and significant associations with firm entry into a focal market. This corroborated Hypotheses 7a and 7b, and the idea that investment alternatives that aim at fulfilling different organizational goals will not *directly* compete between themselves for a firm's capital.

However, more can potentially be said about the relationship between the different types of investment alternatives facing a firm. Indeed, if there is no *direct* competition for capital between investment alternatives that entail entering different potential target markets and investment alternatives that involve consolidating a firm's current market activities, and if a firm's internally-generated capital could be a common antecedent for all of a firm's investments, there is the salient possibility that a firm's investments will actually co-move across different markets.[27]

This potential for co-movement of a firm's investments across different markets is what this *post hoc* analysis tries to infer. For this analysis, the regression models presented in Table 4 are similar to Model 4 in Table 3, with a few variable additions. Model 1 in Table 4 adds a categorical variable to account for a firm's investments in other markets (*Firm investments in other markets*). Model 2 in Table 4 adds instead two categorical variables: a variable for a firm's investments in other markets that do not correspond to other potential target market entries (*Firm investments in other markets (excluding entries)*); and an indicator of a firm's entry into other markets (*Firm entries into other markets dummy*). These variables are defined in Table 1.

- Insert Table 4 about here -

In Table 4, the models support the possibility that a firm's investments will co-move across markets. In Model 1, the estimated coefficient for the *Firm investments in other markets* variable is positive and statistically significant (at the 5% level). The estimated magnitude of the effect is sizable, with a 0 to 1 change in the *Firm investments in other markets* variable being associated with an average estimated increase of 152 percent in the hazard of *Firm entry into the focal market*. Furthermore, in Model 2, the estimated coefficients for both *Firm investments in other markets (excluding entries)* and *Firm entries into other markets dummy* are both positive and statistically significant (at the 5% level). In this case, the effect sizes are also large: a change from 0 to 1 in the *Firm investments in other markets (excluding entries)* variable is associated with a 99 percent increase in the hazard of *Firm entry into the focal market*; whereas a change from 0 to 1 in the *Firm entries*

[27] In this context, such a co-movement of a firm's investments across different markets is not likely to be due to a concurrent co-movement of the opportunities facing a firm in each of those different markets. This is because of the aforementioned lack of highly-positive correlations between *Focal market opportunity*, the *Index of opportunities that a firm faces in its current markets*, and the *Average opportunities in other potential target markets* variable.

into other markets dummy variable is associated with a 204 percent increase in the hazard of *Firm entry into the focal market*. Regarding the remainder of the coefficients, both Model 1 and Model 2 have qualitatively similar estimates for the covariates that are also present for Model 4 in Table 3.[28]

DISCUSSION

Using evidence from the generation segment of the U.S. electric power industry (1999-2010), this paper sought to empirically infer the connection between existing firms' internal capital allocations and their (geographic) market entry decisions. Using some theoretical arguments from the Behavioral Theory of the Firm (BTF) (*e.g.* Cohen *et al.* 1972, Cyert and March 1963, Levinthal and March 1993, March and Olsen 1976), it drew a parallel between a firm's availability of capital and the notion of organizational slack as a motivator of a firm's decision to enter a focal market (Bourgeois 1981, Bourgeois and Singh 1983). Moreover, this paper also leveraged the BTF's conception of different types of investment alternatives as representing different organizational goals that enter a firm's capital budgeting process as more-or-less independent constraints (Cyert and March 1963, Pondy 1962), to infer the working of a firm's internal competition for capital between investment alternatives.

The empirical results showed broad support for the theoretical predictions. In general, the analysis showed that different types of available capital had positive but nuanced associations with the probability of firm entry into a focal market. Specifically, it was found that a greater amount of internally-generated capital was positively associated with the probability of firm entry into a focal market, and that this effect appeared to be irrespective of the level of opportunities in that focal market. Somewhat contrastingly, the analysis also found that a greater ability to borrow capital from external sources was positively associated with the probability of firm entry into a focal market, but that such an association appeared to be significant only when high opportunities existed in that focal market. Besides giving validity to some arguments put forward in the finance literature (*e.g.* Fazzari *et al.* 1988, Graham *et al.* 2015, Kaplan and Zingales 1997), these results highlight the importance of

[28] The only reason why the Chi-Squared statistic is not reported for Model 2 in Table 4 is that the *Firm entries into other markets dummy* variable is 1 for only 164 of 2,940 observations in the final sample, and is always 0 for 29 of the 55 considered firms. As a result, and given that the standard errors are clustered at the level of the firm, the estimated variance-covariance matrix is not of sufficient rank to perform a proper model test. Nonetheless, this does not mean that the model is wrongly specified.

distinguishing between different types of capital availability – and different types of organizational slack, by analogy – when making predictions about firm outcomes.

Moreover, the analysis was also able to infer more intricate aspects related to the relationship between a firm's availability of capital and its market entry decisions by harnessing some characteristics of the empirical context at hand. In particular, it used the fact that a firm's regulated activities are subject to stringent ownership and reporting requirements which will likely constrain the channeling of capital generated by those activities to fund a firm's investments elsewhere. This led to the prediction that firms with larger shares of their current activities that were regulated would be more constrained in their abilities to channel internally-generated capital to enter a focal market. Corroborating this prediction, the analysis showed a negative association between firms' higher shares of current activities that were regulated and the probability of firm entry into a focal market, and that this association appeared to be irrespective of the level of focal market opportunities.

