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A Conceptual Framework for Developing the Cost of capital of Stakeholders (CoSC): Case study of Sustainable Hockerton Ltd.

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Aim

- We introduce a framework for calculating the Weighted Average Cost of Capital (CoSC) for stakeholders of a firm. Built upon the traditional WACC i.e. the weighted average of returns to shareholders and lenders, but extends to incorporate the triple bottom line i.e. the planet, the people along with the notion of profit, thereby capturing the impact of changes in the planet (the resource base) and people (the consumer and labor markets)
- We illustrate this concept by using a case study of Sustainable Hockerton Ltd. (SHOCK), a small community organization in Nottinghamshire, U.K.

Rationale

- Three pillars i.e. environmental, social and financial, drive sustainable growth (De Silva and Pownall, 2014, Elkington, 1994). The focus, currently, is not on whether this is important but how firms can achieve this (Glavas and Mish, 2015).
- A paucity of literature in finance and accounting on how to construct tools for triple bottom line businesses. While mainstream financial education is technical (Lakshmi 2013, 2016) and focuses on owners' financial investment, those techniques fall short of incorporating the other two pillars within their scope.
- Moreover, finance education concentrates mostly on large business, particularly that which has market value. The use of financial metrics permeates every activity in modern life

Stakeholder Theory and Shared Value

- At the same time, stakeholder theory has also been discussed in terms of instrumentality, description and normative angles (Donald and Peterson, 1995). Freeman et al(2004) *"Dividing the world into "shareholder concerns" and "stakeholder concerns" is roughly the logical equivalent of contrasting "apples" with "fruit." Shareholders are stakeholders, and it does not get us anywhere to try to contrast the two, unless we have an ideological agenda that is served by doing so."*
- Hopkins (2003, p.10) defines CSR to be *"concerned with treating the stakeholders of the firm ethically or in a responsible manner……. Social includes economic responsibility. Stakeholders exist both within a firm and outside. The natural environment is a stakeholder. The wider aim of social responsibility is to create higher and higher standards of living, while preserving the profitability of the corporation, for peoples both within and outside the corporation."*

Shared Values

- However, most organizations have been ignoring their contribution to the community (external stakeholders) at large, while over emphasizing their self-preservation (agency). These businesses have created their own 'separate kingdoms' within a society (Van Marrewijk 2003). This has led to what Korten (2001, p.13) states as a *"threefold global crisis of deepening poverty, social disintegration, and environmental degradation"*.
- Jones and Wicks (1999) argue for the case of stakeholder theory having both normative and instrumental justification. Compelling reasons within stakeholder theory to value both normative and instrumental support *'because of both the Kantian idea of "ought" implies "can" and the idea that for stakeholders to receive benefits, managers have to act in such a way as to keep the firm a going concern'*(Freeman 2010).

Our proposal: CoSC

A new measure, termed the cost of stakeholders' capital . We argue that the stakeholders of the firm viz. the investors, the community and the environment also should be compensated for the use of borrowed capital, be it financial, environmental or community volunteering. The firm should compare the return on all new projects (Internal rate of return) to the cost of stakeholders' capital.

Description of Sustainable Hockerton: Territorial Capital

- Community wind turbine project jointly owned by locals and promoted by locals using a Vespa29 turbine which the villagers had jointly purchased in 2009.
- Discussion started July 2006. A village postal surveyFebruary 2007, with a 25% completion rate -29 households supported the project and four were against. Desire for making village carbon neutral.
- Meetings regularly took place to decide form, legal structure and practicalities.
- Form of an Industrial and Provident Society.
- The application for a small 225kW wind turbine was submitted to the local authority on October 29th 2007, installation took place in Autumn 2009 and production started in 2010 (Sustainable Hockerton Ltd. 2016).

