RISK AND RETURN FOR INVESTMENTS IN PETROLEUM VERSUS RENEWABLES

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Overview

Investment in renewables is to a large extent undertaken by private companies. Thus, risk and return on investment is essential for project sanctioning. Uncertainty raises the cost of capital and discourages investment (Stern, 2007, p. 365). Jaraite and Kazukauskas (2013) state that this fact often is ignored in the literature. Using world sector indexes and individual company market data, we compare risk and return in companies undertaking petroleum investments and companies making investments in renewables. We analyze using historic data from 2008 to 2019, and current data.

Methods

The transition to energy with low carbon emission requires large investments, because green technologies such as solar panels and wind turbines are capital-intensive (Johnsen and Lybecker, 2009). The pace of green capital accumulation has accelerated in recent years, led by economies of scale, technological progress, and strong public support (Eyraud et al., 2013). According to the authors, feed-in tariffs are particularly found to foster green investments, with green investments being two to three times larger in countries adopting such schemes. Our analysis relies on conventional methods of analysing the risk-return relationship, using the capital asset pricing model and beta estimates as the determinants for differences in risk adjustments. Using historic data downloaded from investing.com, beta calculations of various investment portfolios are made in order to analyse oil and gas investment return and required return as compared to that of new energy producing companies. Subsidies for renewable energy are used as a means to foster a new industry, to the point where tecnological improvements and economies of scale makes it profitable. Some analysts and researchers argue that we now have reached this stage. This argument is supported by some recent auctions for wind contracts in which the winning bid was without subsidies. We examine investment risk is a setting without price guarantees. To this end we use an alternative method to estimate beta, by identifying the stocks in the Green and Renewable industry group (Damodaran Online) that are clearly in the business of generating new energy. We then remove companies that mainly produces hydroelectricity or have fixed electricity price contracts, and find the beta based on market quoted betas (Investing.com). Thus, in this beta calculation we examine a portfolio of new energy generating companies that face price risk. Finally, the economics of some German offshore wind projects from 2010 to 2018 are examined using available data.

Results

We find that due to negative returns in the supplier industry, the return of the Oil and Gas portfolio (Damodaran Online) has been a negative around 20% in the priod from 2008 to January 2019, while much worse for Alternative Energy Liq.-Ardour (-40%) and a dismal -90% for the Solar Energy Ardour.

The beta risk (CAPM, Sharpe, 1964) is calculated from the monthly average return of the portfolios while the New Energy generating portfolio beta is estimated based on market quoted betas (Investing.com).

Index Name	*Beta 2008-2019*	*Beta 2008-2013*	*Beta 2014-2019*
MSCI ACWI Energy	0,9	0,8	0,9
Alternative Energy Liq.-Ardour	0,8	0,9	0,7
Solar Energy-Ardour	1,2	1,2	0,9
"New Energy" generating companies			0,8

The unleveraged beta for New Energy producing companies is in the range of 0,1 (New energy generating companies) to 0,2 (Alternative Energy Liq.-Ardour) lower than for the Oil and Gas industry according to our analysis, based on historic data. Using a Market risk premium of 7,4% (Damodaran, 2019) a 0,2 difference in Beta would indicate approximately 1,5% difference in the return requirement. We therefore assume a nominal rate of 8,5% which is 1,5% lower than the discount rate that WoodMackenzie (2018) uses for oil and gas exploration valuation.

Our analysis indicates that German offshore wind projects give a sufficient return with the fixed price agreement under the Stauchungsmodel. For the same wind projects to be profitable, without fixed price, and at our current expected market price for electricity (Norpool), the cost of the latest comissioned (2018) offshore wind projects would have to decrease by an additional 60%. This demonstrates how much impact the rate of return requirement and the presence of fixed price (and it's level) contracts have for project profitability assessments in an industry with large front end investments. As seen from the results, the offshore wind projects should give sufficient return under the fixed price regime even if our somewhat optimistic simplified assumptions regarding investment period (1 year) and operating cost will not be met. The three projects commissioned from 2015 to 2018 have nominal internal rate of return above 11% in our calculations with the German feed-in tariff (Stauchungsmodel). However, as seen from the break even price per Mwh, to meet the market price assumption at our expected Norpool price of 35 Euro/Mwh, the investment costs have to be reduced by an additional 60% from the 2018-2019 level.

Conclusions

The return in new energy as compared to the Oil and gas industry has been much lower in the period from 2008 to 2019. Uur nalysis based on historic data indicates that the required rate of return of equity for new energy generating companies that face price risk is close to oil and gas producing companies. The unleverd beta estimate is 0,1-0,2 below that of oil and gas.

Renewables have up to now typically had favourable regulation that secured guaranteed prices, thus lowering the risk considerably. It allows the companies to take up loans with security in revenue from fixed prices, and have enabled high debt ratios. Cost reductions through technological progress, economies of scale and low interest rates, has made new energy able to compete with fossil fuels in some markets (Eyraud et. al, 2013). Depending on how policies are changed, this would represent a new chapter for this industry. The prevalent current policy is that there is an acution bid for the level of fixed price feed-in tariff. Another solution would be that feed-in tariffs are maintained, but the companies pay auction fees for the right to supply energy at a politically determined feed-in tariff. This would increase the risk somewhat by introducing an up-front payment, but the main risk structure would be unchanged. Another solution, that perhaps is more likely in the long term, is that feed-in tariffs are abolished. The companies would then be exposed to market price risk, as other industries. Electricity prices have a similar systematic risk to other energy sources, like oil and gas, which would require a considerably higher rate of return requirement. The fact that higher risk demands a risk premium also for electricity is confirmed by Jaraite and Kazukauskas (2013), who find that companies operating in countries that have implemented tradeable green certificates have a higher rate of return than companies producing under feed-in tariff systems. A deregulation that made companies face price risk would probably also make high debt financing more difficult and therefore mandate lower gearing. From our offshore wind economics calculation, the cost of offshore wind must be reduced by an additional 60% to meet the level of expected variable market price for electricity.

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