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Alternative Measures of the Value of Resource Rent and Natural Capital in Constant Prices

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Under the capital approach, development is sustainable only when total, or 'inclusive,' wealth is non-declining: $K_{t+1} \geq K_t$, and for countries with growing populations, non-declining per capita wealth, where inclusive wealth is defined as the sum of produced assets, K_P, natural capital, K_N, human (and social) capital, K_H, and net foreign financial assets, K_F.

Implementation of this measure of sustainability requires that wealth be measured in volume/constant prices. While there are well-established methods for volume estimates of produced capital, there is no agreement on how to construct volume estimates of natural capital. This topic was not addressed in the recent revision of the SEEA, and remains a major methodological question that needs to be addressed if the SEEA is to provide macroeconomic indicators of sustainable development.

Two different approaches have been proposed for constructing a volume measure of natural capital, one which is production-oriented and the other which is income-oriented.

The Australian Bureau of Statistics, taking the production approach, treats the annual unit rent as the price of the asset. Constant price asset accounts are then obtained by applying the price for the benchmark year to physical accounts throughout the times series (Johnson, pers.comm.). This method may present practical problems of interpretation for natural resources with highly variable unit rent. Even when price averaging is used, there may still be years when the price is negative or zero. If such a year were chosen as the benchmark year, the constant value of natural capital would be zero for the entire time series.

An alternative, income-based approach approach, which was endorsed at the Workshop, Putting Theory to Work: The Measurement of Genuine Wealth[2] deflates current-price unit rent using the GDP deflator[3] to represent the changing purchasing power of rent over time, similar to deflating financial assets or wages.

The two alternative methods can produce rather different results. This may create problems for developing countries where natural capital comprises a large share of

[1] An earlier version of this note was presented at the Workshop, Putting Theory to Work: The Measurement of Genuine Wealth, 25-26 May 2002, Stanford University.
[2] The workshop was attended by K. Arrow, G. Ashiem, P. Dasgupta, L. Goulder, K. Hamilton, G. Heal, K. Maler, M. Weitzman.
[3] There was some discussion at the workshop whether CPI should be used instead of GDP deflator.

wealth. An example of the extent of these differences and the implications for measures of sustainability are provided, based on wealth accounts for Botswana and Namibia. The Botswana natural capital accounts include only minerals, dominated by diamonds. The Namibian natural capital accounts include minerals and fisheries.

For Botswana, the two methods of deflation result in the same positive trend over time. But for Namibia, the two approaches result opposite trends: a loss of natural capital in one case (GDP deflator) and growth of natural capital in another (constant unit rent).

The effect on the indicator of sustainable development, inclusive wealth, will depend on the share of natural capital in total wealth.

Table 1. Change in constant value of natural capital in Botswana and Namibia using alternative methods of deflation, 1980 to 1998

	Change in asset value using:	
	GDP deflator	**Constant unit rent**
BOTSWANA (change between 1980 and 1997, in 1993/94 prices)		
Mineral wealth	**457%**	**271%**
NAMIBIA (change between 1980 and 2001, in 1995 prices)		
Total natural capital **of which:**	-29%	30%
Mineral wealth	-57%	26%
Fisheries wealth*	33%	77%

* figures for fisheries date from 1990 only, when Namibia gained control over its fisheries.
Source: Author's calculations.