Sustainable Value Drivers and Strategies

Frank Figge and **Tobias Hahn**,
Euromed Management School Marseille, France

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The Paper in Five Bullet Points

- We disaggregate corporate eco-efficiency.
- We identify the components and drivers of an efficient use of environmental resources.
- We analyse in detail the capital and CO_2-efficiency of major global car makers.
- We clarify the relation between the efficient use of capital and environmental resources in firms.
- We find that there is no unambiguous link between eco-efficiency and a higher capital efficiency.

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Outline

- The concept of eco-efficiency
- Disaggregation of eco-efficiency
- Application to the car sector
- Sustainable Value strategies
- Discussion

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Eco-Efficiency as an Indicator

- Eco-efficiency as one of the most popular concepts for the integrated measurement of corporate environmental and financial performance (Callens and Tyteca, 1999; Ciroth, 2009; Huppes and Ishikawa, 2005a, b, 2009; Lamberton, 2005)
- Relate desirable outcomes of economic activity to undesirable environmental impacts or resource use (DeSimone and Popoff, 1998; Hahn et al., 2010; Huppes and Ishikawa, 2005a, b; Reijnders, 1998; Saling et al., 2002)
- Corporate eco-efficiency indicators show how efficiently companies use scarce environmental resources.

$$\text{Eco-efficiency} = \frac{\text{Economic outcome [€]}}{\text{Environmental impact}}$$

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Research Interest

- Eco-efficiency as an integrated environmental-economic indicator
- Unclear which are the drivers of changes in eco-efficiency
- Economic value drivers → well established
- Drivers of eco-efficiency → not researched
- Need a better understanding of the drivers behind capital efficiency and eco-efficiency.
- Analysis of corporate strategies towards eco-efficiency

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Disaggregation of Efficiency Figures

- Disaggregation of efficiency figures to enhance understanding
- Most popular example DuPont scheme (e.g., Keown et al., 2007)
- Identification of different components of capital efficiency

$$\text{Capital efficiency} = \frac{\text{Return}}{\text{Equity}} = \frac{\text{Return}}{\text{Sales}} \cdot \frac{\text{Sales}}{\text{Total capital}} \cdot \frac{\text{Total capital}}{\text{Equity}}$$

  - Sales margin
  - Capital turnover
  - Financial leverage

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Disaggregation of Eco-Efficiency

- Strong analogy to DuPont formula
- Identification of different components of eco-efficiency

$$\text{Eco} - \text{efficiency} = \frac{\text{Return}}{\text{Environmental resources}}$$

$$= \frac{\text{Return}}{\text{Sales}} \cdot \frac{\text{Sales}}{\text{Economic capital}} \cdot \frac{\text{Economic capital}}{\text{Environmental resources}}$$

  - Sales margin
  - Capital turnover
  - Sustainability leverage

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Disaggregation of eco-efficiency

$$\frac{\text{Ertrag}}{\text{Umsatz}} \times \frac{\text{Umsatz}}{\text{Ökon. Kapital}} \times \frac{\text{Ökon. Kapital}}{\text{Ökol. Kapital}}$$

Sales margin

Capital turnover

Return on capital

Sustainability leverage

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Towards Value Components

- Value is created when corporate efficiency exceeds market efficiency
- Eco-efficiency multiples: By which factor does corporate eco-efficiency outperform market eco-efficiency? (Hahn et al., 2010)
- Application to components of eco-efficiency

$$\frac{\text{Eco-efficiency}^{C}=\frac{\text{Return}^{C}}{\text{Sales}^{C}}\cdot\frac{\text{Sales}^{C}}{\text{Economic capital}^{C}}\cdot\frac{\text{Economic capital}^{C}}{\text{Environmental resources}^{C}}}{\text{Eco-efficiency}^{B}=\frac{\text{Return}^{B}}{\text{Sales}^{B}}\cdot\frac{\text{Sales}^{B}}{\text{Economic capital}^{B}}\cdot\frac{\text{Economic capital}^{B}}{\text{Environmental resources}^{B}}}$$

Eco-efficiency multiple	Sales margin multiple (comp. I)	Capital turnover multiple (comp. II)	Sustainability leverage multiple (comp. III)

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Value Components of Eco-Efficiency

- Operating profit margin multiple
  - Factor by which the operating profit per sales of a company exceeds or falls short of the benchmark's average operating profit margin.
  - Higher operating profit margin multiple dominates over a lower operating profit multiple.
- Capital turnover multiple
  - Factor by which the sales per unit of capital of a company exceed the capital turnover of its peers
  - A higher capital turnover multiple dominates over a lower capital turnover multiple.
- Sustainability leverage multiple
  - Factor by which the ratio between the amount of economic capital and the amount of environmental capital used by a company is above or below the corresponding benchmark ratio.
  - A lower use of environmental capital at an unchanged use of economic capital results in a higher sustainability leverage, which therefore dominates.