Description-On Going

- The turbine has been successful in meeting its objectives of clean energy production and also has generated a variety of other projects: three more on solar energy generation and increasing the community spend in the village through projects such as community talks, funding social events which foster increasing participation and integration, installation of a library in an old disused phone box, giving cash subsidies to villagers who adopt green measures and installation of an electric vehicle charging meter. Every year, an allocation is made of a pot towards village sustainability.
- The governance is done through a rotating board of directors who are in situ for three years and then must either resign or stand again for election. A transparent system of discussing issues openly is in place. The organization is run as a small business by a full time member and files its accounts under the Financial Services Authority.

Energy

- The NASA (2016) website states that carbon dioxide levels are the highest in the air since 650,000 years. The global temperature is up 1.4 degrees Fahrenheit since 1880 and the ice cap is rapidly melting. Nine of the ten warmest years have occurred since 2000.
- European Commission -The Europe 2020 Strategy for growth: five headline targets that set out where the EU should be in 2020 in order that this growth is not only inclusive and smart but also sustainable.
- One of these headline targets relates to climate and energy. Committed to achieving the 20% energy efficiency target by 2020 by reducing greenhouse gas emissions by 20% and increasing the share of renewables in the European Union's (EU) energy mix to 20%.

Community Groups Research

- Community energy groups have been increasing rapidly, providing 4MW in 2003 to 60MW in 2013. This fourteen fold increase is mainly from wind projects which form 80% of the share (Harnmeijer, Parsons and Julian, 2013, p.3). As not all renewable energy can't be stored, the drive to increase its generation is dependent on both hard and soft (social) factors. (Strachan, Cowell, Ellis, Sherry-Brennan, Toke, 2015).The former are technical factors but the latter relate to the economic geography, local actors and their mix (Boyd and Paveglio, 2015). De Silva and Pownall (2014) find, for example, that whilst income is not the driving force in the preference for adoption of green measures, education and gender are. College educated women are the most willing group to accept measures to "go green".

WACC and CoSc

- The cost of capital is calculated through the following equation:
- $\frac{D}{D+E} i + \frac{E}{D+E} d$ (1)
- Where D: debt investment, E: equity, i=interest rate, d=dividend rate
-
- If there are three stakeholders, the cost of stakeholders' capital becomes:
- $\frac{W}{W+F+S} e + \frac{F}{W+F+S} k + \frac{S}{W+F+S} c$ (2)
-
- Where *W*=Environment capital i.e. Monetary value of investment by environment
- *F*=Financial capital invested
- *S*= Community/Social Capital i.e. Monetary value of volunteers invested
- *e* =Percent Return on environment
- *k*=Percent Return on financial capital
- *c*=Percent Return on society
- Note that Percent (.) is calculated as *e/W, k/F* and *c/S*

The Drivers

- Calculations for *F* and *k*
- These are the most straightforward of all. SHOCK invited capital from local villagers in the form of members' holdings worth £500 each. In total £235,250 was raised for the purchase and installation of the wind turbine. The village decided that the range of financial return should vary between 5% and 8%. This was done with the consensus of the group after one of the residents recommended the rate based on the Bank of England rate. Thus *F* is £235,250 and *k* is computed from the monthly and annual accounts of the company made every financial year.

The Drivers: W and *e*

- *W* the environmental capital cost of the project and not easily available. It refers to the monetary value of environmental resources taken to construct, commission and decommission the wind turbine. The figure for *e* refers to the imputed returns for the environment's role as a reward in exchange for the environmental capital.
- We use the figures collected by SHOCK in relation to carbon emissions saved in tonnes per month. These are converted by a greenhouse gasses conversion factor (GHGs) which is set by DECC which measures the value of renewables in the set of energy sources. The conversion factor is time varying depending upon the DECC's policy. We next multiply this by a monetary value of carbon announced each year by the Secretary of State for Climate change (EU, 2015). This has typically varied between £5.611 (2016) and 4.27 (2014). This allows us to calculate the monetary value of carbon emissions saved for the time in operation. If we trend this for the remaining life of the project, for say 15 years, we can obtain the estimated monetary value of returns in the form of savings in carbon emissions. Totalling these will allow us to calculate the cumulative monetary returns.
- A technical estimate for the efficiency of use of energy is EROI i.e. the ratio of energy delivered to energy cost. Kubisewki, Clevland and Andres (2012) calculate the EROI for many wind turbines. They estimate this to between 19.8 - 25.2.
- If we take the EROI figure (say 19.8) to be correct and we use our estimated cumulative monetary value of carbon emissions saved, we can work out the figure for *W* i.e. environment cost. Using annual figures for monetary value of carbon emissions saved and dividing by *W* allows us to estimate the various annual values for *e*.

