Heun et al Cpt2\_Second pass

You need Barry quote…

who blame stagnation in the CONVENTIONAL factors of production

(manufactured capital, labor, and technology –ALL INTRINSIC TO THE ECONOMY ) for the bleak situation.

p.n27 bot Introduction (Chapter 1) contaied much CONTAINED

2.2.1 by the Best-First Principle (Section 1.4.2) check to see if still appropriate

Fig. 2.1 In the traditional ECONOMIC model, the economy is represented as a circular flow of goods and

services between two sectors. Producers manufacture goods and services by taking in labor and

capital. Consumers exchange labor for wages which are used to purchase the goods and services

of the producers. THERE ARE NO CONNECTIONS TO THE BIOSPHERE. We use energy circuit diagrams to represent the flow of materials, energy and information.[7]

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OK I AM HAVING A PROBLEM WITH THE FOLLOWING: NOT THAT ITS WRONG OR BAD, BUT THE “IN OUR OPINION” SEEMS TO IGNORE THAT IT WAS ALSO IN THE OPINION OF MANY OTHERS FOUR DECADES AGO: HOWARD Odum (1973) myself (1986) , Hemut Haberl and Maria Kowal---; others. Replace with “In our oponion, and that of others ( Odum ….).

2.2 The economy is society’s metabolism

In our opinion, an apt metaphor for the economy in the age of resource depletion

should provide for robust interaction and suggest tight coupling between the biosphere

and the economy. Specifically, it should account for the following facts about

real economies. Economies:

1. intake material and energy from the biosphere

2. exchange materials, energy, and information internally

3. discharge material and energy wastes to the biosphere

4. are a↵ected by energetic costs

5. are a↵ected non-linearly by scarcity in the face of low substitutibility

6. can change non-linearly or in discrete steps with the potential for structural

transformation

7. accumulate embodied energy in material stocks, and

8. maintain organizational structure despite changes in their environment.20

19 See England [31] for a starting point.

20 We note that several areas of the literature speak to the items in this list. Materials Flow

Analysis (MFA) and Economy-Wide Materials Flow Analys (EW-MFA) stress the importance

of material intake by the economy. (See Section 3.5.) The Input-Output (I-O) method highlights

the e↵ects of internal exchanges of material and information with economies. (See Chapter 7.)

Life-Cycle Assessment (LCA) techniques focus attention on otherwise-neglected wastes. (See

Section 7.6.) Net Energy Analysis (NEA) predicts that energy resource scarcity reduces Energy

Return on Investment (EROI) and increases energy prices. (See Sections 4.3 and 9.4.) The Energy

While I am at it there are a lot of issues in this chapter that I feel I was the originator (EROI – It was not my student Cleveland --although he contributed a lot) and felt that Hall et al. 2001 was a better and sometimes earlier critiquer of t he failure of conventional economics to be consistent with the laws of physics etc (not to mention Mirowski, and Georgescu Roegan and Herman Daly. I know there are many who have done this, but your list seems a bit strange or empty to me. You can fix this easily by adding in some of these others as a second reference of the ones you use.

You say this little later: 32–37], Although we’re not the first to suggest the metabolism metaphor for the economy we believe that the metabolism metaphor is underutilized on both practical and theoretical levels. Maybe just put this near the start of the section…

On a theoretical level, the metabolism metaphor is underutilized, because most researchers

(with the exception of Giampietro [33, 34]) (also Odum1973 etc. Hall et almm1986 metc

Fig 2.3 is good, might add to legend see also figure 3 I think in Hall et all 2001 orm5.3 Hall and Klitgaard

highlight the important physical role of RESOURCE EXTRACTION AND manufactured capital stock

by considering anabolism (capital formation), catabolism (energy CONSUMPTION ), autophagy (recycling), and issues of scale. Thereafter, we summarize the benefits of the metabolism metaphor

for national accounting.

How can catabolism be production???

The economic analog to biological anabolism is capital formation, net addition

to the stock of capital ( AND I NFRASTRUCTURE MORE GENERALLY) within a period of time.

2.2.2 Catabolism (energy production???? CONSUMPION OR USE???)

2.2.4 Issues of scale

The metabolism metaphor brings to light issues of scale (size) for economies and

societies. First, scale is directly related to material flow rates. Larger organisms

consume food at higher rates (ALTHOUGH SMALLER RATES PER GRAM), in part to obtain essential nutrients to replenish cellular structures.

Fig. 2.5 Kleiber’s law for metabolic rates (heat production) of di↵erent-sized animals [40, p.530].

Larger animals, as determined by mass, have a higher metabolic rate, but the relationship between

mass and metabolic rate is not linear.

\*\*\*\* Do we need to obtain permission to use this figure? \*\*\*\* It is so old I would think not

2.3 New national accounting

Society needs to respond to the material and energy shortages that we now face

(Chapter 1), and part of that response should involve more-comprehensive national

accounting guided by a deeper understanding of the real BIOPHYSICAL economy gained

p. 39-40 good questions

Throughout the methodological chapters (3–7), our accounting framework is

developed through a series of increasingly-disaggregated models of the economy (Table

2.1), USING THE SME MODEL STRUCTURE AS MUCH AS POSSIBLE. We use the US auto industry as a running example for application and

discussion.