In-depth Analysis of Corporate Eco-Efficiency

- Value components and multiples allow an in-depth analysis of corporate eco-efficiency and the value-creating use of environmental resources.
- First two components → economic elements, outperformance in terms of capital efficiency (ROC-mulitple)
- Sustainability leverage → environmental element, relative dependance on environmental resources
- Product of all three multiples → eco-efficiency multiple

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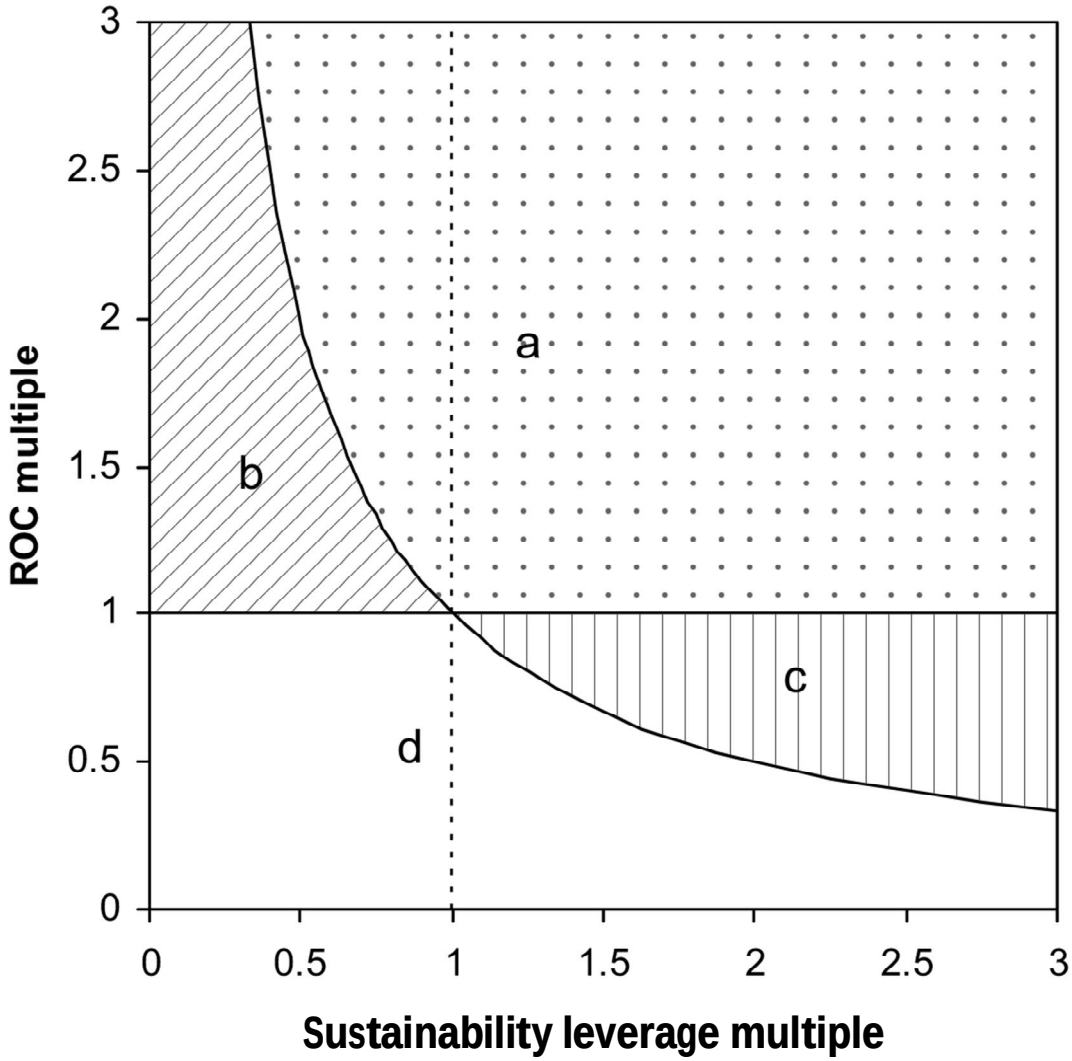
In-depth Analysis of Corporate Eco-Efficiency