The Drivers -*S* and *c*

- The community capital, *S* is the imputed capital invested by members of the community. It encompasses all the monetary value of meetings during 2006-2009, the survey taken, the appeal by the Parish and the legal, technical and consensual framework adopted by the community and its various actors. To do this we, note that ten meetings took place during this period of approximately 2 hours duration each and on average 20 villagers attended these. In addition, we can estimate the man-hours invested in the various other activities. The total man-hours can be estimated by converting to a monetary value by multiplying with the UK median wage rate. The value for *c* was obtained from the figures for village sustainability pot allocated each year in the accounts. Dividing these figures by *S*, allows us to estimate annual levels for *c*.

- This approach was followed by looking at volunteering websites (Haldane, 2014; Volunteer Centre, Bath and North East Somerset, 2016). The choice according to one of the websites was to use the UK average wage rate. However, given the socio economic demographic parameters of the residents, the median wage was used (Trading Economics, 2016).

Findings

- 2 main sources of income: Electricity Sales and Green FIT Certificates
- Largest driver of income and profit is the income from certificates. This explains 91% of the income and almost 80% of the profit. As expected, profit and income have a close relationship of above 84%, suggesting that annual expenses are relatively constant.
- When the monthly returns of total income (percent change in monthly total income) is calculated it is also positively correlated (0.34) to monthly returns of FIT certificate income. Thus certificate income has a very large bearing on the ability of the firm to earn. Correlations amongst other variables are small or negligible as expected. (certificate income is not expected to be related to electricity income)

Description

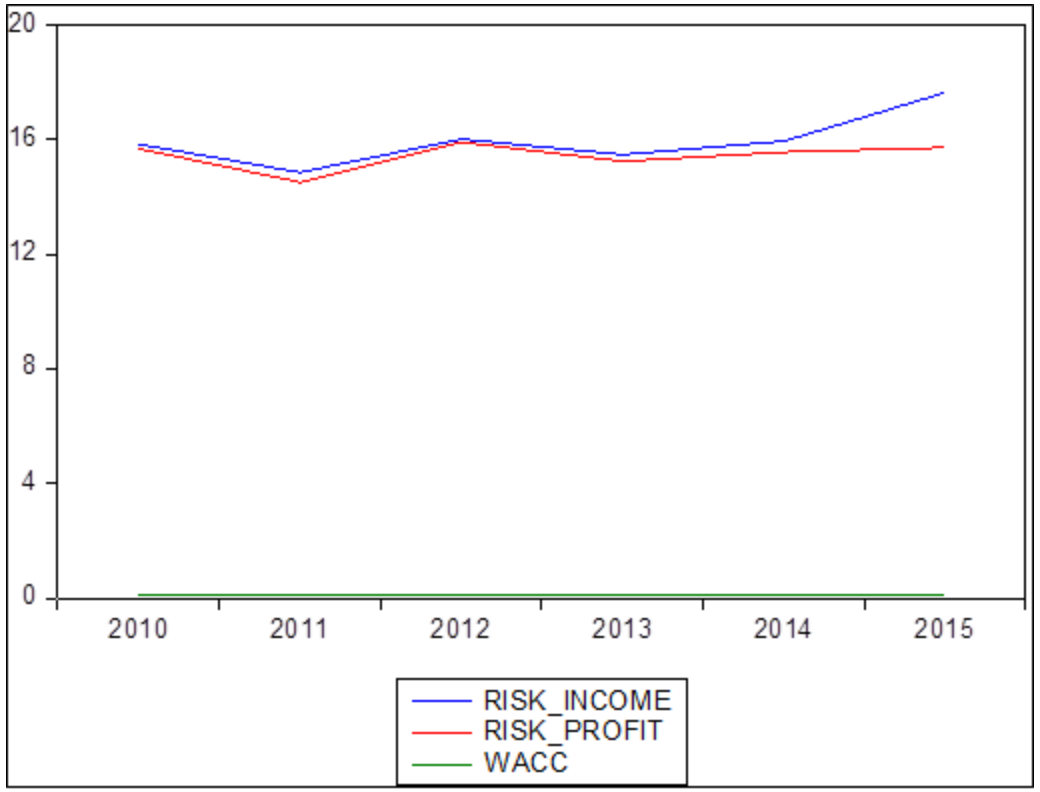
Table 3. Descriptive Statistics of annual returns and Parkinson risk (1980)								
	Returns				Risk			
	El	FIT	I	PROFIT	El	FIT	I	PROFIT
Mean	-0.2170	-48.99	-3.10	4.83	10.29	15.78	15.96	15.44
Std. Dev.	0.2022	35.70	1.02	18.08	2.04	0.8898	0.9227	0.5057
Skewness	0.1667	-0.9201	0.4172	-0.1384	1.07	0.8739	0.8885	-1.13
Kurtosis	1.89	2.16	1.95	2.79	3.38	2.96	3.07	2.95