Lastly, when looking at the effects of the internal competition for capital between a firm's different investment alternatives, it was found that the probability of firm entry into a focal market was not negatively and significantly associated with either opportunities in a firm's current markets or opportunities in other potential target markets for firm entry. This finding does not support the notion of internal competition for capital within a firm as a centralized process of ranking of different investment alternatives, in which those alternatives compete *directly* for funding with each other on the basis of their relative economic merits. Instead, this result supports ideas that lie at the heart of the BTF, by which different types of investment alternatives represent different organizational goals that enter a firm's capital budgeting process as more-or-less independent constraints (Cyert and March 1963, Pondy 1962). This would lead investments to enter a focal market not to compete *directly* for capital with either investments in a firm's current markets or investments in other potential target markets for firm entry.

The following *post hoc* analysis attempted to delve deeper into some implications of the purported absence of *direct* internal competition for a firm's capital between different types of investment alternatives. Leveraging the fact that a firm's internally-generated capital could be a common antecedent for all of a firm's investments, this analysis sought to infer the actual possibility

that a firm's investments would co-move across different markets. Corroborating this rationale, the *post hoc* analysis showed that the probability of firm entry into a focal market was positively associated with a firm's investments in other markets, be those investments in a firm's current markets or in other potential target markets for firm entry.

Contributions

In general, the presented theory and findings are a testimony to the virtues of a multidisciplinary approach to the study of firms' internal capital allocations. Specifically, this paper shows that the integration of some contributions from the BTF with more traditional rationales can be fruitful. On the one hand, it was shown that contributions from the finance literature can help disambiguate the role of different types of available capital on firms' investment decisions and, in this way, refine predictions of the BTF regarding the role played by different types of organizational slack (Bourgeois and Singh 1983, Sharfman *et al.* 1988). The empirical setting also allowed for assessing the impact of constraints to the channeling of internally-generated capital within a firm – due to regulation – on market entry decisions, which added an interesting and novel nuance to the results. On the other hand, when discussing the internal competition for capital between a firm's investment alternatives, it was also shown that insights from the BTF on the structure and processes involved in capital budgeting decisions can supplement more traditionally-used theoretical perspectives.

Furthermore, looking at market entry decisions also made it possible to move beyond the traditional research focus placed on capital allocations between a firm's existing businesses (*e.g.* Haspeslagh 1982, Williamson 1975). This represents an important first step for the explicit consideration of different types of investment alternatives competing for a firm's capital, and thus for a better understanding of internal capital allocation outcomes.

In spite of the appropriateness of the U.S. electric power industry as an empirical setting, one of the inherent limitations of a single-industry study has to do with the applicability of its findings to other settings. Studying this phenomenon in distinct contexts could both test the generalizability of the presented findings and uncover new and interesting boundary conditions and contingencies.

CONCLUSION

This paper attempted to empirically link firms' internal capital allocations with their market entry decisions. By resorting to some arguments from the Behavioral Theory of the Firm, it highlights a general opportunity for complementing traditionally-used rationales in quantitative treatments of firms' internal capital allocations with approaches from management research that highlight the role of structure and process. These approaches include – but are not limited to – the literature on the resource allocation process (*e.g.* Bower 1970, Burgelman 1983), and the literature on strategic planning (*e.g.* Chakravarthy and Lorange 1984, 1991). Taking on such a research endeavor has the potential to greatly improve scholarly understanding of firms' capital allocation decisions and their resulting investment outcomes.

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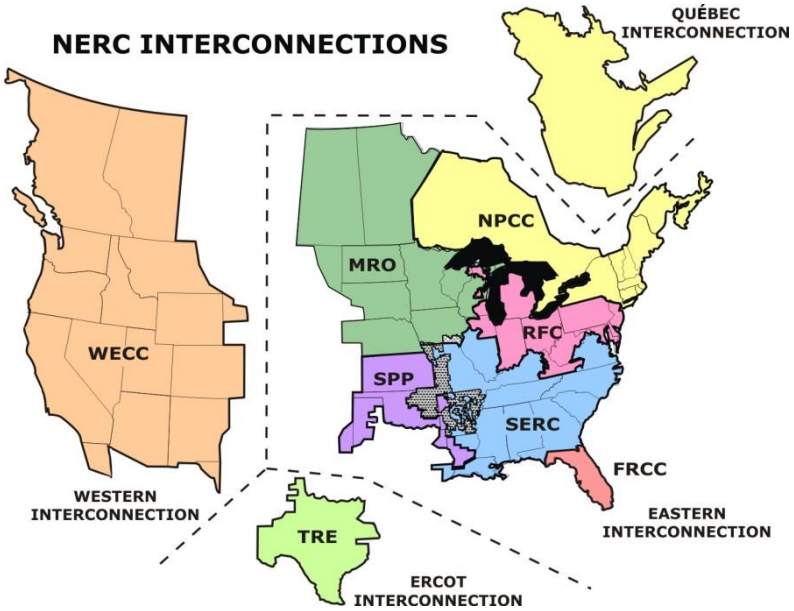
APPENDIX: NERC REGIONS (WHOLESALE MARKET DEFINITION)

Figure A1: NERC Regional Entities for the Contiguous United States, Canada, and Northern Baja California, Including the Main Interconnections (Source: NERC - North American Electric Reliability Corporation**)**[29]



U.S. Wholesale electricity markets

The mission of the North American Electric Reliability Corporation (NERC)[30] is to promote the reliability and adequacy of bulk power transmission in North America. The NERC develops standards for power system operation and monitoring, and enforces compliance with those standards. Besides that, it also assesses resource adequacy and provides educational and training resources to power system operators. The NERC is currently organized around ten different and mutually-exclusive geographic reliability regions.

Wholesale markets in the U.S. electric power industry work within those ten NERC reliability regions, which encompass also most of Canada, and northern Baja California (Mexico), as shown in Figure A1. For the contiguous U.S. (excluding the Alaska (ASCC) and Hawaii (HICC) NERC regions), the eight relevant NERC regions are further aggregated into three major interconnection networks that help balance supply and demand across regions (EIA 2000).

