

Weak vs strong  
sustainability  
economics essay



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According to the definition of the Brundtland Report sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Baumgartner and Quass broaden this definition and state that sustainability focuses on and looks for the balance between both human generations, and, humans and nature. They state three aspects of sustainability: "(i) justice between humans of different generations, (ii) justice between different humans of the same generation, in particular the present generation, and (iii) justice between humans and nature". Thus sustainability should cover economic, social and environmental factors and it has to provide close interaction between these three points. However some analysts are sceptical about the usefulness of traditional economic and social indicators as measures of the sustainable development (Hammond et. al, 1995). For instance, GDP is the most commonly used indicator to assess the development and sustainability. However, this is challenged. According to Talberth (2010) GDP is inadequate to measure the sustainability and it lacks the ability to indicate the depletion and degradation of different types of capital such as natural, human, manufactured or social capital. Today, it is clear that there is a need to redefine the sustainability indicators. Nevertheless, there is neither sufficient body of research nor global consensus for such measures.

In this paper, we will examine concept of total capital stock and the difficulties of measuring it. We will first look at the factors of production and types of capital. Then we will clarify as to what is meant by weak and strong

sustainability in economic theory. Finally, we will examine the difficulties of accurately quantifying the total capital stock.

In classical economic theory, there are three factors of production: land, labour and capital. Capital is used to produce other goods and unlike the raw materials it is not used immediately in the production process. Today capital stock has a broader definition. Ekins (1992) classifies capital stock in four different categories: (i) manufactured, (ii) human, (iii) social/organizational, and, (iv) natural capital. In addition, financial capital can be added to this list as a 5th category of capital stock (2008, p. 5). Each of these stocks is used to produce goods and/or services which are used as either final products or inputs in the production process.

Ekins et. al. (2003) defines the manufactured capital as the capital which includes tools, machines and infrastructure that is used for producing goods and not used up immediately. That is, manufactured goods can last more than one year and generally they cannot be seen as a part of final product. Human capital is the other type of capital stock which involves “ the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being” (OECD, 2001, p. 18). Social capital may be the most difficult category to define. Schuller (2011) depicts social capital as networks which mainly contain relationships within and between these networks. Finally, as stated in UN (1993, p. 8) report “ the assets of the natural environment that are-directly or indirectly, actually or potentially- affected by human activities are called natural assets or natural capital”. Moreover, Harte (1995) points out that “ the environmental stocks that provide environmental goods and services are

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natural capital, and the flows of goods and services are natural income". Additionally we can enhance this definition by classifying natural capital according to its renewable capacity as renewable and non-renewable. With the increase in the awareness of sustainability concept, all these types of capital have started to feature in new approaches of calculation of sustainable growth and development unlike the first neo-classical economic growth models.

Turner (1993) identifies four different kinds of sustainability, ranging from very weak to very strong. The main determiner in Turner's classification is the substitution level of capital stocks. For instance, if one type of capital can be substituted with another easily this is labelled as very weak sustainability. In this paper, we classify sustainability in two groups: weak and strong.

Rennings and Wiggering (1997) state that " Monetary indicators can be characterised as indicators of weak sustainability because they assume that manufactured and natural capital are close substitutes". In weak sustainability approach each type of capital stocks is converted to monetary values, allowing easy conversion and comparison of one type of capital to another. Thus a decrease in one type of capital, say, natural capital like forest damage can be compensated by an increase in another type of capital like manufactured capital.

In the strong sustainability approach, on the other hand, each capital stock is assessed separately and it is necessary to keep each of them above the critical level. Unlike in the weak sustainability, natural capital cannot be substituted by other types of capital stocks (Dietz & Neumayer, 2007).

Strong sustainability approach has an advantage compared to the weak sustainability; in this method, one may leave a stock of natural capital to the future generations not smaller than the one he consumes (Gutes, 1996).

The challenge for both weak and strong sustainability approaches is defining the indicators and measuring capital stock adequately. Stiglitz et. al. (2009) point out the inadequacy of frequently used figures to measure the sustainability. They give traffic jams as an example of this problem. Traffic jams increase the consumption of gas which can be interpreted as an indication of growth in economy. However, this happens due to lack of information and inappropriate use of statistics because traffic jams cause too much use of gas which damages the air quality and decrease the natural capital stock. Moreover it has adverse impacts on human capital which is very important for human well-being. Thus economists should be very careful when they are developing their production functions to avoid misleading measurements and/or measurement misinterpretation. Payson (1997) states that the measurement of physical capital by economists is insufficient because it is unclear, metaphysical, underutilized and out of date. This difficulty appears more clearly while measuring the sustainability in terms of both weak and strong sustainability approaches.

