Not measuring sustainable value at all: A response to Kuosmanen and Kuosmanen

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A B S T R A C T

In their article in this issue of Ecological Economics, Kuosmanen and Kuosmanen [Kuosmanen, T. and
Kuosmanen, N., this issue. How Not to Measure Sustainable Value (and How One Might). Ecological
Economics] aim to criticise the measurement of Sustainable Value as proposed in our previous research.
By adopting a production perspective and based on a productive efficiency analysis, they claim that the proposed
way of measuring Sustainable Value represents an invalid simplification that rests on restrictive and unrealistic
assumptions. Our response is to show that their argument rests on a fundamental misspecification of the
Sustainable Value approach. We identify three conceptual misfits: a mismatch in the perspective of the
analysis, a misspecification of opportunity costs and the irrelevance of production functions. Ultimately,
Kuosmanen and Kuosmanen’s train of thought rests entirely within the realm of productive efficiency analysis,
whereas Sustainable Value builds on the foundations of financial economics and consequently adopts a macro
rather than a firm perspective. It is thus not surprising that the findings of Kuosmanen and Kuosmanen appear
to contradict the Sustainable Value approach. However, this is due to their fundamental misspecification of the
Sustainable Value approach. As a result, rather than providing novel insights into how Sustainable Value might
be measured in a better way, they do not measure Sustainable Value at all.

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1. Introduction

Despite being developed and proposed only recently, the Sustainable Value approach (Figge, 2001; Figge and Hahn, 2004a, 2004b, 2005, 2008; Hahn et al., 2007) has attracted considerable attention and sparked at times lively debate (Klevas et al., 2009; Korhonen, 2008; Schmidt and Schwegler, 2008; Van Passel et al., 2007). Most recently, in an article in this issue of Ecological Economics Kuosmanen and Kuosmanen (2009-this issue) (henceforth KK) aim to criticise the Sustainable Value approach. We identify three conceptual misfits: a mismatch in the perspective of the analysis, a misspecification of opportunity costs and the irrelevance of production functions. Ultimately, Kuosmanen and Kuosmanen’s train of thought rests entirely within the realm of productive efficiency analysis, whereas Sustainable Value builds on the foundations of financial economics and consequently adopts a macro rather than a firm perspective. It is thus not surprising that the findings of Kuosmanen and Kuosmanen appear to contradict the Sustainable Value approach. However, this is due to their fundamental misspecification of the Sustainable Value approach. As a result, rather than providing novel insights into how Sustainable Value might be measured in a better way, they do not measure Sustainable Value at all.

2 Please note that this quote from Markowitz’s Nobel Lecture relates to portfolio theory. We feel that it can also be attributed to financial economics in a wider sense.
following, we will develop on these three misfits by addressing the key aspects of Kuosmanen and Kuosmanen’s (2009-this issue) article. Regarding the first mismatch, we show the fundamental difference in perspective between SV and productive efficiency analysis. The second mismatch refers to the notion and role of opportunity costs. For identifying the third mismatch we discuss the relevance of production functions in the context of the SV approach. Finally, we briefly discuss some implications of our argument and KK’s criticism for sustainability assessment and from the perspective of welfare economics before concluding our response.

2. Misspecification of perspective

In their article, KK claim to draw a sharp distinction between the conceptual idea of SV and the operational estimator to measure SV. As we will show in this section, such a distinction is futile if the estimator that is proposed by KK is based on a completely different perspective that has little in common with the logic of the SV approach. For this purpose we need to address the fundamental perspective the SV approach itself is based on and contrast it with the perspective that KK adopt for their analysis of the validity of the SV measurement.