Despite the progressive expansion of wholesale electricity trade between NERC regions, the overwhelming majority of wholesale trade still occurs within NERC regions (EIA 2008), which further justifies their choice as our relevant market definition. Given that trade data between regions is not publicly available, we sought to approximate it by considering each of our eight selected NERC regions and looking at the ratio of anticipated capacity resources coming from adjacent NERC regions to the internal capacity resources of each NERC region for 2010 (data from the EIA 411 data file). On average, across NERC regions, the obtained ratio was 3 percent – with a maximum value of 8 percent and a minimum of 0 –, underscoring the relatively small volumes of inter-regional trade. These results are consistent with prior evidence that the law of one price does not prevail across adjacent electricity wholesale regions (Joskow 2006).

[29] White space between regions delimits the main interconnection networks.

[30] The NERC only adopted this designation in 2006. Previously, it was called North American Electric Reliability Council, originally founded in 1968.

FIGURES AND TABLES

Table 1: Control Variable Descriptions

Variables	Definitions
Demand growth in the focal market	A proxy for the overall momentum of demand and cycles in a focal market. This variable is the geometric average of the growth of *Market average hourly net energy for load* (as defined for the *Focal market opportunity* variable) over the prior 2 years.
Focal market HHI index	The Herfindahl-Hirschman Index (HHI), based on the electricity generated by firms in a focal market.
Share of focal market generation that is regulated	This variable is the total share of regulated electricity generation in a focal market. For each market m and year t, it is calculated using the following expression: $\frac{\sum_{p \in P_{mt}} Electricity\ generated_{pt} * I[if\ regulated]_{pt}}{\sum_{p \in P_{mt}} Electricity\ generated_{pt}}$ P_{mt} is the overall set of plants in market m and year t; $Electricity\ generated_{pt}$ is plant p's electricity generation in year t; and $I[if\ regulated]_{pt}$ is an indicator variable, coded 1 if plant p is regulated, and 0 otherwise.
Firm overall expected capacity utilization	For each firm i in year t, this variable is computed by the following expression: $\frac{\sum_{p \in P_{it}} Plant\ capacity_{pit} * Plant\ capacity\ utilization\ benchmark_{p\tau_p t}}{\sum_{p \in P_{it}} Plant\ capacity_{pit}}$ P_{it} is the set of a firm i's plants in year t; $Plant\ capacity_{pit}$ is plant p's capacity in year t; τ_p indexes plant p's technological class; and $Plant\ capacity\ utilization\ benchmark_{p\tau_p t}$ represents the average across-sample capacity utilization for plants in technological class τ_p in year t.
Firm overall lumpiness	This variable is the inverse of the count of the number of generating units (generators within a plant) that a firm has across all markets in which it is present. In theory, lumpiness will detrimentally affect a firm's ability to closely and smoothly match changes in demand with its capacity increases (Lieberman 1987, Zhang and Gimeno 2010).
Firm overall relative efficiency variables	Because of the technical and economic complexities of different firms' technological mixes for generating electricity, two separate variables were constructed aimed at capturing distinct aspects of a firm's efficiency levels: *Firm overall "within-generation-technology" relative efficiency*, which captures the average efficiency of a firm's plants relative to the average efficiency levels of each of those plants' respective generation technology classes (hence the *within* mention); and *Firm overall "between-generation-technology" relative efficiency*, which operationalizes the average efficiency of a firm's portfolio of plants across generation technologies relative to other firms' plant portfolios (thus the *between* label). Stated differently, the former variable measures the average relative efficiency of a firm's plants compared to all other firms in the sample, given the technological mix of a firm's plant portfolio; whereas the latter variable looks at the overall average efficiency of the technological mix of a firm's plant portfolio, relative to the technological mixes of the plant portfolios of all other firms in the sample. On the whole, using these two variables provides a more complete picture of the relative efficiency differences between firms in the sample. - *Firm overall "within-generation-technology" relative efficiency:* For each firm i and year t, the following expression was computed: $\sum_{p \in P_{it}} share_{pit} * (1 - \frac{standardized\ avg.variable\ cost_{p\tau_p t} - min\ standardized\ avg.variable\ cost_{\tau_p t}}{max\ standardized\ avg.variable\ cost_{\tau_p t} - min\ standardized\ avg.variable\ cost_{\tau_p t}})$ P_{it} is the set of firm i's plants in year t, $share_{pit}$ is the share of plant p's generation relative to firm i's total generation across all markets in year t, and τ_p indexes plant p's technological class. For each plant p and year t, the $standardized\ avg.variable\ cost_{p\tau_p t}$ component is the standardized measure of plant p's average variable expenditure in year t relative to the technological class τ_p; obtained by subtracting from plant p's actual average variable expenditure (US$/MWh) in year t the mean of the average variable expenditure across all plants in the τ_p technological class in year t, and then dividing that difference by the standard deviation of the average variable expenditure across all plants in the τ_p technological class in year t. The $max\ standardized\ avg.variable\ cost_{\tau_p t}$ and $min\ standardized\ avg.variable\ cost_{\tau_p t}$ components are, respectively, the maximum and the minimum standardized average variable expenditure across all plants from technological class τ_p in year t; and are used to bound the within efficiency measure for each plant between 0 and 1. To obtain plant-year level within efficiency measures, the above ratios are multiplied by -1 and 1 is added to them so that higher values reflect higher plant within efficiency levels. The final firm-year variable is just a sum of the plant-year within efficiency measures, weighted by $share_{pit}$. - *Firm overall "between-generation-technology" relative efficiency:* For each firm i and year t, this variable takes the form: $\sum_{p \in P_{it}} share_{pit} * (1 - \frac{standardized\ avg.variable\ cost_{pt} - min\ standardized\ avg.variable\ cost_{t}}{max\ standardized\ avg.variable\ cost_{t} - min\ standardized\ avg.variable\ cost_{t}})$ P_{it} is the set of firm i's plants in year t, and $share_{pit}$ is the share of plant p's generation relative to firm i's total generation across all markets in year t. For each plant p and year t, the $standardized\ avg.variable\ cost_{pt}$ component is the standardized measure of plant p's average variable expenditure in year t relative to *all* other plants in the sample; obtained by subtracting from plant p's actual average variable expenditure (US$/MWh) in year t the mean of the average variable expenditure across *all* plants in year t, and then dividing that difference by the standard deviation of the average variable expenditure across *all* plants in year t. The $max\ standardized\ avg.variable\ cost_{t}$ and $min\ standardized\ avg.variable\ cost_{t}$ components are, respectively, the maximum and the minimum standardized average variable expenditure across *all* plants in the sample in year t; and are used to bound the between efficiency measure for each plant between 0 and 1. To obtain plant-year level between efficiency measures, the above ratios are multiplied by -1 and 1 is added to them so that higher values reflect higher plant between efficiency levels. The final firm-year variable is attained by summing the plant-year between efficiency measures, weighted by $share_{pit}$.
Average relative efficiency of focal market firms variables	For the same reasons as the ones put forward for the *Firm overall relative efficiency variables*, two different measures for the average relative efficiency levels of firms in a focal market are also presented: *Average "within-generation-technology" relative efficiency of firms in the focal market*, based on the *Firm overall "within-generation-technology" relative efficiency* variable; and *Average "between-generation-technology" relative efficiency of firms in the focal market*, which is based on the *Firm overall "between-generation-technology" relative efficiency* variable. Whereas the former measure looks at the average relative efficiency of the plants of firms present in the focal market compared to all other firms in the sample, given the technological mixes of their plant portfolios; the latter measure looks at the overall average efficiency of the technological mixes of the plant portfolios of the firms that are present in a focal market, relative to the technological mixes of the plant portfolios of all other firms in the sample. - *Average "within-generation-technology" relative efficiency of firms in the focal market*: For each market m and year t, the following expression was computed:

