



Dream team or strange bedfellows? Complementarities and differences between incumbent energy companies and institutional investors in Swiss hydropower

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ABSTRACT

Institutional investors can potentially be a significant source of capital for financing the energy transition. This is even more important as incumbent energy companies in many European countries struggle to adjust their business model to changing market conditions. This article reports on a choice experiment with pension fund and energy managers conducting 1,129 experimental investment choices in Swiss hydropower. We find that complementarities exist with regard to financing different stages of project development – pension funds are averse to construction and development risk but comfortable in deploying capital to existing projects, while incumbents are willing to invest in all project stages. The two groups show surprising similarities in their aversion to fluctuating electricity prices. When fully exposed to revenue risk, energy firms and pension funds demand a risk premium of 5.98% and 7.94% respectively. For policy makers, this suggests that shielding investors from revenue risk, as has been done with feed-in tariffs for other renewables, might be an effective way of lowering the financing cost of hydropower. When it comes to their preferred co-investors, the two groups express mutual distaste for each other: energy firms would rather invest in consortia with other incumbents, and the same goes for institutional investors.

1. Introduction

The transition towards a low-carbon energy system requires mobilising significant capital flows to finance renewable energy projects. The Organisation for Economic Cooperation and Development (OECD) estimates that current global energy investment levels have to be doubled to about USD 2 trillion per year or two per cent of gross domestic product (GDP) (Kaminker and Stewart, 2012). Institutional investors, who manage USD 71 trillion in assets, may potentially play an important role in providing the required capital (Nelson and Pierpont, 2013). It has also been pointed out that there may be a good match between the long investment horizon of institutional investors, such as pension funds, and the typical cash flow profile of energy infrastructure projects such as hydropower (Spreng et al., 2001). In addition, the current low interest rate environment is leading institutional investors to watch out for new asset classes that promise steady long-term income streams (Kaminker and Stewart, 2012). In fact, looking at who is financing new renewable energy capacity, there are signs for an increasing investor diversity, with non-energy investors accounting for a large share of ownership in renewable energy assets (Bergek et al.,

2013). For example, more than 95% of solar photovoltaic (PV) assets in Germany are owned by either institutional or retail investors (Helms et al., 2015). In the case of larger renewable energy projects, such as hydropower, this trend is less pronounced (Chassot, 2012). The current liquidity situation of incumbent energy companies, however, is under severe pressure in many European countries (Economist, 2013), raising the question whether institutional investors can contribute to closing the gap and playing a more important role in financing large-scale renewables in the future.

The current paper provides an empirical answer to this question by reporting on results of a choice experiment with 53 investment professionals from incumbent firms¹ and pension funds in Switzerland, conducting 1,129 experimental investment choices. We focus on Switzerland as hydropower represents 58% of the overall electricity mix and the traditional owners of large-scale hydropower plants, incumbent energy companies, struggle with the unprofitability of both existing and new power plants. By surveying risk preferences of professional investors, we add new empirical evidence to the academic debate about investor diversity and energy investment decision-making. Our aim is to test the common implicit assumption that pension funds are willing to

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¹ The terms “incumbent energy company”, “incumbent firm”, “energy company” and “energy firm” are used interchangeably within this paper.

finance renewable energy projects at lower cost of capital than incumbent energy companies, and to get in-depth insights into the relative preferences of both investor groups with regard to different stages of project risk, electricity price risk, technology, and investment consortia.

The remaining part of this paper is structured as follows: The next section reviews relevant literature and presents the research hypotheses. Section 3 discusses our methodology. Section 4 presents and discusses the results of the choice experiment. Section 5 concludes the paper with a summary and policy implications, limitations and suggestions for further research.

2. Theory and hypothesis development

To determine the differences in the risk-return perceptions of incumbent firms and pension funds towards renewable energy investments, we subsequently review relevant literature and state hypotheses around major influence factors.