As noted by KK, in our original article in Ecological Economics we introduced the If- and Where-matrix (Figge and Hahn, 2004a, p. 176–177) to distinguish between two different rationales in the context of sustainability assessments. A sustainability measure that answers the If-question looks at whether the resource should be used at all. A sustainability measure that addresses the Where-question looks at where, i.e. by which economic entities the resource should be used. As explained in our article answering the If-question is desirable but not possible in practice as we need to know the absolute societal cost of resource use to answer the If-question. Unfortunately, reliable information on the external costs of environmental and social burdens is not available most of the time (Tol, 2005). Our SV approach follows the Where-logic of this matrix. We argue that this question can be answered based on opportunity costs. SV ‘[...] indicates how much more sustainable (in monetary terms) the use of the resource is in comparison to other entities’ (Figge and Hahn, 2004a, p. 177). As explained in our article we follow the logic of investment decision making in this context (Figge and Hahn, 2004a, p. 176). SV is, similar to capital-oriented concepts like the shareholder value approach (Copeland et al., 2000; Rappaport, 1986), based on efficiency. Companies that increase their efficiency will, ceteris paribus, also increase their SV. Answering the Where-question can help us to allocate resources even if we do not know if we should use the resource at all.

There is a logical follow on question once resources have been allocated, namely the How-question. The How-question looks at how resources are used once they have been allocated to an economic entity (e.g. a company). Companies can for example choose between different production technologies. Different production technologies will use different resources to a different degree to produce their outputs. It is useful to describe these production technologies using production functions. The efficiency of the resource use — including environmental and social aspects — on the individual firm level has been analysed for decades using productive efficiency analyses (Callens and Tyteca, 1999; Kuosmanen and Kantelainen, 2005; Reinhard et al., 1999). In this context, scholars analyse alternatives of a given production technology (and thus production function) in order to determine the best alternative technology option for every individual firm.

We decided not to discuss the How-question in our original article (Figge and Hahn, 2004a) because SV inscribes itself in the methodological tradition of financial economics and not of productive efficiency analysis. Financial economics deals with the Wherelocation. In contrast, the How-question is related to theories that follow the methodological tradition of the theory of the firm such as productive efficiency analysis. Even if both questions refer to the question of efficiency of resource use they are fundamentally different with respect to their underlying rationale for optimising resource use and for assessing efficiency of resource use.

The perspective of the Where-question is based on the logic of financial economics. Financial economics are concerned with the questions how to allocate economic capital among different companies in order to maximise the overall risk-adjusted return on economic capital (Modigliani and Miller, 1958). Note that the rationale for optimising resource use does not reside on the individual firm level but on the overarching perspective of investors who can diversify by investing in different companies at the same time. As a consequence, financial economics are not concerned with optimising capital efficiency or even assuring survival of an individual firm. SV adopts this perspective of financial economics and extends it to environmental and social resources. The fundamental question SV asks is thus where environmental and social resources should be allocated in order to achieve an optimal overall return (Where-question).

The perspective of the How-question stems from the firm level. It asks how resources should be best used by each individual firm once resources have been allocated to different firms. Productive efficiency analysis is an important example in this context. It determines for every individual firm the best possible (= most efficient) technology for using the resources and assesses by how much each company falls short of achieving its individual optimal use of resources. Note that the rationale of optimisation resides entirely on the single company level and is different for every individual company.

It becomes clear that the Where-question refers to the allocation of resources between firms whereas the How-question addresses the technology choice or use of every individual company. This has far reaching consequences for assessment approaches that are based on either of the two perspectives. The fundamental difference in the assessment logic of the two perspectives can be illustrated using a simple example. In this example we assess the performance of two companies A and B. Both companies use one resource to produce their output. We assume that they use the same absolute amount of the resource to produce different levels of output. To answer the Where-question we use the economy that both companies operate in as a benchmark. To answer the How-question we compare their production technology to the best available production technology as it is for example done by Kuosmanen and Kuosmanen (2009-this issue).

Table 1 summarises the information that we have regarding both companies. We will first look at the Where-question and thus at the SV approach. SV is created if an additional return could be achieved by giving a resource to the company rather than the benchmark. In our simple example each unit that is given to company A rather than the benchmark (Where-column) results in a loss of € 50. Each unit that is given to company B results in a gain of € 50. B will thus be preferred to A, i.e. B will have a higher valuation than A.