$$\sum_{i \in F_{mt}} share_{imt} * Firm\ overall\ "within-generation-technology"\ relative\ efficiency_{it}$$

F_{mt} is the set of firms present in market m in year t, and $share_{imt}$ is the share of firm i's generation relative to total generation in market m in year t. For each firm i and year t, the $Firm\ overall\ "within-generation-technology"\ relative\ efficiency_{it}$ component is just the homonymous variable described earlier.

- *Average "between-generation-technology" relative efficiency of firms in the focal market*: For each market m and year t, the variable is given by the following expression:

$$\sum_{i \in F_{mt}} share_{imt} * Firm\ overall\ "between-generation-technology"\ relative\ efficiency_{it}$$

F_{mt} is the set of firms present in market m in year t, and $share_{imt}$ is the share of firm i's generation relative to total generation in market m in year t. For each firm i and year t, the $Firm\ overall\ "between-generation-technology"\ relative\ efficiency_{it}$ component is just the homonymous variable described earlier.

Single potential target market dummy

This variable is coded 1 if, in a given year, a firm only had the focal market as a potential target market for entry (*i.e.* if the firm was already present in seven of the eight considered markets); and 0 if the firm had more than one potential target market for entry.

Index of focal market exposure to state-mandated/-advised divestitures

This variable is meant to operationalize the exposure of a focal market to specific regulations by state-level Public Utility Commissions (PUCs), demanding or advising the divestiture of the generating assets of firms that are present in electricity retail in those PUCs' states of jurisdiction. For each market m and year t, it was calculated using the following formula:

$$\sum_{s \in S} share_{smt} * State\ level\ divestiture_{st}$$

s indexes states, and S is the set of states in the U.S. (excluding Alaska and Hawaii, which are not part of the considered markets). $share_{smt}$ is the share of capacity belonging to both state s and market m out of the total capacity in market m in year t, reflecting the fact that wholesale markets most often encompass more than one state. $State\ level\ divestiture_{st}$ is a categorical component coded 1 if the divestiture of generating assets was mandated or advised by PUCs to electricity retail utilities in state s during year t, and 0 otherwise.

Index of focal market exposure to state-mandated renewable portfolio standards

This variable is built to capture the overall exposure of a focal market to state-level renewable portfolio standards by state-level PUCs, demanding certain percentages of electricity generation in their respective states of jurisdiction to come from approved renewable sources. For each market m and year t, it was calculated using the following formula:

$$\sum_{s \in S} share_{smt} * State\ level\ renewable\ portfolio\ standard_{st}$$

s indexes states, and S is the set of states in the U.S. (excluding Alaska and Hawaii, which are not part of the considered markets). $share_{smt}$ is the share of capacity belonging to both state s and market m out of the total capacity in market m in year t, and is reflective of the fact that a wholesale market typically includes more than one state. $State\ level\ renewable\ portfolio\ standard_{st}$ is a categorical component coded 1 if renewable portfolio standards were mandated by PUCs to electricity retail utilities in state s during year t, and 0 otherwise.