Dietz and Neumayer (2007) state that renewable and non-renewable natural resources were included into Cobb-Douglas production function by Hartwick-Solow model in the 1970s. In this model it is assumed that natural capital and manufactured (produced) capital are alike and they can be substituted easily. This model can be given as an example of weak sustainability approach. According to Stiglitz et. al. (2009) weak sustainability approach <https://assignbuster.com/weak-vs-strong-sustainability-economics-essay/>

provides an easy means of measuring sustainability; however, it has very significant limitations that have to be taken into account. The most important disadvantage of this approach is the lack of markets which are needed for valuation of assets. Valuation is important because each type of capital has to be described with a common unit which is possibly money (UN, 2008, p. 5). Moreover, even if these markets were to exist, there is not any guarantee that they will reflect the accurate value of capital because there is no guarantee that they will function appropriately as defined in economic theory. Furthermore, some natural capital is labelled as “critical” which means it is impossible to represent it in monetary terms; thereby it is impossible to substitute it with other types of capitals. Because of these reasons there is still a huge gap in measuring the true value of natural capital. Thus economic models tend to depend on manufactured capital, financial capital and human capital (labour) which are comparatively easy to measure. However, there are some new approaches which include environment to measure the sustainability.

The need for a new indicator to measure the sustainable growth and development resulted in environmentally adjusted net domestic product (EDP). This indicator is “obtained by subtracting the cost of natural resource depletion and environmental degradation from net domestic product” (Glossary, 2011). Measuring the depletion of natural capital is even more complex than it seems. TEBB (2009) indicates that there is not any unique and devoted system to measure, monitor and report the natural capital. In an ecosystem all components are closely linked with each other. Thus, in order to measure the depletion or degradation accurately all mechanism

should be taken into account. Talberth (2010) states deforestation problem as an example of this issue. When we lose forest we do not just lose forest. We also lose the future clean water supplies which are very prominent part of natural capital. Moreover if this happens it is more likely a need will occur to facilitate some manufactured and human capital into acquiring the fresh water from different sources. However, it is very difficult to precisely determine how much fresh water will disappear or how much ecosystem will be damaged by deforestation in order to calculate the exact capital depreciation. Ranganathan and Talberth (2010) states that in spite of measurement difficulties, accurately measured natural capital stocks for sustainable development is very important because success of economic activity mostly depends on the quantity and quality of natural capital stock. On the other hand some forecasting methods can be used to predict the depreciation. Nevertheless, the findings can only be indicative of the actual depletion or degradation measures but no one can guarantee their correctness

Measuring the natural capital is not the sole difficulty to tackle. Quantifying the human capital and social capital also have similar problems. According to Schuller (2011) human capital is measured by skills that are gained throughout life (by education or experience). This measurement approach for human capital is generally used by the analysts. However its inadequacy is acknowledged by the experts. Evaluating social capital is more complicated than measuring human capital. It is mainly measured in terms of attitudes, moral standards or participation level in social life. It is clear that

representing this kind of values in terms of a monetary unit is almost impossible.

Another problem which economists have to tackle when measuring the capital stock is the externality problem. According to Perrlof (2008, p. 600) 'an externality occurs when a person's well-being or a firm's production capability is directly affected by the actions of the other consumers or firms rather than indirectly through changes in prices'. Externality cannot be priced in the market system. In return it may cause problems in determining the true cost or price of a capital stock. Stiglitz et. al. (2009) states that if pollution occurs (for instance, carbon emission as a type of externality), market prices do not reflect the actual values because prices/costs do not include the negative effect of pollution. Thus, in order to measure the adequate capital stock value, we should be aware of the externality problem and its effects on economy and nature.

In conclusion, sustainability has three interrelated aspects: economic, social and environmental. Thus theoretical models have to take into account these three features in order to measure the accurate level of growth and/or development. In economics, especially in environmental economics, the main concern is defining a new concept for a set of indicators which can provide sustainability. In this process the fundamental difficulty is measuring the total capital stock accurately. It is clear that new concept should include all types of capital stock (particularly natural capital). However it is very demanding and sometimes impossible to measure capital stock accurately. Converting all types of capital stock into a single unit such as money is generally impossible. Moreover, sometimes it is useless and it may result in

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even bigger issues because the conversion may not be accurate due to the insufficient conversion methods and lack of data. We have to notice that there is a need to redefine our indicators based on all types of capital stocks. It is probably understatement to suggest that a significant amount of research is still needed into measuring the total capital stock accurately.