We will now look at the How-question and thus productive efficiency analysis as proposed by Kuosmanen and Kuosmanen (2009-this issue). Note that according to productive efficiency analysis a company is rated higher the closer it operates to its individual efficiency frontier that determines the rationale for optimal resource use for the respective company. Company A could increase its performance from 100 €/t CO2 to 120 €/t CO2, i.e. by 20%. By not operating at the maximum possible level € 20 is lost per unit of resource used. In the case of company B this amounts to € 100 per unit of resource and thus a 50% increase. In this case company A is preferred to company B, i.e. A will receive a higher valuation than B as it operates closer to its efficiency frontier.

The objective of the SV approach is to answer the Where-question. Recall that the Where-question is concerned with the allocation of resources between different firms. However, if this allocative question was answered on the basis of assessment following the logic of

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3 We restrict ourselves to one resource as well as to the same absolute amount only for convenience. The argument holds true analogously for more than one resource and for different absolute amounts of resource use.
productive efficiency analysis (How-question) the next available resource would probably be shifted towards company A and thus to the less efficient company from the viewpoint of the societal level. This would have a negative impact on the degree of sustainability on the societal level. The How-question is of interest whenever we want to identify the potential that a decision maker within a specific company has when it comes to optimising resource use within that company. It does not allow us to answer any question regarding the efficiency of resource use on a societal level.

Assessments that are based on the How-question will only be consistent with (but not necessarily the same as) the SV approach whenever less efficient entities on a societal level will also have a larger improvement potential than more efficient entities on a firm level. Put simply, a resource hungry company that operates close to its maximum attainable efficiency will receive a high ranking according to the assessment of KK despite the fact that its resource efficiency trails the efficiency that is attained on a societal level as reflected in the SV approach. If the Where-question was to be answered on the basis of this approach the efficiency of resource use would be reduced rather than increased on the societal level.

More generally, it becomes evident that there is a considerable potential for misspecification if the two assessment perspectives are mixed or confused. Kuosmanen and Kuosmanen (2009-this issue) do not appear to be aware that they claim to address the Where-question but only provide an answer to the How-question. Rather it seems as if they claim to assess the validity of measuring SV according to our initial proposition — a measure that exclusively addresses the efficiency of resource use based on the Where-question — by using the rationale of productive efficiency analysis that is entirely and exclusively concerned with the How-question. This misspecification and confusion of perspectives represents the first and most serious misfit of KK’s critique of SV. We think that one can hardly expect that an allocative problem on the societal level can be validated by using a technological efficiency analysis from the individual firm level. However, it seems that KK are exactly trying to do that. This misspecification of their analysis translates into two further conceptual misfits that we address in the two following sections.

### Table 1

<table>
<thead>
<tr>
<th>Company</th>
<th>Observed efficiency CO₂ (€/t)</th>
<th>Where-question Efficiency CO₂ (€/t)</th>
<th>How-question Efficiency of benchmark CO₂ (€/t)</th>
<th>Best achievable efficiency CO₂ (€/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>50</td>
<td>100</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Company B</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

3. The definition of opportunity costs

KK further criticise the definition of opportunity costs that forms the conceptual basis of SV. In fact, the core contribution of the SV approach is to apply the notion of opportunity costs (Bastiat, 1870; Green, 1894; Haney, 1912; Huang, 1933) from financial economics to sustainability assessment. To create SV companies must at least cover the opportunity costs of their economic, environmental and social resources. We agree with KK that opportunity costs can be defined as the return that would have been created had the resources been used in the best available alternative. However, and this follows directly from the misspecification of perspective of KK shown above, we disagree that the best available alternative and thus opportunity costs should be determined on the individual firm level. Rather, by following the methodological tradition of financial economics we argue that the best available alternative is defined by an average return on resources of many different companies. In this section, we will show that the definition of opportunity costs in the financial markets actually represents the appropriate definition of opportunity costs if the allocative Where-question is addressed under the presence of risk. For the development of the SV approach in our original article in Ecological Economics (Figge and Hahn, 2004a), we trusted that the foundations of financial economics are known to the reader. In the following, we briefly address the rationale behind the definition of opportunity costs in financial markets in order to show the logic of the definition of opportunity costs for SV assessments.