Index of overall firm exposure to state-mandated/-advised divestitures

This variable operationalizes a firm's overall exposure to specific regulations by state-level PUCs, demanding or advising the divestiture of the generating assets of firms that are present in electricity retail in those PUCs' states of jurisdiction. For each firm i and year t, it was calculated using the following formula:

$$\sum_{s \in S} share_{ist} * State\ share_{ist} * Firm\ retail\ presence_{ist} * State\ level\ divestiture_{st}$$

s indexes states, and S is the set of states in the U.S. (excluding Alaska and Hawaii, which are not part of the considered markets). $share_{ist}$ is the share of firm i's capacity in state s and year t out of firm i's total capacity in year t. $State\ share_{ist}$ is firm i's share of the total generating capacity in state s in year t, reflecting the fact that firms with higher shares of overall state capacity were more likely to be targeted by PUCs' divestiture initiatives. $Firm\ retail\ presence_{ist}$ is a categorical component coded 1 if firm i was present in electricity retail in state s during year t, and 0 otherwise. Finally, $State\ level\ divestiture_{st}$ is a categorical component coded 1 if the divestiture of generating assets was mandated or advised by PUCs to electricity retail utilities in state s during year t, and 0 otherwise.

Index of overall firm exposure to state-mandated renewable portfolio standards

This variable captures a firm's overall exposure to state-level renewable portfolio standards by state-level PUCs, demanding certain percentages of electricity generation in their respective states of jurisdiction to come from approved renewable sources. For each firm i and year t, it was calculated using the following formula:

$$\sum_{s \in S} share_{ist} * State\ share_{ist} * Firm\ retail\ presence_{ist} * State\ level\ renewable\ portfolio\ standard_{st}$$

s indexes states, and S is the set of states in the U.S. (excluding Alaska and Hawaii, which are not part of the considered markets). $share_{ist}$ is the share of firm i's capacity in state s and year t out of firm i's total capacity in year t. $State\ share_{ist}$ is firm i's share of the total generating capacity in state s in year t, reflecting the fact that firms with higher shares of overall state capacity were more likely to be targeted by PUCs' renewable portfolio standards initiatives. $Firm\ retail\ presence_{ist}$ is a categorical component coded 1 if firm i was present in electricity retail in state s during year t, and 0 otherwise. This component is included because retail utilities in a state are typically the main targets of PUCs in these renewable portfolio standards initiatives. Finally, $State\ level\ renewable\ portfolio\ standard_{st}$ is a categorical component coded 1 if renewable portfolio standards were mandated by PUCs to electricity retail utilities in state s during year t, and 0 otherwise.

***Post hoc* Analysis Variables**

Firm investments in other markets

This variable operationalizes a firm's investments in other markets as a categorical measure, following the standard in the literature on capacity additions (*e.g.* Gilbert and Lieberman 1987, Henderson and Cool 2003). For each firm i, "market-at-risk" m and year t, it takes the form:

$$\begin{cases} 1\ if\ \dfrac{\sum_{m' \in M_{m'}} I_{im't}}{\sum_{m' \in M_{m'}} K_{im't-1}} > 0.05 \\ 0 \qquad otherwise \end{cases}$$

m' indexes markets, and $M_{m'}$ is the set of markets excluding "market-at-risk" m. $I_{im't}$ is the *expected electricity generation increase* (in Megawatt hours – MWh) from gross capacity additions by firm i to market m' in year t, and $K_{im't-1}$ is the *expected generation* (in MWh) from that firm's previous-year installed capacity in market m'. The use of metrics based on *expected electricity generation* instead of pure generation capacity is justified because different technologies have different investment costs per MW of capacity, and technologies with higher capacity utilization typically have higher capital costs. Thus, using metrics based on *expected electricity generation* helps make investments in different generation technologies more comparable in terms of their costs. The *expected generation* metrics for firm i in a given market m' ($I_{im't}$ and $K_{im't-1}$) are calculated through weighted averages of the actual capacity (in MW) that is either added (in the case of $I_{im't}$) or previously installed (in the case of $K_{im't-1}$), with the weights being the sample average capacity utilizations of each generation technology in the previous year, times the number of hours in a year (8,760). Thus, $\frac{\sum_{m' \in M_{m'}} I_{im't}}{\sum_{m' \in M_{m'}} K_{im't-1}}$ represents the ratio of new-to-pre-existing *expected electricity generation* of firm i in other markets (excluding "market-at-risk" m). This ratio is then discretized using a 5-percent threshold.

Firm investments in other markets (excluding entries)	This variable is almost identical to the *Firm investments in other markets* variable. The sole difference is that, in this case, the term I_{imrt} includes only gross capacity additions in firm i's current markets, and thus excludes gross capacity additions pertaining to firm i's entry into other potential target markets.
Firm entries into other markets dummy	This variable is an indicator of entry of a firm into other potential target markets. For firm i, "market-at-risk" m and year t, it is coded 1 if the firm entered any other market in the same year; and 0 otherwise.