CoSc

Table 4. Estimates for CoSC and its Constituents

Years	E	K	c	WACC
2010	117.00%	5.00%	1.09%	9.55%
2011	160.00%	5.50%	5.30%	11.79%
2012	127.00%	5.80%	20.10%	10.76%
2013	118.00%	6.20%	21.44%	10.78%
2014	102.00%	6.60%	95.38%	10.65%
2015	134.00%	7.30%	25.78%	12.49%

Risk and Return



Comparisons With Traditional WACC

- DECC (Frontier Economics, 2013, pg. 8) is 9.6% in UK.
- Another recent report by Windpower monthly (2015) notes that the WACC which is used for state-funded projects draw funding directly from governments and is termed the test discount rate. Values of WACC tend to vary between 4.7% and 7.5%, but the DECC generally uses a 10% test discount rate. The International Energy Agency uses an 8% test discount rate. The WACC in the US in 2009 and 2010 for wind was between 5.5% and 12.6%, and the US (Renewables International, 2014). In 2014, the weighted average cost of capital for wind energy projects in Europe were between 3.5% and 12%, depending on the country. (Sun and Wind Trade reports, 2016)

Limitations and Concluding Remarks

- Firstly, we have used simplified figures such as an estimate of the life for our project. In reality, the wind turbine is second hand and may need to be replaced before then. Our projections are based on average trend for the five years, the turbine has been in operation. Wind speed can be notoriously difficult to estimate year on year, these might change. The calculation of the community capital is difficult to calculate precisely as it is based on a median per hourly wage. Secondly, we use a method of calculation for estimation of environment capital and community capital; there may be many other ways to impute the estimated values. Lastly, our model may misspecify the drivers. For example, one may argue that the return to the environment must include the hospital visits saved due to living in a cleaner environment. This would underestimate the returns figure used. Similar biases could enter other drivers also. The case study in question has been in existence for five years but has already diversified into other income streams. This has had an impact on the village community allocation i.e. the main driver for *c.*
- Notwithstanding, these limitations, we feel we have introduced the *principles* on which stakeholders' WACC is based. In terms of pedagogy, no such example has been used previously (Lakshmi, 2015).

Expensive? Think about Inter-generational Equity and Sustainability….

- Thank you and in anticipation of your comments

Community

Investors

SHOCK