In the financial markets a typical distinction is made between decisions under certainty and decisions under risk and uncertainty. Investors are exposed to risk whenever we do not know the future return of an economic entity, i.e. the return on capital or the return on another resource, for sure. Almost all decisions on resource use are made in a condition of risk. In the financial markets it is assumed that people are risk averse, i.e. they prefer certain outcomes to uncertain outcomes.

In the context of certainty the best alternative to one investment is one other investment that has the highest return possible. As we can see this is similar to the definition that is used by Kuosmanen and Kuosmanen (2009-this issue) and in productive efficiency analysis in general. Even if KK have not stated their assumptions regarding risk and certainty it appears that based on their definition of opportunity costs they assume certainty. This might be a fair assumption if one seeks to optimise the resource use within an individual firm (How-question). When answering the Where-question the opportunity costs of the resource use of one economic entity are only defined by the resource use of the one other economic entity that yields the highest return if there is certainty.

To assume certainty is considered to be unrealistic in the overwhelming majority of decision making situations in the financial markets. In most cases, we do not know the expected return on capital for companies for sure. Consequently, the impact of risk on decision making has been discussed already more than 100 years ago (Hawley, 1893; Haynes, 1895). The fact that diversification plays an important role in this context has also been known for quite some time (Hardy, 1923). Already on the basis of what was known more than 80 years ago we can conclude that for risk-averse investors a better alternative to investing in a single economic entity is to invest in many different economic entities at the same time. This leads to risk reduction through diversification and thus to a higher utility for the risk-averse investor. In terms of opportunity costs we can conclude already at this stage that in the presence of risk the best available alternative to investing in one economic entity will be to spread the investment across many economic entities.

Based on the work of Markowitz (1952, 1959) on the one hand and Sharpe (1964), Lintner (1965a, 1965b) and Mossin (1966) on the other hand we can come up with a more precise definition of opportunity costs under risk. Markowitz (1952, 1959) developed Modern Portfolio Theory (MPT). MPT shows the link between the return and risk of individual securities and the return and risk of a portfolio of securities and shows the way an optimizing investor would behave. The work of Sharpe, Lintner and Mossin that is known today as the Capital Asset Pricing Model (CAPM) describes an economic equilibrium that is attained when all investors behave in the way described by Markowitz (1990). Both MPT as well as the CAPM are described in all main textbooks on finance (see e.g. Brealey and Myers, 2003) and this is not the place to discuss these theories in any detail. However, it is worthwhile pointing out the main consequences of these theories for investment behaviour and thus opportunity costs.

One of the most important implications of MPT and CAPM is that risk-averse investors will not only diversify but they will also, independent of their degree of risk-aversion, invest in the same portfolio of

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*4 In the following we will not distinguish between risk and uncertainty.*
risky securities (see e.g. Lintner, 1965a). This portfolio can be referred to as the market portfolio. Investing in fewer or even only a single risky security would be considered irrational. Put differently, as financial economics has shown it is rational for investors to allocate resources to the same degree to the same (risky) firms to arrive at an optimal allocation of resources from a societal level (Lintner, 1965a, 1965b; Mossin, 1966; Sharpe, 1964). As a consequence, on financial markets the best alternative use of capital and thus the opportunity costs of capital are not determined by the single best capital efficiency that is achieved by an individual firm. Rather, the best available alternative is represented by the market return on capital and thus not by the return on the level of the individual firm. As a consequence, optimal allocation of capital from a societal perspective (and not from a single firm’s point of view) will be achieved.

