

Ecological Macroeconomics – next steps

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MACROECONOMIC
MODELLING WITH BINDING
RESOURCE CONSTRAINTS

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Binding resource constraints & sustainability

Weak vs. strong sustainability (Neumayer, 2002):

Weak: Natural capital and man-made capital are substitutes (ALSO in utility/welfare !) → income and capital stock growth can always potentially compensate for externalities

Strong: Binding resource constraints concern different ecological dimensions: availability of resources as inputs for production/consumption, absorption capacity of natural media, avoiding damages vs. resilience

Weak sustainability: social welfare functions

Weak vs. strong sustainability:

C

$$U_j = A_j^{(1-\delta)} M_j^\delta \Omega$$

$$\Omega_j = \left[1 + \theta_1 (E_j + E - \ell_j^N / \varphi) \right]^{\theta_2}$$

nnn

Bicknell, et.al. (1998), Ferng (2001, 2002),

Lenzen and Murray (2001, 2002, 2003)

Wiedmann, et.al. (2006)

The Ecological Footprint (EF) & input-output

The EF-concept (Wackernagel, Rees, 1996):

Converting all environmental and resource problems into ‘*bioproductive land*’ that would be necessary for (strong) sustainability = EF and comparing EF with ‘Biocapacity’ → “*Ecological Deficit*”

Linking EF & input-output

Bicknell, et.al. (1998), Ferng (2001, 2002),

Lenzen and Murray (2001, 2002, 2003)

Wiedmann, et.al. (2006)

Conclusions

Leontief's pollution model (1970) delivers a monetary measure for not exceeding Biocapacity

GDP share of costs of eliminating Ecological Deficit rises c.p. with economic growth (Biocapacity = resource constraint)

Empirical results for UK: numerical example of the concept, exact numbers sensitive to assumptions about elimination technology