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Do investors pay a premium for going green? Evidence from alternative energy mutual funds

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ABSTRACT

We studied the financial performance of alternative energy mutual funds using multifactor models and propensity score matching techniques. For a sample of alternative energy mutual funds quoted in EUR and in USD for the period 2010–2016, we found that alternative energy funds underperformed corporate and socially responsible mutual funds in terms of returns and downside risk protection. Our results are consistent with the idea that investors are paying a premium for going green via renewable energies.

1. Introduction

Deployment of renewable energies as an alternative to traditional energy sources has been the recent policy focus of many developed and emerging economies aiming to converge towards low-carbon and sustainable economies.¹ The renewable energy sector has consequently experienced fast growth and a significant increase in investment in recent years. The OECD [1] confirms that the contribution of renewable energies to the energy supply has increased in the last decade, although shares have tended to vary greatly; moreover, growth rates are very uneven across countries, with the contributions of a broad set of countries for the period 1990–2010 displaying divergence and dissimilar temporal patterns (Reboredo [2]).

Regarding investment, there has been a clear upward trend in global investment in renewable energies in recent years. According to Bloomberg New Energy Finance [3], total investment in clean energy amounted to 45 billion USD in 2004 and grew steadily to reach a peak of 182 billion USD in 2008; thereafter investment growth moderated (due to the global financial crisis), although it rebounded in 2011. Investment in renewable power and fuels (including small hydroelectric projects) was 285.9 billion USD in 2015, representing an

increase of 5% from the previous year's figure of 273 billion USD and surpassing the previous 2011 peak of 278.5 billion USD. Regarding new markets in developing countries, renewable energy investment experienced rapid expansion in 2015, increasing by 19% over 2014 to reach 156 billion USD. Of the developing countries, China, Brazil, India and South Africa saw the largest increases in investment. Renewable energy investment continues to be dominated by solar and wind energies, which account for 92% of overall investment.

Although governments have traditionally been the most important source of funding for renewable energy projects, private investment has gradually been gaining ground as a source of capital. Scaling up and managing acceptance of renewable energy investments by the financial community is an important success factor in catalysing private investment and deploying alternative energy (see [4,5]). The recent United Nations Climate Change Conference in Paris in 2015 drew attention to the importance of effective financing of renewable energy projects and the creation of suitable vehicles to facilitate such investments. As an alternative to direct investment in alternative energy company stocks, alternative energy mutual funds have been gaining popularity as investment vehicles, as they offer retail investors professionally managed global portfolios that include a wide range of renewable energies

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¹ Indeed, reducing dependence on both non-renewable fossil fuels and carbon dioxide emissions are energy challenges that are currently shaping the policy agenda of many developed and emerging economies. For example, the renewable energy directive of the European Union sets a target of 20% final energy consumption from renewable resources by 2020. The clean power plan of the Obama administration has established a reduction in carbon dioxide emissions of at least 30% by 2030. Also in the USA, 29 states mandate that electricity producers obtain between 10% and 25% of their power from renewable sources.

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(wind, solar, geothermal, hydrogen and hydroelectric). Investors in alternative energy mutual funds naturally seek to achieve good financial performance while taking into account renewable energy and environmental concerns.

In this paper we study the financial performance of alternative energy mutual funds relative to corporate investment funds and socially responsible investment (SRI) funds, as financial performance has decisive implications for investment decisions and for the success of sustainable energy projects. In particular, we endeavour to answer two crucial questions: (1) do investors pay a green premium for investing in alternative energy investment funds? (2) do investors in alternative energy funds limit downside/upside risk? The answers to these questions will allow us to determine the price investors pay for going green.

Incorporating renewable energy criteria in the portfolio selection process may negatively affect financial performance or may yield higher returns and lower risks. According to the portfolio theory (see [6]), renewable energy screening restricts diversification opportunities as the universe of stocks is narrower; hence, the risk-adjusted performance of these funds should be poorer than for other corporate mutual funds. In addition, green energy mutual funds invest in smaller firms that tend to be concentrated in a few industries (see [7]), and most of these firms manage incipient and innovative environmental projects (see [8] and [9]). Renewable energy projects may therefore be less financially attractive, as they typically offer a low return due to high production and innovative technology costs.

However, an opposite view is that renewable energy screening allows alternative energy companies with higher potential returns and better management to be identified, which ultimately results in a better financial performance and risk profile. Furthermore, since renewable energy technologies have been gaining competitive and technological ground over fossil fuels (see [10]), alternative energy mutual funds can benefit from the corresponding improvements in the financial performance of new energy firms (see [11]).