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In-depth Analysis of Corporate Eco-Efficiency

- Area a+b: above-market ROC
- Area a+c: above-market eco-efficiency (EE)
- Area b: above-market ROC but below-market EE
- Area c: below-market ROC but above-market EE
- Area d: below-market ROC and below-market EE
- Area right to the dotted line: above-market sustainability leverage
- Area within a left to the dotted line: Above-market EE due to economic outperformance
- Area c: Above-market EE due to environmental outperformance

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Application to the Carbon Efficiency of Car Makers

- In-depth analysis of CO_2-efficiency of 16 car makers worldwide
- CO_2-efficiency = EBIT from ordinary operations / CO_2-emissions from operations (scope 1+2)
- CO_2-data from company reports
- Data correction to ensure matching scopes
- Elimination of exceptional items
- Average interbank exchange rate to convert to €

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Results

Company	Value components			ROC multiple	CO_2-efficiency multiple	Area in graph
	Operating profit margin multiple	Capital turnover multiple	CO_2-leverage multiple			
	(α)	(β)	(γ)	(α) x (β)	(α) x (β) x (γ)	
						a
Daimler	1.56	0.93	1.33	1.45	1.92	a
FIAT Auto	0.61	1.79	0.31	1.08	0.33	b
						d
						d
						a
Hyundai	0.83	1.01	1.33	0.84	1.11	c
Isuzu*	1.03	1.57	0.56	1.62	0.91	b
Mitsubishi*	0.81	2.09	0.75	1.69	1.27	a
Nissan	1.48	1.10	0.82	1.63	1.34	a
						c
						c
						a
Tata	1.92	1.39	0.37	2.66	0.99	b
Toyota	1.75	0.98	0.91	1.72	1.56	a
						b

*domestic operations

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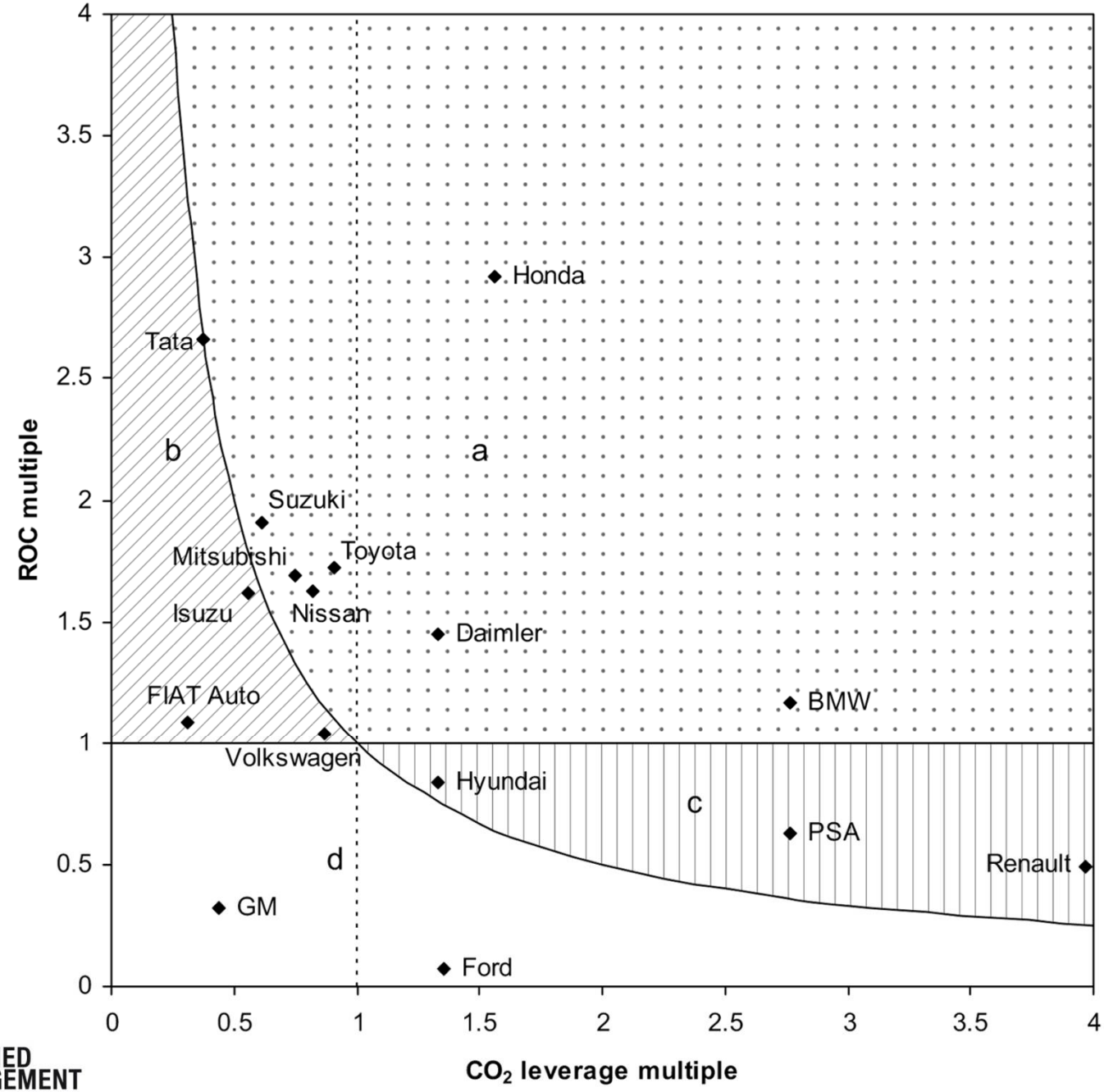

