CORPORATE FINANCE FOR LONG-TERM VALUE

Chapter 5: Calculating social and environmental value

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The BIG Picture

- How to make social and environmental value comparable to financial value?

Solution

- Select material social (S) and environmental (E) factors

- Express them in their own units (Q)

- Monetise the S and E factors with shadow prices (SP)

- Use the standard DCF model to discount the value flows (Q * SP)

- The resulting SV and EV is comparable to FV

Basics of value calculation

☐ The discounted cash flow (DCF) model is commonly used to calculate the value of a project or company:

$$V = \sum_{n=0}^{N} \frac{CF_n}{(1 + r)^n}$$

CF = expected cash flows

r = discount rate

n = number of periods

☐ This chapter shows how to calculate SV and EV using the DCF model

How to measure SV and EV

- ☐ S and E issues can be expressed in their own units *Q*

- ☐ Then multiplied by their respective shadow price *SP*

- ☐ The calculation of the value flows is:

$$VF = Q \cdot SP$$

- ☐ The social value flows *SVF* and environmental value flows *EVF* are discounted using the DCF model to obtain *SV* and EV:

$$SV = \sum_{n=0}^{N} \frac{SVF_n}{(1+r)^n} \qquad\qquad EV = \sum_{n=0}^{N} \frac{EVF_n}{(1+r)^n}$$

Example

- The cash flows of a steel project

Year	2023	2024	2025	2026	2027	2028
Cash flows, in $ millions	-100	40	40	40	40	40
Carbon emissions, in thousands tons	0	30	30	30	30	30

- Use the shadow carbon price of $224 per 1 ton of CO_2 to calculate *EVF*

Year	2023	2024	2025	2026	2027	2028
Cash flows, in $ millions	-100	40	40	40	40	40
Carbon emissions, in thousands tons	0	30	30	30	30	30
Shadow carbon price, in $	224	224	224	224	224	224
Environmental value flows, in $ millions	0.0	-6.7	-6.7	-6.7	-6.7	-6.7
Total value flows, in $ millions	**-100.0**	**33.3**	**33.3**	**33.3**	**33.3**	**33.3**

Example

□ Then calculate *FV* and *EV* using the financial discount rate of 6% and social discount rate of 2% respectively

Year	2023	2024	2025	2026	2027	2028
Cash flows, in $ millions	-100	40	40	40	40	40
Discount factor, 6%	1.00	0.94	0.89	0.84	0.79	0.75
PV (cash flows), in $ millions	-100.0	37.7	35.6	33.6	31.7	29.9
Financial value, in $ millions	**68.5**					
Environmental value flows, in $ millions	0.0	-6.7	-6.7	-6.7	-6.7	-6.7
Discount factor, 2%	1.00	0.98	0.96	0.94	0.92	0.91
PV (value flows), in $ millions	0.0	-6.6	-6.5	-6.3	-6.2	-6.1
Environmental value, in $ millions	**-31.7**					
Integrated value, in $ millions	**36.8**					

□ Conclusion: the integrated value is positive, so the project is worth doing!

Material, social and environmental factors

☐ The value calculation for SV and EV can be done in three steps:

1. **Materiality assessment** - determine important SV and EV factors;

2. **Quantification** - express these factors in their own units Q; and

3. **Monetisation** - express these factors in money with shadow prices SP

Materiality assessment

- Materiality assessments aim to determine which S and E factors are important to consider

- Material topics are those that reflect the company's most significant impacts (positive or negative) on people and environment

- Materiality depends on the specific situation and can differ per industry and country

- A core set of factors which should always be included:

  - Greenhouse gas emissions - including carbon emissions

  - Labour practices - including discrimination and inclusion

  - Business ethics - including corruption and fraud

Material social and environmental factors

Social factors

☐ *Labour practices* (e.g. training, discrimination)

☐ *Combatting poverty* (e.g. underpayment in value chain)

☐ *Interaction with communities* (e.g. regional economic activity, health & safety, business ethics)

Environmental factors

☐ *Pollution* (e.g. carbon emissions, water pollution)

☐ *Use of scarce resources* (e.g. scarce materials, land, water)