The SV approach extends this logic of the financial markets from the use of capital to other resources. If we assume that there is certainty then the economic entity with the highest return reflects the appropriate opportunity cost. We believe that this assumption is unrealistic more often than not. The return of economic entities cannot be predicted with certainty most of the time. Consequently, the appropriate opportunity cost will always consist of a portfolio of economic entities. The SV approach as it was presented in Ecological Economics assumes that the return of all economic entities that are assessed is risky and that they all covary to the same degree with the market and are thus subject to the same non-diversifiable risk. In this case the appropriate opportunity cost is reflected by the market average of all risky economic entities. This assumption was for example also at the heart of the ADVANCE survey (ADVANCE Project, 2006) that KK criticise in their article.

We appreciate that the assumption that all companies have the same degree of risk is unrealistic. It is however less restrictive than KK’s implicit assumption that all companies are risk free. It becomes evident that for answering the Where-question, i.e. the question where resources should best be allocated to achieve overall optimality, opportunity costs are only defined by the resource efficiency of the single economic entity that yields the highest return when there is certainty. KK seem to ignore that the definition of opportunity costs for answering the Where-question needs to take into account risk. Either KK try to address the Where-question and make the restrictive assumption that all companies are risk free. Or they are bluntly applying the rationale of productive efficiency analysis that addresses the How-question on the individual firm level to SV that addresses the Where-question from a societal point of view. We rather believe that the latter is the case. We wonder whether KK notice this fundamental conceptual misfit and are aware that they apply an inappropriate notion of opportunity costs to test the validity of SV. This misspecification of opportunity costs represents the second mismatch of KK’s criticism of SV.

4. The role of production functions

The third major criticism of KK regarding our initial conception and measurement of SV refers to the understanding and role of production functions. KK claim to show that our initial notion of measuring SV is based on very strong and restrictive assumptions regarding the underlying production function. It is worthwhile noting that our initial article (Figge and Hahn, 2004a) did not discuss any production functions. As we will show in this section we do not have to consider production functions on the firm level for SV assessments. This is due to the financial economics perspective that SV takes and the nature of the Where-question.

As argued above, when it comes to the assessment of resource use there is a difference between the Where-question on the one hand and the How-question on the other hand. Put in less colloquial terms there is a difference between financial economics and approaches that follow the tradition of the theory of the firm such as productive efficiency analysis. Financial economics is mainly concerned with the allocation of resources across many different economic entities and often across time in an uncertain environment (Merton, 1997). For doing so, financial economics takes the perspective of the investor. Economic theories that follow the theory of the firm take the perspective of the firm. Productive efficiency analysis falls into the latter category of theories as it seeks to optimise the use of resources on the firm level and from a managerial perspective. Production functions are one of the tools that are typically used by such approaches on the firm level. As shown above, the SV approach takes the perspective of investors that allocate their resources across firms.

The two perspectives are of course interrelated. Investors give resources to firms and firms create a return for investors. As has been known in economics for quite some time the two views are however not the same. Investors assess resource use from a different perspective than firms. This is manifested among others in the principal–agent problems that have been vividly discussed in economics for quite some time (Fama, 1980; Fama and Jensen, 1983; Jensen and Meckling, 1976). As a consequence, the valuation of the use of the same resource will differ between both perspectives, which leads to these agency problems. Investors are for example not interested in a reduction of diversifiable risk while firms have an interest to reduce this risk as this risk, if it materializes, can endanger the survival of the company. Investors can and firms cannot diversify this risk. In economics this has led to the debate whether firms and their managers use economic resources for their own sake or for the benefit of their shareholders. Applied to the context of the SV approach we need to ask whether companies use resources for the firms’ own sake or for the benefit of society.

