

ENERGY AS THE NUMÉRAIRE OF ANY GIVEN ECONOMY FOR DESCRIBING THE PHASE OUT OF A NON-RENEWABLE ECONOMY BY ITS PHYSICAL UNITS.

Olaf SCHILGEN

John-F.-Kennedy-Place 5, 38100 Braunschweig, Germany
wea@schilgen.com

ABSTRACT

(1) Overview

The actual economic theories are based on money as the unit of accounting, measuring and exchange. Even natural resources are normally monetized by a given exchange rate in a given money system (Dollar, Euro or else).

Instead of any monetary numéraire this paper discusses the use of the necessary amount of energy for producing the common and capital goods as a really measurable physical unit as the numéraire for any given macro economy. It sets a real and measurable characteristic of all kind of economics as the numéraire.

This puts a real measurable physical unit below the glue of all price labels. It sets a definition of any given economy in a real physical unit below the price level for the accounting of the GDP.

This now allows to describe the phase out of running the economy out of stock (of fossil fuels as the driver of the economy) and to describe the unavoidable need to describe and follow the necessary path of phasing in to an economy running and driven on and by a continuously available source of energy (instead of surprisingly running out of stock of fossil fuels as the driver of the economy).

This method makes the limits of growth measurable and predictable by physical real world constrains and evolves the economic theory to a real world based definition.

(2) Methods

This paper discusses the usage of energy as the numéraire instead of using a given currency. Energy here means only the productively used part of the total energy used in that given economy.

Using the productively used energy part of the total energy consumption as the numéraire of any given economy means in other words having a unit of a real physical characteristic of a macro economy.

Why energy as numéraire?

Because the energy could be seen as 'the' core production factor since it is contained in every single step of economic doing. Without energy to do each single step of all kind of production processes there is no doing at all. Without the flow of energy there is no economy possible. By this method it is possible to really measure and also to predict in physical units the size of any given economy by its total amount of productively used energy.

(3) Results

An economy totally based on the availability of fossil fuels is not only limited in the total maximum size (maximum peak output of fossil energy) but also limited on a given time period (maximum total output of fossil energy).

The limit is twofold. It is on the one hand the maximum available fossil fuel in a shorter time frame for being used for running the economy (producing goods) and on the other hand the limit is also the maximum total size over a longer timeframe because of the limited total available fossil fuels to be used and therefore describes the maximum timespan of this fossil fuel energy based economy.

Using the energy as the numéraire of the economy means to have a defined scale for the real measurable description of the core characteristic of any given economy, a scale for the amount of energy used to produce all kind of capital and common goods of to deliver services.

Switching to a renewable energy resource is nothing but switching from a limited economic fuel (maximum total output of fossil energy) to an unlimited economic fuel (with no maximum total output of the renewable energy in sight from a human perspective).

(4) Conclusions

This is a qualified step forward since it is now possible to argue, to measure, and to define the limits of growth for an economy running out of stock of fossil fuels.

It is now possible to exactly define and predict the limits of growths for an economy driven by the out of stock fuel, namely fossil fuels and/or nuclear fuels as well.

With energy as the physically defined and measurable numéraire below the price label glue of neoclassical economic theories it is now possible to argue in physical units about the pure need of phasing out the out of stock economy and to phase in to an economy run by renewable energy.

References

- Ayres, Robert U.; Warr, Benjamin (2004) "Accounting for Growth: The Role of Physical Work", *Center for the Management of Environmental Resources INSEAD*, <http://www.abundancedebunked.com/downloads/Ayres-TheRoleOfPhysicalWork.pdf>
- Ayres, Robert U.; (2011) "Energy and Economic Growth", *Lecture for SEAI seminar in Dublin*, http://www.seai.ie/news_events/previous_seai_events/energy%20security%20and%20global%20economics%20seminar%20oct/robert%20ayres.pdf
- Georgescu-Roegen (1979) "Energy Analysis and Economic Valuation", *Southern Economic Journal* 4, page 1023–1058, http://85.204.47.15:8080/library/bitstream/10491/82/1/NGR_1979.pdf
- Georgescu-Roegen (1986) "The Entropy Law and the Economic Process in Retrospect", *Eastern Economic Journal*, Vol. 12, issue , page 3-25, http://college.holycross.edu/RePEc/ej/Archive/Volume12/V12N1P3_25.pdf
- Hall, Charles A.S.; Klitgaard, Kent A., (2012) "Energy and the Wealth of Nations", *New York, Springer*, p. 134 – 248
- Kümmel, Rainer (2011) "The Second Law of Economics, Energy, Entropy, and the Origin of Wealth", *New York Heidelberg, Springer*
- Kümmel, Reiner; Ayres, Robert U.; Lindenberger, Dietmar, (2010), "Thermodynamic Laws, Economic Methods and the Productive Power of Energy", *Würzburg*, http://www.ewi.uni-koeln.de/fileadmin/user_upload/Publikationen/Zeitschriften/2010/10_07_01_Lindenberger_Lawmethods.pdf
- Lindenberger, Dietmar; Eichhorn, Wolfgang; Kümmel, Reiner (2001) „Energie, Innovation und Wirtschaftswachstum“, *ZfE - Zeitschrift für Energiewirtschaft*, Heft 25, p. 273–282
- Morris, Ian (2010) "Why the West rules - for now, the patterns of history, and what they reveal about the future", *New York, Farrar, Straus and Giroux*, p. 35
- Schilgen, Olaf (2013-1) "Energy as the Numéraire of any given economy", *World Economics Association (WEA), Conference No.1 2013, Conference on the political economy of economic metrics: 28th January to 14th March, 2013*.
- Schilgen, Olaf (2013-2) "What do you pay for when you buy fossil oil", *ResearchGate discussion May 14, 2013*, https://www.researchgate.net/post/What_do_you_pay_for_when_you_buy_fossil_oil
- Tverberg, Gail, (2012-1), "Evidence that Oil Limits are Leading to Declining Economic Growth", <http://ourfiniteworld.com/2012/07/13/plan-for-lower-growth-in-real-gdp-going-forward/>
- Tverberg, Gail (2012-2) "How energy shapes the economy", <http://ourfiniteworld.com/2012/09/03/how-energy-shapes-the-economy/>
- Tverberg, Gail (2012-3) "The close tie between energy consumption, employment, and recession", <http://ourfiniteworld.com/2012/09/17/the-close-tie-between-energy-consumption-employment-and-recession/#more-36088>