Sustainability, Shareholder Value and the Corporation

Hans-Werner Gottinger, University of Maastricht, NL

INTRODUCTION

This paper argues that shareholder value (SV) and sustainable economic growth (SEG) are mutually reinforcing. The paper will specifically focus on environmental sustainability as distinguishable from other dimensions of sustainability (financial, technological and otherwise). This paper starts with an operational description of SV before I identify the 'drivers' of sustainable economic growth, i.e. eco-efficiency (EE), life-cycle analysis (LCA) and full cost accounting (FCA). I infer that these features are both supportive elements of SV as well as of SEG and therefore mutually conditional. The concept of SV has become central in recent years for the valuation of companies and financial assets.

Creating SV is a perpetual, long-term managerial task that would entail a profitable growth to the company and a return on investment that consistently exceeds (in the long run) alternative investments which the investor may be able to choose at a comparable level of risk. Not all of corporate activities would equally generate a (sustainable) profit stream, thus some of the less value generating activities should be substituted by more value generating ones. That is, as a bottom line, corporate policy should only be directed toward activities producing positive social value.

It would be hard to venture a single, unified and comprehensive definition of SV since it involves multi-dimensional, time-dependent and uncertain factors that would not be able to map themselves into a unique number (such as net present value). I would rather suggest looking into some essential sub-metrics as to what such a (possible) measure should be covering:

- long-term, profitable growth of the company in terms of its sustainable value generating product portfolio,
- pricing of goods and services net of their externality costs (competitive market prices minus unit costs of externality, that is, 'social costs')
- the level of discount rate on future profit streams dependent on likely future externality or resource recovery costs. (The discount rate, on a corporate level, would be an indicator as to which a product sale contributes to sustainable values)

A guiding principle for achieving SV could be put in equational form such as

$$\text{Max} \int_o^\infty \left(\sum_i \Pi_i \delta^n \right) = \text{Max} \int_o^\infty U(c(t),e(t))e^{-\delta t}$$

where Π_i is the sustainable firm profit, say, about $i = 1,\ldots,k$ firms, δ^n the discount rate over n periods, U(...) the non-declining utility in consumption c and environmental amenities e, discounted at the factor $e^{-\delta t}$.

All of the sub-metrics are dynamic and forward looking. Accounting figures with their backward looking focus would be of little help. Thus in contrast to figures of financial accounting SV has an intrinsic link to environmental management of the firm: it is future oriented and based on sustainable costs. In the same vein I can show that submetrics (i) to (iii) are intrinsically linked to the building blocks of sustainability, i.e., eco-efficiency, life-cycle analysis and full cost accounting. The first two of which would relate to 'cost-efficiency', the last one to 'value assessment'. All of them are contributing to welfare enhancement that would be the ultimate contributor (driver) of intertemporal welfare change in sustainability.

Linking sustainability to “proxies” such as EE, LCA and FCA has been established (BCSD,1994) to be in full harmony with the macro principle of system sustainability. System sustainability can be disaggregated into project rules of corporate environmental management in a similar way that system optimality can be disaggregated into parts for project optimization. Industries which apply micro principles of corporate environmental management essentially satisfy ‘increasing returns’ characteristics because of (positive) network externalities, therefore are more likely to show sustainable growth performance.

This essay attempts to analyze sustainability concepts, such as sustainable growth, sustainable development and sustainable resource use, in terms of environmental economics, emphasizing sustainability on a macro scale (as compared to corporate sustainability on a micro scale).

Dozens of different verbal definitions of sustainability concepts are discussed in the literature (Chichilnisky, 1996).The general economy/environment model is used to suggest quantified, sometimes conflicting interpretations of these definitions. Key points which emerge are:

- The geographical and temporal context for sustainability concepts must always be made clear
- “Growth” generally ignores the direct effect that the environment may have on social welfare, whereas „development“ takes it into account
- The most common, although subjective, definition of sustainability is that the well-fare for future generations should not be less than the welfare of the current generation, i.e. utility should be non-declining
- “Sustainable resource use” focuses on maintaining a stock of renewable resources. Looking objectively at the resource base may be more relevant than notions of inter-generational welfare, when studying poor developing country economies
- Many definitions of sustainable development explicitly require attention to the needs of the current poor as well as to the needs of the future.

The uses and shortcomings of abstract optimal growth models for analyzing sustainable development are relevant. Optimal growth models can never achieve much realism, but may be useful for clarifying concepts and for making general suggestions for policy in what is a very diverse and complex field (Gottinger, 1997). Sustainability may be viewed as a constraint on the conventional optimality criterion of maximizing discounted utility, rather than as a replacement for it.