☐ *Restoration of air, land or water* (e.g. land restoration, water purification)

Quantifying social and environmental impact

☐ Expressing E issues in own units:

   ◻ GHG emissions: expressed in tonnes of CO_2

   ◻ Some issues are easily quantifiable (carbon, nitrogen or freshwater use) whereas others are more difficult to express in a single metric (biodiversity)

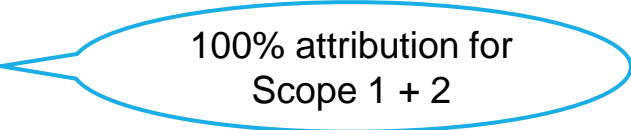| Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
CO_2-eq. million tons	30	31	22	25	31	30	29	25	20

☐ Expressing S issues in own units:

   ◻ For example, quality of life years added by a medical company

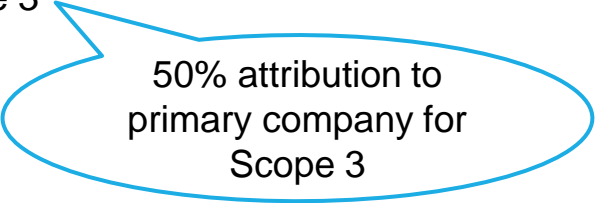| Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
Quality life years added, x 1,000	62	64	67	70	73	75	78	82	99

Attribution of impact

- A challenge is attributing (i.e. distributing) shares of the impact to each of the stakeholders

  - For example, carbon emissions from the usage of combustion engine vehicles can be attributed to:
    - The car manufacturer
    - The oil company selling petrol
    - The user of the vehicle

  - For greenhouse gas (GHG) emissions, Scope 1, 2 and 3 emissions attribute by distinguishing:
    - All direct GHG emissions of an organisation– Scope 1
    - Indirect GHG emissions from consumption of purchased energy – Scope 2
    - Other indirect GHG emissions both upstream and downstream of the value chain – Scope 3
    - New item (not yet in GHG Protocol) saved emissions – Scope 4

100% attribution for Scope 1 + 2

50% attribution to primary company for Scope 3

Monetising social and environmental impact

- The monetary value is calculated by multiplying the quantified issues with the shadow price, which is the price to restore the original situation

- Monetising E issues:

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
CO_2-eq. million tons	30	31	22	25	31	30	29	25	20
Shadow carbon price, $	224	232	240	248	257	266	275	285	295
Environmental value flow, $ billions	-6.7	-7.2	-5.3	-6.2	-8.0	-8.0	-8.0	-7.1	-5.9

The shadow carbon price will increase in the future

- Monetising S issues

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030
Quality life years, x 1,000	62	64	67	70	73	75	78	82	99
Shadow price, x $1,000	119	119	119	119	119	119	119	119	119
Social value flow, $ billions	7.4	7.6	8.0	8.3	8.7	8.9	9.3	9.8	11.8

The shadow price per quality of life year is expected to stay constant

Welfare-based shadow prices

- The shadow prices should reflect the 'true scarcity' of resources to stay within planetary boundaries

- Organisations such as the Impact Economy Foundation and True Price provide regularly updated lists of impact and shadow prices (see Appendix of Chapter 5)

- True prices are based on two welfare categories:
  - Rights (human, labour and environmental rights)
  - Well-being

Well-being

- Well-being, also known as quality of life, refers to what is intrinsically valuable for someone

- Includes:
  - Well-being of employees – additional to the salary received, measured by life satisfaction points (on a scale of 0 to 100)
  - Well-being of customers – calculated as consumer surplus, which is the difference between the price of a product and what consumers want to pay
  - Well-being of communities