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Werttreiberanalyse

- Ergebnisse der Werttreiberanalyse für die folgenden Unternehmen
  - BMW, Daimler, FIAT, Ford, Honda, Hyundai, Renault, Toyota, Volkswagen
- die folgenden Indikatoren
  - CO_2, VOC, Abfall, Wasser, Unfälle, Mitarbeiter
- und die folgenden Jahre
  - 2008-2010

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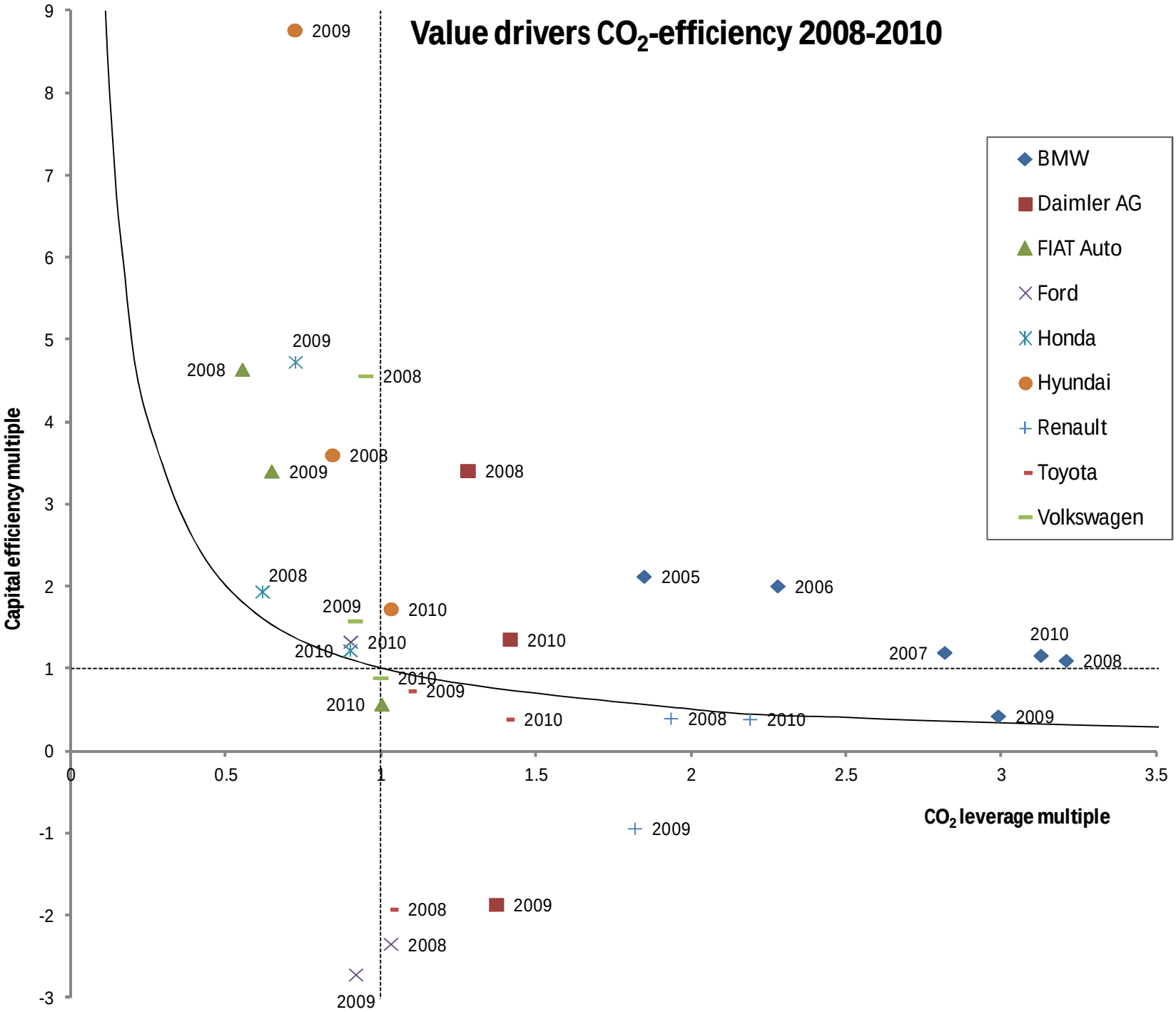
Value drivers CO_2-efficiency 2008-2010
Capital efficiency multiple
CO_2 leverage multiple
BMW
Daimler AG
FIAT Auto
Ford