Table 2: Variable Summary Statistics and Correlations

		Nr. of Obs.	Mean	St. Dev.	Min.	Max.
1	*Firm entry into the focal market*	2940	0.0146259	0.1200701	0	1
2	*Demand growth in the focal market*	2940	0.0175413	0.0368899	-0.0871731	0.2066926
3	*Average "within-generation-technology" relative efficiency of firms in the focal market*	2940	0.8521193	0.0551373	0.7299153	0.964492
4	*Average "between-generation-technology" relative efficiency of firms in the focal market*	2940	0.9511473	0.0421082	0.8579703	0.9982382
5	*Focal market HHI index*	2940	0.1973504	0.0784489	0.0787233	0.3630852
6	*Share of focal market generation that is regulated*	2940	0.5790729	0.2636487	0.1053189	0.8771139
7	*Focal market opportunity*	2940	0.5007806	0.0287566	0.424878	0.5611016
8	*Firm overall expected capacity utilization*	2940	0.5261319	0.118988	0.0926866	0.7729918
9	*Firm overall lumpiness*	2940	0.0501035	0.071718	0.0035587	1
10	*Firm overall "within-generation-technology" relative efficiency*	2940	8.55E-01	0.0940285	0.3851546	0.9978482
11	*Firm overall "between-generation-technology" relative efficiency*	2940	0.9534383	0.0461878	0.6618418	0.9998621
12	*Cash flow from operations*	2940	691.6368	896.6949	-1043.341	6551
13	*Cost of debt*	2940	0.0631222	0.0133039	0.0237679	0.1211074
14	*Share of a firm's overall capacity that is regulated*	2940	0.7814261	0.3121773	0	1
15	*Index of opportunities that a firm faces in its current markets*	2940	0.5073279	0.0235646	0.430949	0.5611016
16	*Single potential target market dummy*	2940	0.0006803	0.0260776	0.00E+00	1
17	*Average opportunities in other potential target markets*	2940	0.5003415	0.0169996	0	0.5539234
18	*Index of focal market exposure to state-mandated/-advised divestitures*	2940	0.2506852	0.3648086	0	1
19	*Index of focal market exposure to state-mandated renewable portfolio standards*	2940	0.3555644	0.361083	0.00E+00	1
20	*Index of overall firm exposure to state-mandated/-advised divestitures*	2940	0.0241243	0.0684809	0	0.4524398
21	*Index of overall firm exposure to state-mandated renewable portfolio standards*	2940	0.0644073	0.1233308	0	0.5174848

Table 2 (continued): Variable Summary Statistics and Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1													
2	0.0136	1												
3	-0.00516	-0.162***	1											
4	-0.0713***	0.0567**	0.0633***	1										
5	-0.0301	0.0645***	-0.163***	-0.242***	1									
6	-0.0512**	0.128***	-0.0948***	0.0943***	0.503***	1								
7	0.0338	0.221***	-0.159***	-0.0832***	0.361***	0.523***	1							
8	0.000436	-0.0278	-0.0375*	-0.196***	-0.00661	-0.0703***	0.00556	1						
9	-0.0362*	-0.0067	0.0453*	-0.0279	-0.0134	-0.0227	0.0202	-0.0542**	1					
10	-0.0258	-0.0583**	0.291***	0.138***	-0.0441*	-0.0249	-0.0473*	-0.284***	0.111***	1				
11	-0.0823***	0.0588**	0.0451*	0.803***	-0.212***	-0.0317	-0.155***	0.0767***	-0.0305	0.130***	1			
12	0.0603**	0.0163	0.0393*	0.0799***	0.0492**	0.0669***	-0.0232	0.015	-0.317***	-0.106***	0.0713***	1		
13	0.0213	0.0923***	-0.0382*	-0.0787***	0.0816***	0.0296	0.0598**	0.0632***	-0.0122	0.0271	-0.0307	-0.0179	1	
14	-0.0617***	-0.0617***	-0.0578**	-0.0504**	-0.0915***	-0.152***	-0.0314	0.366***	0.0719***	0.0735***	0.0501**	-0.226***	-0.0519**	1
15	0.0559**	-0.0177	0.00478	-0.406***	0.0973***	-0.00664	0.00919	0.354***	-0.117***	-0.0493**	-0.299***	0.0568**	0.0671***	0.118***
16	0.105***	0.0075	-0.0113	-0.0384*	-0.00594	0.0256	-0.0203	-0.033	-0.0155	0.00737	-0.0664***	0.0168	-0.0195	0.00757
17	-0.0519**	0.0129	0.0237	-0.294***	0.0125	-0.162***	-0.127***	0.0556**	0.0557**	-0.0893***	-0.236***	-0.0531**	0.115***	-0.0508**
18	0.0176	-0.164***	0.0937***	0.0168	-0.423***	-0.818***	-0.557***	0.0422*	0.00566	0.0333	0.111***	-0.031	-0.0351	0.117***
19	-0.0221	-0.132***	0.219***	0.116***	-0.410***	-0.700***	-0.627***	-0.0318	-0.0387*	0.0417*	0.169***	0.0371*	-0.134***	0.0386*
20	0.0113	0.0171	0.00186	-0.125***	0.0655***	0.0585**	0.0473*	-0.011	-0.0659***	-0.125***	-0.113***	0.109***	-0.0308	-0.300***
21	-0.021	-0.0496**	-0.0106	0.0753***	-0.0684***	0.0161	-0.0302	0.115***	-0.0893***	-0.163***	0.131***	0.017	-0.0994***	-0.0595**

	15	16	17	18	19	20
15	1					
16	0.0212	1				
17	0.00224	-0.768***	1			
18	-0.0254	-0.0179	0.117***	1		
19	-0.103***	-0.0123	0.0353	0.616***	1	
20	-0.00626	-0.00918	0.0963***	-0.0891***	-0.0592**	1
21	-0.0802***	-0.0136	-0.0566**	0.0071	0.0667***	0.0820***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Market Opportunities and Total Gross Capacity Additions by Firms (in MW) in the Eight Considered Markets (2000-2010)