Comparative static analysis can be used to analyse rational tradeoffs between consumption and environmental quality at different stages of economic growth. Resource inputs are ignored, and a given output is assumed to be divided between consumption and pollution control expenditure. It is possible to view a commonly observed pattern, that environmental quality first decline and then recovers as industrialisation precedes, as an optimal allocation of resources proceeds. One can then perhaps conclude that continued environmental improvement is generally compatible with economic growth in the mature stages of development. However, it is also possible that environmental policy is inevitably weak during early industrialisation, and that truly optimal consumption-environment tradeoffs actually lead to continually declining environmental quality as growth proceeds (World Bank, 1992).

We suggest a few “stylized” somewhat representative though by no means exhaustive models how SEG manifests itself driven by (aggregate) corporate environmental management consistently enhancing SV in the long run. Models of optimal growth and control are applied to radical simplifications of general economy/environmental frameworks, in order to examine sustainability in the context of non-renewable and renewable resources (Beltratti, 1996; Gottinger, 1998). A first model is of „cake-eating“, with exogenous technical progress in the transformation of a single non-renewable resource into consumption good. The optimal path shows steady growth of consumption (i.e. sustainability) only if the rate of technical progress exceeds the rate at which future utility is discounted; so people’s concern for the future does affect sustainability.

A second model is also of cake-eating, but here an individual's utility depends not only on the rate at which he/she depletes his/her own resource stock, but also on the total resource stock owned by all individuals. This total resource effect is either direct (environmental amenity) or via the production function (environmental productivity). In either case, non-cooperative (privately optimal) resource depletion results in a "tragedy of the commons": private rates of resource depletion are greater than is socially optimal, and the economy is less sustainable.

Government intervention in the form of resource conservation subsidies or depletion taxes (supported by corporate environmental management) is shown both to correct the tragedy of the commons and to improve sustainability. Conversely, government subsidies for resource depletion, as often occurring in reality, have the opposite effect. However, slowing down resource depletion also means lower initial levels of consumption and utility. The suggested (not proved) implications for policy are that conventional environmental policy may also improve sustainability, making a separate sustainability criterion redundant in practice; and that politically difficult short-term sacrifices may be needed to reach optimal and sustainable growth paths. "Conventional environmental policy" need not always mean making the polluter pay for externalities; more important is that property rights over the environment are first defined and enforced.

A third model looks at steady states of an economy which also uses accumulated capital as well as resource flows to produce output (via a Cobb-Douglas production function). Environmental amenity or environmental productivity, combined with privately optimal resource depletion, again results in socially excessive resource depletion rates and lowered sustainability. (Along this vein, corporate investment in end-of-pipe technologies may not be cost-effective in view of long-term investments for a future sustainability path). A government conservation incentive again slows resource depletion. It also raises the rate of return on capital (the interest rate), because the resource price is driven up and capital investment results in resource savings. Possible limits, imposed by the laws of thermodynamics, on capital substitution for resources (limits which the Cobb-Douglas formula does not recognize) and on technological progress must be observed.

A fourth simple model is based on a single renewable resource ("corn"), where there is exogenous population growth, no technical progress in corn growing and harvesting, no environmental externalities, and a minimum consumption level needed for survival. This is clearly more relevant to developing countries whose economies depend largely on renewable resources. The optimal solution can be one of sustained growth of consumption and welfare, but only if two conditions both hold. The first is that the resource growth rate exceeds the sum of the utility discount and population growth rates; if not, grinding along forever at subsistence consumption is optimal. The second condition is that the initial resource growth is large enough to feed the initial population; if not, people are forced to eat resource capital (seedcorn) simply to survive, and total depletion and catastrophe are the inevitable result. This model provides a rationale for common development policies such as agricultural improvement, population control and the need for outside assistance. Possible extensions to include capital accumulation, non-renewable resources and environmental externalities are suggested.

REFERENCES

Beltratti, Andrea (1996). Models of Economic Growth with Environmental Assets, Kluwer Academic Publishers: Boston

Business Council for Sustainable Development (1994). Internalizing Environmental Costs to Promote Eco-Efficiency, Geneva

Chichilnisky, Graciela (1996). 'What is Sustainable Development?', Columbia University, mimeo Gottinger.

Hans –Werner (1997). 'Polluted and Sustainable Growth Paths', Japan Review of Economics 77 (2), pp.47-74

Gottinger, Hans- Werner (1998). Global Environmental Economics, Kluwer Academic Publishers: Boston

World Bank (1992). World Development Report: Development and the Environment, Oxford Univ. Press: Oxford