In financial economics the cost of capital is defined from the perspective of investors. In a market economy the cost of capital as defined from the perspective of investors sets the price of capital from the perspective of the firm. As Modigliani and Miller have shown in their seminal article: “[...] the marginal cost of capital to a firm is equal to the average cost of capital [...]” (Modigliani and Miller, 1958, p. 288; emphasis added). Note that the average cost of capital is defined from the perspective of the investors. As Modigliani and Miller also developed, a firm that is acting in the best interests of its stockholders will exploit any investment opportunity as long as its marginal return on investment is equal or greater than the average cost of capital from the perspective of the investors, i.e. market return on capital (Modigliani and Miller, 1958). Which production technology and thus production function is used in this context is not relevant from the perspective of the investors and is thus usually not discussed in financial economics.

As the SV approach builds on the analogy of financial economics it adopts the perspective of investors. SV is concerned with the question where resources should best be allocated to achieve an optimal return from the societal perspective. It is not about how different individual firms can optimise their resource use on an operational level. SV thus measures the contribution of a single entity to an improvement of the overarching efficiency. Most importantly, SV extends the logic of financial economics that is restricted to economic capital to cover also environmental and social resources. The rationale behind the allocation and the assessment according to the SV approach thus
remains the same as in financial economics: From the perspective of investors — who now allocate economic, environmental and social resources — based on opportunity costs it is not relevant which production technologies are used on the single firm level. SV never intended to discuss production technologies and production functions and as we have shown: it does not have to.

In this respect SV differs fundamentally from existing research that takes a firm perspective which is the view that is also adopted by Kuosmanen and Kuosmanen (2009-this issue). We agree with KK that there is little new in adopting such a firm perspective in a sustainability context. Most importantly, SV was never proposed as a measure based on the firm perspective. Once one accepts that SV is based on a market logic rather than a firm logic it follows that production functions are simply not relevant for SV assessments. Despite this fundamental conceptual difference KK act as if SV was a concept to assess operative efficiency on the firm level and thus constantly refer to production functions in order to examine the validity of SV. This represents the third mismatch of their critique of SV.

5. Discussion of implications

Before concluding our response we briefly sketch out some of the most important implications of the argument developed above. In this context, we refer to implications from the perspective of welfare economics and for sustainability assessment.

5.1. Implications from the perspective of welfare economics

As both the argument of Kuosmanen and Kuosmanen (2009-this issue) and SV follow an efficiency logic one might now be led to believe that both approaches will arrive at the same result. Using some basic insights of welfare economics it becomes evident that there is further optimisation potential from the societal level even after KK’s optimization. We have developed the argument and its underlying logic in another article (Figge and Hahn, 2004b) and we refer to this article for a more elaborate explanation.

In their article KK define the opportunity cost of a firm as the individual best practice technology of each firm. The opportunity costs will thus differ from firm to firm. Consequently, the ratios of marginal products of any two resources are likely to differ. As we can learn from welfare economics (Allais, 1943; Hotelling, 1938; Lange, 1942; Lerner, 1934, 1944) and as we have shown earlier (Figge and Hahn, 2004b) there is further optimisation potential whenever the ratio of marginal products of any two resources of any two firms differ. Optimality on a societal level has only been reached and thus the Where-question only been answered when the ratio of marginal products is identical. Whenever the ratio of marginal products differs, production can be increased at constant resource use by reallocating resources between firms. Note that such reallocation does guarantee a constant overall level of resource use which is why SV is conceptually in line with the notion of strong sustainability.

Conceptually, there follows a fundamental rule for the optimal allocation of resources if one aims to answer the Where-question: The ratio of opportunity costs of different resources must be identical for all economic entities. As soon as the ratio of opportunity costs differs there is room for improvement through a further reallocation of resources. It is easy to see that this is the case of the SV approach as developed in our article in Ecological Economics (Figge and Hahn, 2004a) and that it is not the case with the argument of Kuosmanen and Kuosmanen (2009-this issue).