Honda
Hyundai
Renault
Toyota
Volkswagen
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
0
0.5
1
1.5
2
2.5
3
3.5
2009
2008
2009
2008
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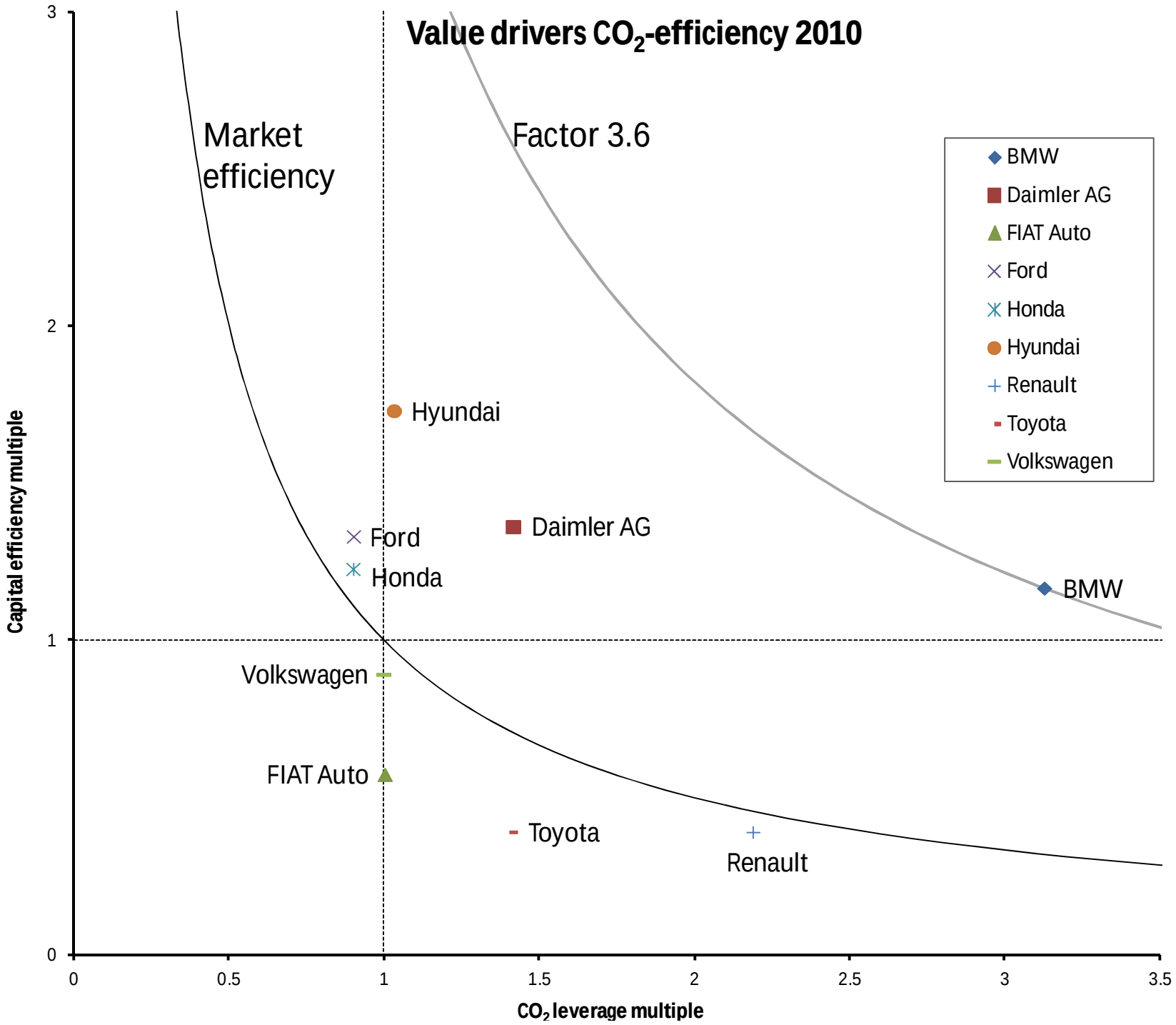
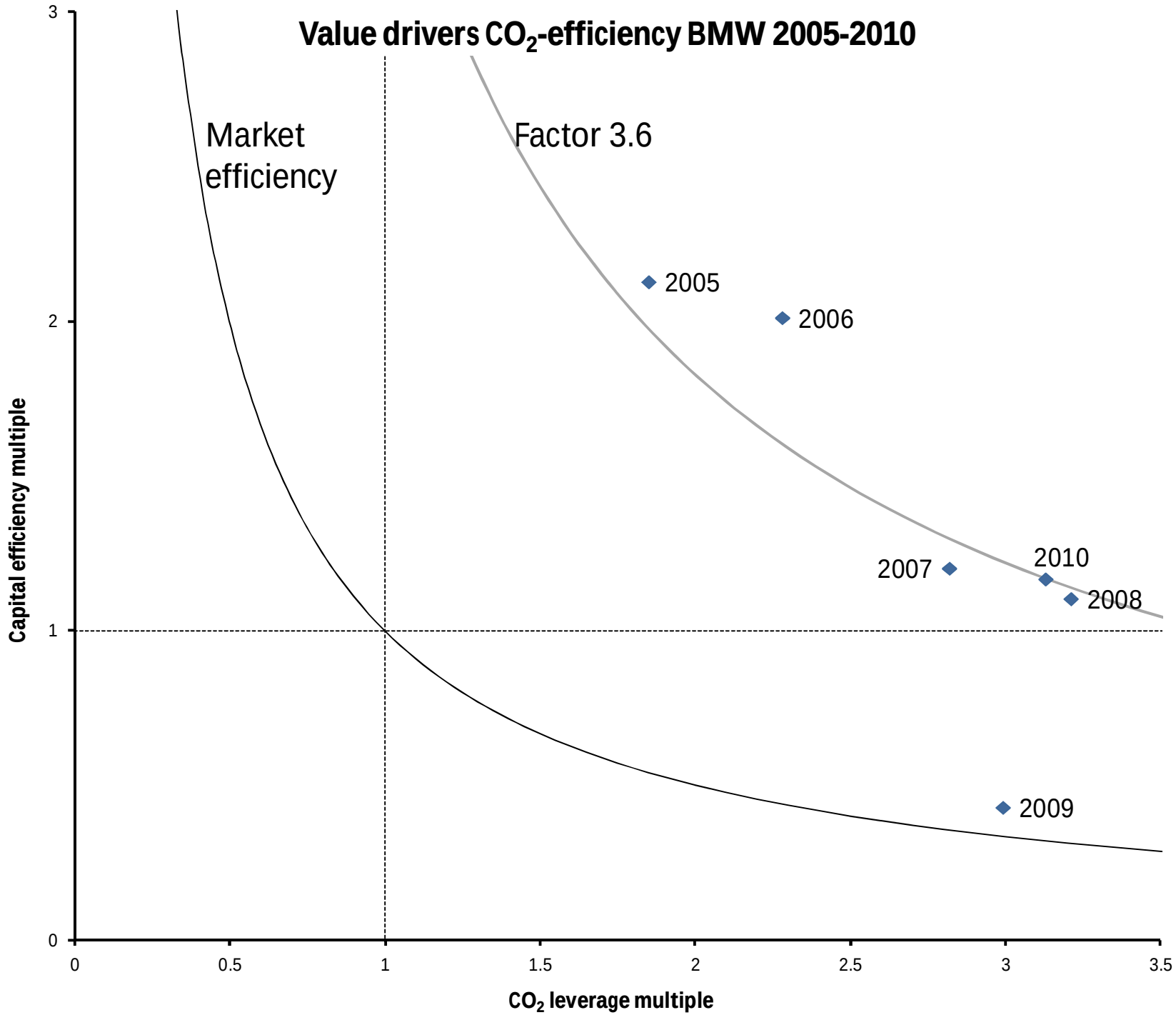