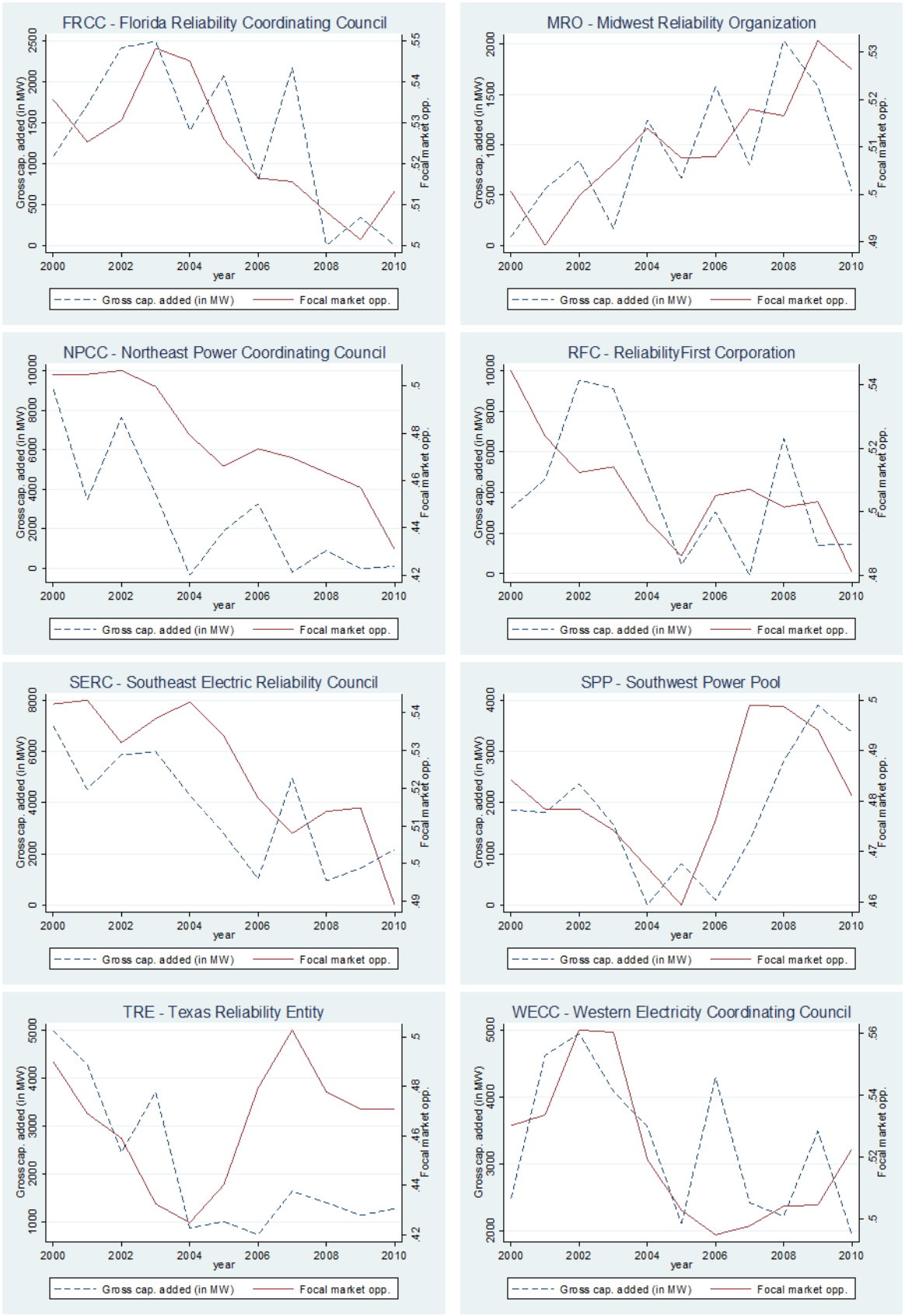


Table 3: Event History Piece-wise Exponential Regression Models on Firm Entry into a Focal Market – Results

		(1)	(2)	(3)	(4)
Demand growth in the focal market		10.1798	8.9765	8.3499	8.1322
		(6.5142)	(6.6260)	(6.9675)	(7.0974)
Average "within-generation -technology" relative efficiency of firms in the focal market		3.7990	2.0818	2.1989	1.8391
		(4.7093)	(4.6076)	(4.6051)	(4.6371)
Average "between-generation -technology" relative efficiency of firms in the focal market		-28.2415	-25.4710	-24.3839	-22.1644
		(27.4506)	(25.9275)	(26.1757)	(25.2595)
Focal market HHI index		-9.5768***	-11.8869***	-11.6629***	-12.7737***
		(2.2991)	(2.4956)	(2.5306)	(2.7729)
Share of focal market generation that is regulated		-1.9704**	-2.7212***	-2.9645***	-3.6076**
		(0.7360)	(0.8177)	(0.8343)	(1.2038)
Focal market opportunity	H1: $\beta > 0$	15.7248+	18.3153*	21.2058*	24.1019*
		(9.2369)	(8.2850)	(10.3580)	(9.8093)
Share of focal market generation that is regulated X Focal market opportunity		-71.8067*	-74.7690*	-69.9525*	-87.2661*
		(29.5787)	(32.8133)	(34.3438)	(38.9065)
Firm overall expected capacity utilization			-0.3491	-0.1471	0.1203
			(1.8915)	(2.0064)	(2.1534)
Firm overall lumpiness			-6.4711	-5.0246	-5.8609
			(6.5714)	(6.0753)	(6.7466)
Firm overall "within-generation-technology" relative efficiency			-0.7850	-0.9312	-0.7279
			(2.9743)	(2.8418)	(2.6699)
Firm overall "between-generation-technology" relative efficiency			-5.5887	-5.9572	-6.2469
			(4.8198)	(4.7039)	(4.9875)
Cash flow from operations	H2a: $\beta > 0$		0.0004*	0.0004*	0.0004*
			(0.0002)	(0.0002)	(0.0002)
Cash flow from operations X Focal market opportunity	H3a: $\beta > 0$		0.0001	-0.0001	-0.0004
			(0.0026)	(0.0024)	(0.0024)
Cost of debt	H2b: $\beta < 0$		-2.3275	0.5186	-0.0964
			(15.7128)	(14.7814)	(14.1184)
Cost of debt X Focal market opportunity	H3b: $\beta < 0$		-676.3175	-743.0570+	-710.5802+
			(423.6562)	(405.6318)	(387.5148)
Share of a firm's overall capacity that is regulated	H4: $\beta < 0$		-1.1963*	-1.3589*	-1.7243**
			(0.5526)	(0.5445)	(0.5655)
Share of a firm's overall capacity that is regulated X Focal market opportunity	H5: $\beta < 0$		0.0393	3.4888	0.6240
			(14.1290)	(14.8775)	(16.0430)
Index of opportunities that a firm faces in its current markets	H6a(7a): $\beta < (=)0$			7.3144	5.8772
				(12.6268)	(12.6414)
Single potential target market dummy				2.3526	3.2175
				(17.0671)	(15.8638)
Average opportunities in other potential target markets	H6b(7b): $\beta < (=)0$			-2.1021	-0.0117
				(33.5648)	(31.1932)
Index of focal market exposure to state -mandated/-advised divestitures					-0.6158
					(0.8419)
Index of focal market exposure to state -mandated renewable portfolio standards					0.6066
					(0.7561)
Index of overall firm exposure to state -mandated/-advised divestitures					-4.0625+
					(2.1455)
Index of overall firm exposure to state -mandated renewable portfolio standards					-0.7412
					(1.4194)
Number of observations		2940.0000	2940.0000	2940.0000	2940.0000
Number of firms (clusters)		55.0000	55.0000	55.0000	55.0000
Number of subcases (firm-"market-at-risk")		325.0000	325.0000	325.0000	325.0000
Number of failures (entries)		43.0000	43.0000	43.0000	43.0000
Log-likelihood		-153.2203	-136.7416	-134.1190	-132.1498
Akaike's Information Criterion statistic		342.4406	329.4831	330.2380	334.2997
Chi-Squared		559.9858	1247.9913	5.392e+08	2.066e+08
- *p-value*		0.0000	0.0000	0.0000	0.0000