Although there is no empirical evidence on the plausibility of these opposing views regarding alternative energy mutual funds, previous empirical literature has found mixed evidence for the impact of SRI or of green screening on financial performance. Thus, it has been shown that SRI funds underperform corporate funds, meaning that investors do pay for ethical decisions ([12]); it has also been shown that the cost of excluding striking firms from portfolios on the basis of SRI criteria is high and independent of management skills ([13]). In contrast, Statman [14] and Bollen [15] argue that investors must gain some utility from the externalities of investing in a manner consistent with their beliefs. Notwithstanding, Nofsinger and Varma [16] and Becchetti et al. [17] reported that SRI funds outperformed corporate mutual funds during periods of financial crisis, and Briec and Kerstens [18] and Ito et al. [19] found that SRI funds outperformed conventional funds in the USA and in the EU. Contrarily, other empirical studies have concluded that the differences between SRI and corporate funds performance are statistically insignificant. Mill [20] found that there was no change in the performance of funds when these were switched to SRI funds. Similarly, in studies of different markets, Statman [21], Bauer et al. [22], Scholtens [23], Bauer et al. [24] and Leite and Cortez [25] reported no statistically significant differences in the performance of SRI and corporate funds. Renneboog et al. [26] provide a comprehensive review of the literature on SRI.

As for environmental screening, Muñoz et al. [27] and Lesser et al. [7,28] reported that green funds underperformed corporate funds in normal market periods but performed similarly in periods of market turbulence. Similarly, White [29] found that environmental mutual funds in the USA underperformed both general stock market returns and SRI returns. Climent and Soriano [30] showed that returns for US green mutual funds did not differ from returns for other corporate or SRI funds for the period 2001–2009. More recently, Ibikunle and Steffen [11] suggest that the risk-adjusted returns on green funds

improve over time, citing green outperformance of black stocks over the 2012–2014 period.

Our study contributes to this strand of the literature by specifically examining the financial performance of alternative energy mutual funds. These environmentally friendly and socially responsible investment vehicles have been gaining prominence in terms of investment in renewable energy projects (see [31]); hence, scrutiny of their performance is of interest for investors and policymakers alike, as both agents are particularly concerned with the viability of renewable energy projects. Alternative energy mutual funds are a particular sub-set of green mutual funds, which include – in addition to renewable energies – sustainable construction, transport, water and waste management, energy efficiency and sustainable living. Alternative energy is featured specifically by innovative technology, high production costs and high investment requirements that, overall, merit specific consideration.

An important dimension of the financial performance of mutual funds is their return behaviour, not only under normal market conditions, but also in times of extreme upward/downward price movements. Investors might not be particularly concerned with funds that underperform under normal market conditions when those funds are less negatively impacted by extreme upward/downward price changes [32]. As investors' fundamental concerns may be exacerbated in times of financial stress, examining whether alternative energy mutual funds favour downside/upside risk protection is of interest for investors who may be concerned with this kind of risk. Previous empirical literature on mutual fund performance has paid little attention to this type of risk, although it has examined the insurance role of SRI funds during the global financial crisis. Thus, SRI funds were shown to outperform corporate mutual funds during market crisis periods at the cost of underperforming during non-crisis periods [16] and to outperform corporate funds during the recent global financial crisis [17]. We add to this literature by examining downside/upside risk for alternative energy mutual funds with respect to corporate and SRI funds using different risk measures.

For a dataset of weekly returns for alternative energy mutual funds quoted in EUR and USD for the period 2010–2016, we investigated fund performance in terms of Jensen's alphas and downside/upside risk exposure with respect to corporate and SRI mutual funds. We compared the relative performance of alternative energy funds with corporate and SRI funds using a multifactor model with five factors, including those of Fama and French [33], Carhart [34] and Bollen and Busse [35]. We tested for statistically significant differences between the alphas of alternative energy funds with respect to the alphas of other kind of funds using the propensity score matching procedure described by Rosenbaum and Rubin [36]. We used this procedure because it reduces the impact of treatment-selection bias when estimating causal treatment effects based on observational data. The scoring probability was estimated using information on the fund's exposure to different risk factors. Similarly, we studied the downside/upside value-at-risk (VaR), expected shortfall (ES), semivariance (SV) and regret (RE) performance of alternative energy funds and tested for statistically significant differences between these measures for the different funds using the propensity score matching procedure to control for a fund's exposure to different risk factors. Our empirical evidence indicated that alternative energy mutual funds performed less well than corporate and SRI funds, as their Jensen's alphas were negative and significantly lower than the counterfactual alphas for both corporate and SRI funds. This result holds for funds quoted in both currencies (EUR and USD). Regarding the risk analysis, our results provide mixed evidence. Alternative energy funds quoted in EUR offered greater downside risk than corporate or SRI counterfactual funds and similar upside risk to counterfactual corporate funds. However, for alternative energy funds quoted in USD, we found a similar downside/upside risk profile as for counterfactual SRI funds, but a greater downside/upside risk profile than for counterfactual corporate funds. Our reported evidence would suggest that results for

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