Consumer surplus

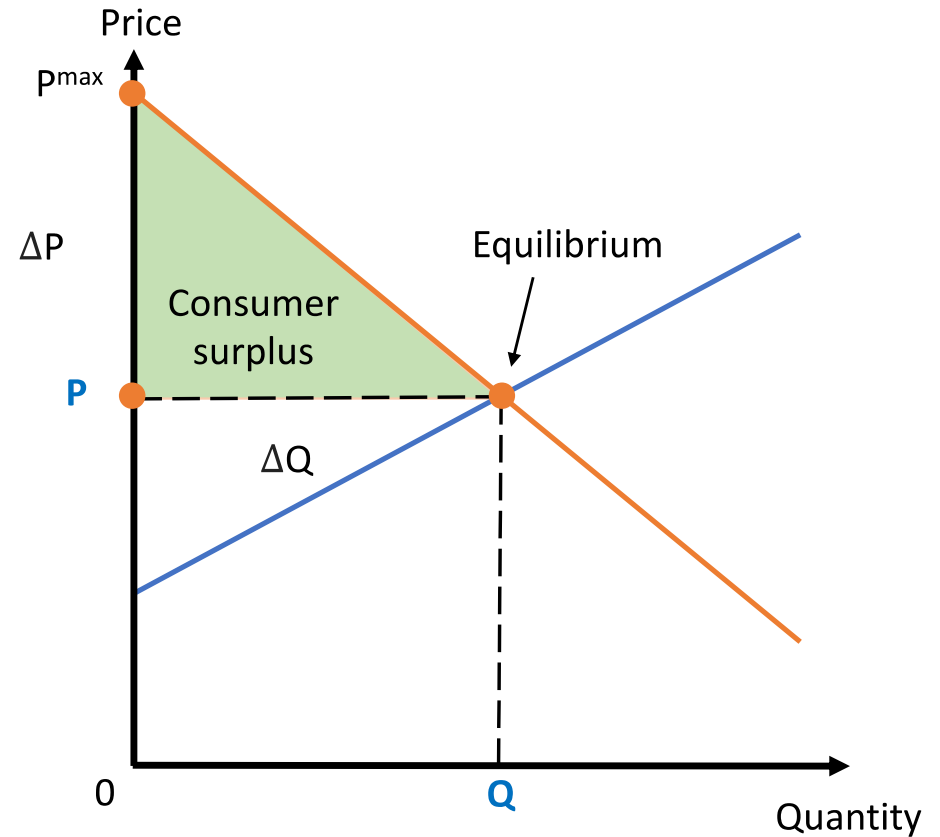$$\text{consumer surplus} = \Delta P \cdot Q \cdot \frac{1}{2}$$

ΔP = maximum price P^{max} minus price paid P

$Q =$ number of goods sold

$$\text{price elasticity} = \frac{\Delta Q / Q}{\Delta P / P}$$

which leads to:

$$\text{consumer surplus} = \frac{\Delta Q \cdot P}{price\ elasticity} \cdot \frac{1}{2} = \frac{sales}{price\ elasticity} \cdot \frac{1}{2}$$

Calculating social and environmental value

□ Using the social (*SVF*) and environmental (*EVF*) value flows, you can determine social (*SV*) and environmental (*EV*) value:

$$SV = \sum_{n=0}^{N} \frac{SVF_n}{(1+r)^n} \qquad EV = \sum_{n=0}^{N} \frac{EVF_n}{(1+r)^n}$$

Year	2022	2023	2024	…
Social value flows (SVF), $ billions	7.4	7.6	8.0	…
Discount factor, 2%	1	0.98	0.96	…
PV (SVF)	7.4	7.5	7.7	…
Social value (SV)	73.3			

Year	2022	2023	2024	…
Environmental value flows (EVF), $ billions	-6.7	-7.2	-5.3	…
Discount factor, 2%	1	0.98	0.96	…
PV (EVF)	-6.7	-7.0	-5.1	…
Environmental value (EV)	-57.6			

Examples

☐ This chapter shows that SV and EV can be measured and valued

  ◘ We can now calculate IV = FV + SV + EV

☐ Ch 6 and 7 provide examples for projects - from Net Present Value (NPV) of FV to Integrated Present Value (IPV)

☐ Ch 7 provides case study for integrated value of Inditex

Conclusions

☐ Recent advances in impact measurement enable companies to measure social and environmental quantities and to multiply them by their respective shadow price

☐ The challenge for calculating social value (SV) and environmental value (EV) is the availability of company information on S and E issues

☐ It is important to keep the big picture by focusing on material S and E issues, and not to get lost in unnecessary detail

☐ Remember: better to be approximately right than exactly wrong