Value drivers CO_2-efficiency 2010
Market efficiency
Factor 3.6
BMW
Daimler AG
FIAT Auto
Ford
Honda
Hyundai
Renault
Toyota
Volkswagen
Capital efficiency multiple
CO_2 leverage multiple
0
0.5
1
1.5
2
2.5
3
3.5


Value drivers CO_2-efficiency BMW 2005-2010
Market efficiency
Factor 3.6
2005
2006
2007
2008
2009
2010
Capital efficiency multiple
CO_2 leverage multiple
0
1
2
3
0
0.5
1
1.5
2
2.5
3
3.5

Analytical Implications

- The analysis shows
  - out- or underperformance of a company with regard to each of the different components of eco-efficiency relative to the market
  - the value component(s) that determine the overall out- or underperformance with regard to the value-creating use of environmental resources

Conceptual Implications

- Economic and environmental resources are complements for the creation of value from a sustainability perspective.
- There is a difference between economic value creation and sustainable value creation
- Economic value focuses exclusively on an above-average return on capital and the related value drivers result according to their influence on an enhanced return on capital.
- Analysis considers the return on other resources next to economic capital.
- Sustainable value drivers are thus drivers that enhance the return on environmental next to economic resources.

Discussion of Value Drivers

- The drivers of capital efficiency and eco-efficiency are not fully congruent.
- There is no automatic link between eco-efficiency and economic value creation as assumed by the win-win paradigm.

Value Drivers	Economic Value	Sustainable Value
Operating profit margin	+	+
Sales growth	+	+
Investment of economic capital	-	+/–
Cost of economic capital	-	-
Investment of environmental capital	not considered	-
Cost of environmental capital	-	-

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The Ambiguous Role of Capital Investments (i)

- Capital investments as a negative driver of economic value
- Ambiguous picture when it comes to eco-efficiency
  - investments of economic capital ↗, capital turnover ↘, return on capital ↘, and eco-efficiency ↘ (cp)
  - investments of economic capital ↗, sustainability leverage ↗ and eco-efficiency ↗ (cp)
- Two opposite effects that need to be balanced
- Investment of economic capital to reduce emissions = substitution of environmental capital through economic capital
- Condition: The positive leverage effect must outweigh the negative effect on capital turnover and the return on capital (cp).
- PSA and Renault

The Ambiguous Role of Capital Investments (ii)

- The analysis…
  - …shows if and when companies should use economic capital to decrease the use of environmental resources from the viewpoint of a value-creating use of environmental resources.
  - …helps to control and balance economic and environmental perspectives
  - …clarifies the relation between the use of economic and environmental resources in companies

Managerial implications

- Allows managers to identify strategies that lead to a value-creating use of economic and environmental resources.
- Value components and the related multiples help managers to identify whether their companies out- or underperform the market in the economic and/or environmental sphere.
- Multiples reveal the driving forces behind the value-creating use of economic and environmental resources.
- Helps managers to identify primary areas for action in order to enhance their economic and environmental competitiveness
- Ford → economic performance
- Tata → environmental performance

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Limitations

- Requires quantitative data on the use of economic and environmental capital
- Only applicable to sustainability aspects that are quantifiable in a reasonable way
- Focus only on the operational processes and activities of companies due to strong analogy to traditional economic performance assessment tools

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Conclusions

- First analysis that considers environmental value drivers next to economic value drivers
- Strong analogy to standard financial performance assessment
- Capital efficiency and eco-efficiency are complements
- The is no unequivocal link between a higher eco-efficiency and a higher capital efficiency.
- The analysis helps to manage businesses in a way that creates value for both shareholders and the environment.

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Questions?