5.2. Implications for sustainability assessment

We believe that there are at least three reasons to look at sustainable development from a higher level perspective rather than purely from a firm perspective. First, sustainable development is a societal concept (Hanley, 2000). It is therefore useful to optimise the use of resources from a societal perspective rather than from the perspective of individual firms. This corresponds to the view taken by financial economics where capital is allocated according to market efficiency and not single firm efficiency. Obviously, the SV approach establishes a micro–macro link as it assesses the use of economic, environmental and social resources in companies from an overarching societal perspective. In contrast, productive efficiency analyses as for example used by KK entirely remain on an individual firm level. As a consequence, they can only establish an indirect link to the societal goal of sustainable development at best.

Second, environmental and social resources are, similar to economic capital, resources without a price tag. Financial economics thus had to solve a similar pricing problem as one can find with research into sustainability assessment. Financial economics price economic capital from a macro perspective using opportunity costs. Even if the fundamental idea of applying opportunity cost thinking to the assessment of environmental resources has been proposed in the late 19th century (Green, 1894), it is — to the best of our knowledge — only until the proposition of the SV approach that this idea was taken up conceptually. Most importantly, pricing environmental and social resources with opportunity costs as proposed in our initial paper in Ecological Economics (Figge and Hahn, 2004a) circumvents the notorious difficulties researchers face with the pricing of environmental and social externalities. Assessing corporate sustainability from the firm level perspective adopted by KK does not take into account the pricing problem from the societal perspective.

Third, financial economics deal with decisions under risk and lay down rules for rational decisions under risk. Most decisions regarding our use of environmental and social resources are also decisions under risk (Figge, 2005). SV as proposed initially deals with risk by assuming that the use of environmental and social resources is subject to the same risk in all firms. This is a restrictive assumption. However, it is less restrictive and less unrealistic than the implicit assumption of KK that the use of environmental and social resources is risk free, i.e. that the return that can be achieved with these resources can be predicted with certainty. However, it seems to us that KK are not aware of the relevance and the role of risk in the context of the Where-question.

6. Conclusion

Overall, we think that the article of KK is both interesting and disappointing. It is interesting as their research takes a statistically sound and elaborate look at the efficient use of resources on the level of individual firms. Their research inscribes itself in the tradition of productive efficiency analysis which ultimately recurs to the theory of the firm. They contribute to extend such theories and techniques to the use of resources other than economic capital. However, as the authors note themselves this is not new.

At the same time, the article is disappointing as it commits a cardinal sin in theory testing: The authors misapply the underlying model that they claim to test. Thus, the fact that the result of their research appears to contradict the SV approach is not a reason for concern but reassuring. As we have shown in this response, the argument of KK suffers from confusing the fundamental perspective of SV that is based on financial economics with a productive efficiency perspective. Put simply, KK confuse the Where–with the How-question. Consequently, KK treat and test SV as if it was an approach to analyse resource efficiency from a single firm production perspective. This fundamental misapplication leads them to an inappropriate notion of opportunity costs and a misleading focus on production functions. Ultimately, KK fail to appreciate that SV never intended to analyse or answer the question whether resources are being used using the most efficient production technology on the individual firm level. Rather — and in strong analogy with financial economics and established capital assessment techniques on financial markets — SV is concerned with the question how resources should be allocated among different companies to achieve an overall optimal use of economic, environmental and social resources. The
rationale for optimisation with SV thus resides on the societal level. This is why a productive efficiency analysis that entirely rests within a single firm perspective as deployed by KK is simply inappropriate to test the validity of measuring SV. There is no use in “drawing a sharp distinction between the conceptual idea and the operational estimator” of SV as Kuosmanen and Kuosmanen (2009-this issue) claim to do if the conceptual idea is fundamentally misinterpreted. As a result, rather than providing novel insights into how Sustainable Value might be measured in a better way, KK do not measure Sustainable Value at all. Ultimately, this provides an important reminder to all of us: We must make sure to understand a conceptual idea before testing it empirically.

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