Standard errors clustered at the firm level in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: *Post hoc* Event History Piece-wise Exponential Regression Models on Firm Entry into a Focal Market – Results

		(1)	(2)
Demand growth in the focal market		8.6849	9.2075
		(6.9545)	(7.2845)
Average "within-generation -technology" relative efficiency of firms in the focal market		2.1489	1.7639
		(4.6218)	(4.7295)
Average "between-generation -technology" relative efficiency of firms in the focal market		-23.1911	-24.4682
		(26.2293)	(26.2380)
Focal market HHI index		-13.0389***	-13.0844***
		(2.9916)	(3.0320)
Share of focal market generation that is regulated		-3.8003**	-3.6204**
		(1.2030)	(1.1859)
Focal market opportunity	H1: $\beta > 0$	25.8758**	25.0166**
		(9.0523)	(9.5826)
Share of focal market generation that is regulated X Focal market opportunity		-89.6930*	-89.0472*
		(39.5204)	(42.0048)
Firm overall expected capacity utilization		0.4446	0.3979
		(2.0432)	(1.7275)
Firm overall lumpiness		-7.1581	-5.5235
		(7.7476)	(5.8678)
Firm overall "within-generation-technology" relative efficiency		-0.2071	-0.5034
		(2.4423)	(1.9199)
Firm overall "between-generation-technology" relative efficiency		-4.2185	-4.3452
		(4.2837)	(3.7729)
Cash flow from operations	H2a: $\beta > 0$	0.0004*	0.0004**
		(0.0002)	(0.0001)
Cash flow from operations X Focal market opportunity	H3a: $\beta > 0$	0.0002	0.0007
		(0.0021)	(0.0025)
Cost of debt	H2b: $\beta < 0$	1.5884	-0.6131
		(13.9813)	(13.7788)
Cost of debt X Focal market opportunity	H3b: $\beta < 0$	-763.2382+	-787.0281+
		(395.6370)	(407.0905)
Share of a firm's overall capacity that is regulated	H4: $\beta < 0$	-1.6582**	-1.4777***
		(0.5161)	(0.4065)
Share of a firm's overall capacity that is regulated X Focal market opportunity	H5: $\beta < 0$	1.3969	2.9564
		(15.3576)	(14.5592)
Index of opportunities that a firm faces in its current markets	H6a(7a): $\beta < (=)0$	6.6261	5.7684
		(11.5904)	(11.4497)
Single potential target market dummy		5.9456	5.9697
		(13.9171)	(14.5914)
Average opportunities in other potential target markets	H6b(7b): $\beta < (=)0$	6.2062	5.6432
		(27.4092)	(28.5867)
Firm investments in other markets		0.9244*	
		(0.3891)	
Firm investments in other markets (excluding entries)			0.6864*
			(0.3486)
Firm entries into other markets dummy			1.1127*
			(0.4934)
Index of focal market exposure to state -mandated/-advised divestitures		-0.6028	-0.5932
		(0.8519)	(0.8262)
Index of focal market exposure to state -mandated renewable portfolio standards		0.5690	0.5674
		(0.7533)	(0.7560)
Index of overall firm exposure to state -mandated/-advised divestitures		-3.3135+	-3.6169*
		(1.9104)	(1.7818)
Index of overall firm exposure to state -mandated renewable portfolio standards		-0.6892	-0.7028
		(1.4691)	(1.2892)
Number of observations		2940.0000	2940.0000
Number of firms (clusters)		55.0000	55.0000
Number of subcases (firm-"market-at-risk")		325.0000	325.0000
Number of failures (entries)		43.0000	43.0000
Log-likelihood		-129.4747	-126.8740
Akaike's Information Criterion statistic		330.9494	325.7479
Chi-Squared		5.112e+08	.
- *p-value*		0.0000	.

Standard errors clustered at the firm level in parentheses
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$