

ADJUSTED NET SAVING AS A PERCENTAGE OF GROSS NATIONAL INCOME		
Economic development	Macroeconomic performance	

1. INDICATOR

(a) **Name:** Adjusted Net Saving (ANS) as a percentage of Gross National Income (GNI).

(b) **Brief Definition:** Adjusted net saving is derived from the standard national accounting measure of gross saving by making four adjustments: (i) consumption of fixed capital is deducted to obtain net national saving; (ii) current public expenditure on education is added to account for investment in human capital; (iii) estimates of the depletion of a variety of natural resources are deducted to reflect the decline in asset values associated with extraction and depletion; (iv) deductions are made for damages from carbon dioxide and particulate emissions. The indicator is then computed by dividing ANS by GNI.

(c) **Unit of Measurement:** %.

(d) **Placement in the CSD Indicator Set:** Economic development/ macroeconomic performance.

2. POLICY RELEVANCE

(a) **Purpose:** Adjusted net saving provides a measure of a country's sustainability by measuring the change in comprehensive wealth during a specified accounting period. In particular it provides a test to check the extent to which today's rents from a number of natural resources (i.e. change in natural capital) and changes in human capital are balanced by net saving (i.e. change in man-made capital), that is, this generation's bequest to future generations.

(b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** Adjusted net saving measure the change in value of a specified set of assets, excluding capital gains. If a country's net saving is positive and the accounting includes a sufficiently broad range of assets, economic theory suggests that the present value of social welfare is increasing. Conversely, persistently negative adjusted net saving indicates that an economy is on an unsustainable path.

(c) **International Conventions and Agreements:** None.

(d) **International Targets/Recommended Standards:** For developed and developing countries, adjusted net saving should not be negative. This constitutes a necessary condition for sustainability.

(e) **Linkages to Other Indicators:** This indicator is particularly linked with the other national accounting measures such as gross national income, gross saving and net saving. It builds upon the SNA by accounting for natural resource depletion and human capital net changes.

3. METHODOLOGICAL DESCRIPTION

(a) **Underlying Definitions and Concepts:** **Gross savings** are the difference between gross national income and public and private consumption, plus net current transfers. **Consumption of fixed capital** represents the replacement value of capital used up in the process of production. **Net savings** are gross savings minus the value of consumption of fixed capital. **Education expenditure** refers to public current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment. **Energy depletion** is the product of unit resource rents and the physical quantities of energy extracted. It covers coal, crude oil, and natural gas. **Mineral depletion** is the product of unit resource rents and the physical quantities of minerals extracted. It refers to tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. **Net forest depletion** is the product of unit resource rents and the excess of roundwood harvest over natural growth. **Carbon dioxide damage** is estimated to be \$20 per ton of carbon (the unit damage in 1995 U.S. dollars) times the number of tons of carbon emitted. **Particulate emission damage** is the willingness to pay to avoid mortality and morbidity attributable to particulate emissions. **Adjusted net savings** are net savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage.

Gross national income (GNI) is the sum of value added by all resident producers plus any taxes (less subsidies) not included in the valuation of output, plus net receipts of primary income (compensation of employees and property income) from abroad.

(b) **Measurement Methods:** Measurement of adjusted net saving (ANS) is based on standard national accounting concepts. Adjusted net saving is obtained using the following identity:

$$\begin{aligned} & \text{Gross national saving} \\ & - \quad \text{Consumption of fixed capital} \\ & = \quad \text{Net national saving} \\ & \quad + \quad \text{Education expenditure} \\ & \quad - \quad \text{Energy depletion} \\ & \quad - \quad \text{Mineral depletion} \\ & \quad - \quad \text{Net forest depletion} \\ & \quad - \quad \text{Damage from carbon dioxide emissions} \\ & \quad - \quad \text{Damage from particulate emissions} \\ & = \quad \text{Adjusted net saving} \end{aligned}$$

Note: all the terms are expressed as percent of Gross National Income (GNI)

(c) **Limitations of the Indicator:** The exercise treats **public education expenditures** as an addition to savings effort. The adjustment made to savings goes in the right direction. However, the reader should bear in mind that current expenditure of \$1 on education does not necessarily yield \$1 of human capital. The calculation should also consider private education expenditure, but data are not available for a large number of countries. The accounting of natural resource depletion and pollution costs still has some gaps. Key **estimates missing on the resource side** include the value of fossil water extracted from aquifers, net depletion of fish stocks, and depletion and degradation of soils. The **energy and mineral depletion** figures are part of a range of depletion estimates that are possible depending on the assumptions made about future quantities, prices, and costs, and there is reason to believe that it is at the high end of the range. Because the **net forest depletion** estimates reflect only timber values, they ignore all the external and nontimber benefits associated with standing forests.

(d) **Status of Methodology:** The methodology is kept under review by the World Bank.

(e) **Alternative Definitions/Indicators:** Adjusted net saving has been referred to as 'genuine saving'.

4. ASSESSMENT OF DATA

(a) **Data Needed to Compile the Indicator:** GNI, consumption of fixed capital, current education expenditure. For energy and minerals: extraction volumes, price, cost of extraction. For forest: roundwood production, price, cost of production. For carbon dioxide damage: emission levels. For particulate emissions damage: concentration levels, dose-response relationship, baseline mortality and morbidity data, value of a statistical life.

(b) **National and International Data Availability and Sources:** The data is published by World Bank in World Development Indicators (Table 3.15).

(c) **Data References:** World Bank, *World Development Indicators*; World Bank, *Little Green Data Book*.

5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) **Lead Agency:** The lead agency is the World Bank. The contact point is the Environment Department, World Bank; e-mail eadvisor@worldbank.org.

(b) **Other Contributing Organizations:** None

6. REFERENCES

(a) **Readings:**

World Bank, *World Development Indicators 2007*. World Bank: Washington DC.
Katharine Bolt, Mampite Matete, and Michael Clemens, 2002, *Manual for Calculating Adjusted Net Savings*, Environment Department, World Bank: Washington DC.

(b) Internet sites:

www.worldbank.org/environmentaleconomics

<http://go.worldbank.org/3AWKN2ZOY0>