2.1. Investor-specific differences in risk-return perceptions

Most of the theoretical concepts in investor-specific risk-return perceptions use variations of Bentham's utility theory (see Section 3.2). As these concepts primarily address consumer behaviour, Markowitz transferred this theory to the institutional investment domain, explaining that investors who accept a higher level of risk should be compensated by proportionally higher returns. This theory represents the groundwork for further research into investor-specific variations in perceived risk and return (Farrelly and Reichenstein, 1984; Gooding, 1975; Koonce et al., 2005), which is receiving significant attention in recent energy-related research. In research practice, several streams investigate investor-specific investment behaviour (Stenzel and Frenzel, 2008). The influence of past activities on present decisions is characterised by the concept of path dependence, which is often called upon to explain the lock-in of incumbent energy companies to fossil-based technologies (Unruh, 2002; Wüstenhagen and Teppo, 2006). Further, a lack in dynamic capabilities describes the inability to adapt existing resources to new market conditions (Bergek et al., 2013; Langniss, 1996; Masini and Menichetti, 2012; Stenzel and Frenzel, 2008). Another rather financially-driven concept that is highlighted by Helms et al. (2015) is capital cost dependency. It explains why some energy investors use the high returns that they have previously generated in conventional parts of their business to form return expectations with regard to lower-risk renewable energy projects. Salm et al. (2016) found evidence for investor-specific risk-return expectations through a segmentation analysis by discovering two types of renewable energy retail investors: “local patriots” and “yield investors”. Following previous argumentation on investor-specific risk-return expectations and the late interest of incumbent firms to invest in renewable energy, we test the following hypothesis:

H1: Pension funds are willing to finance renewable energy assets at lower cost of capital than incumbent firms.

2.2. The choice of investment partner

Many companies build partnerships to benefit from knowledge, information or financial contribution that would otherwise not be accessible. Existing research largely confirms the beneficiary nature of cooperation for companies, particularly in the financial industry.

Lerner (1994), for instance, found that venture capitalists (VC) prefer to invest in a consortium with other VCs rather than investing on their own. Investment syndication enables VCs and other professional investors to spread financial risk, establish long-term partnerships and at the same time exchange valuable industry experience, contacts and resources (Bygrave, 1988; Cai and Sevilir, 2012; Lerner, 1994).

Important information could also contain the signal whether cooperation partners would pursue a particular investment opportunity. Especially, in situations with high uncertainty such information can be valuable (Sah and Stiglitz, 1986; Wilson, 1968). Tian (2012) added to the discussion that VC firms cooperating in syndicates are more successful throughout the entire engagement process. Their portfolios are performing better and achieve higher exit valuations. This phenomenon is further reflected in professional investors' access to cooperation networks: the more they are connected to their investment within a social (Cohen et al., 2008) or professional network (Cai and Sevilir, 2012), the better the performance and / or value creation of their investments (Hochberg et al., 2007). Sorenson and Stuart (2001) suggested that cooperation across industries and regional boundaries are of major importance. Partners with different backgrounds potentially have complementary knowledge that enables a more balanced view on an investment opportunity (Bygrave, 1988; Gorman and Sahlman, 1989; Sahlman, 1990). In addition to supporting the beneficial role of co-operations across sectors, Gompers et al. (2016) found that partnering with similar investors can harm a company's portfolio performance due to social conformity and less critical questioning, which results in less effective decision-making (Ishii and Xuan, 2014; Uzzi, 1996). We thus state the following hypothesis:

H2: Given their complementary capabilities, incumbent firms and pension funds should prefer investing in consortia with the other investor type.

2.3. The moderating influence of experience

Measuring the influence of experience on future developments has been investigated within a wide range of subject areas, including foreign direct investments, mergers and acquisitions, new product launches and renewable energy decision-making. It has primarily been examined with respect to positive business performance as an answer to previous experience and potentially subsequent decision-making.

Given an investigation of foreign investments entering the United States, Mitchell et al. (1994), Li (1995) and Shaver et al. (1997) argued that foreign direct investments are more likely to survive for companies with prior experience in their host country. On a more general base, this was further confirmed by Johanson and Vahlne (1977) and Perkins (2014) who pointed out that multinational companies with experience in similar-structured countries, are more likely to operationally succeed in foreign countries. The influence of experience has further been investigated with respect to organisational acquisitions indicating that companies with previous experience drive post merger operations more successfully (Brauer et al., 2014; Hayward, 2002). For product launches in new markets, Brady and Davies (2004) and Hoang and Ener (2015), among others, added that prior experience with technology and new product markets is positively associated with the later performance of such products. Following the rationale of the previous success stories, behavioural finance literature as of Agnew and Szykman (2005) revealed that future decisions are derived from past experience, particularly for situations where confronted with many new information, investors rely on their experience. This was further verified by Masini and Menichetti (2012, 2013) who found that investors with previous renewable energy experience are more likely to invest in renewable energy than those without prior experience. Following the discussed influence of experience on investors' decision-making and subsequent success, we are particularly interested to see whether incumbent firms, that are mostly experienced with investments in renewable energy technology, are more likely to be operationally involved in such projects than pension funds. Thus, we state the following hypothesis:

H3a: Not having relevant industry experience, pension funds are more risk-averse than incumbent energy companies with regard to operational risk.

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