Gross and net measures of the UK economy

Explains the concepts of gross domestic product and net domestic product in understanding production, welfare and sustainability.

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1 . Main points

- Gross domestic product (GDP) is a production concept which captures the value added through the production of goods and services in an economy, the income that is earned from that production, and the expenditure on final goods and services that are produced domestically; gross national income (GNI) is a measure which includes the income earned by a country, regardless of where it is earned.

- Net domestic product (NDP) reflects the level of resources that are available for consumption, where it is a proxy of the level of consumption that can be maintained while leaving capital assets used for production intact by taking depreciation into account. NDP is more appropriate than GDP from a welfare and sustainability perspective.

- One proposal under consideration for the 2025 System of National Accounts (SNA) is to consider recording the depletion of natural resources as “a cost of production”, which would bring some of the environmental implications of the depletion of natural resources into our estimates of NDP; this would capture the consumption of natural resources as part of the production process.

- A future Office for National Statistics (ONS) work programme will consider how best to improve the timeliness, frequency, and accuracy of net measures in the UK National Accounts, including the recording of the depletion of natural resources, as part of capturing production, welfare, and sustainability considerations in the UK National Accounts.

2 . Measuring the UK economy

Gross domestic product (GDP) is widely recognised as a measure of economic activity, but is a production concept only, and captures the value added through the production of goods and services in an economy. It also reflects the income that is earned from that production and the expenditure on final goods and services that are produced domestically. However, production is not the same as economic welfare or environmental sustainability.

There are some activities that increase GDP but do not make a country better off. Likewise, there are some activities that reduce the level of resources that are available for future consumption. For example, the deforestation of the Amazon rainforest would lead to higher levels of GDP from a production perspective, reflecting the sale of timber. However, this change in GDP would not reflect the environmental cost of reducing the stock of natural capital, which are of relevance from a welfare and sustainability perspective.

We explain how these wider considerations of the economy are reflected in the UK National Accounts, specifically the concept of net domestic product (NDP). We also refer to how the ”depletion of natural resources” could be included, which would capture the environmental impacts of producing GDP.

3 . Concepts

From a welfare perspective, there are some users that prefer indicators that focus on income rather than production, such as gross national income (GNI). This includes the income earned by a country, regardless of where it was earned. For instance, GNI includes the labour income that is earned by domestic residents who live inside the UK but work abroad. It is then adjusted for the labour income that is earned by foreign residents who live abroad but work in the UK. GNI would also reflect the income that is received from and paid to the rest of the world. For example, it includes the interest, dividends, and the retained earnings of foreign enterprises that are owned by UK resident enterprises. It also reflects the interest, dividends, and the retained earnings of UK enterprises that are owned by foreign resident enterprises. GNI is the total domestic and foreign output claimed by residents of a country.

This manifests as:

$$Gross\ National\ Income\ =\ Gross\ Domestic\ Product\ +\ Net\ Foreign\ Factor\ Income$$

GDP reflects the total value of goods and services provided within a country in a reference period. However, this includes output that is produced to replace those capital assets that are consumed as part of the production process. There are also some who prefer net indicators from a welfare and sustainability perspective, such as NDP to GDP or net national income (NNI) to GNI. The distinction between ”gross” and ”net” reflects that the value of fixed assets falls over time, as there is wear and tear as well as obsolescence of the capital stock as being part of the production process. This is known as capital depreciation, or the "consumption of fixed capital", in National Accounts.

It is not necessarily welfare enhancing if there is an increase in GDP which simply maintains existing levels of capital stock. NDP reflects the level of resources that are available for consumption by taking depreciation into account. It also is a rough proxy of the level of consumption that can be maintained while leaving capital assets intact, which is important from a sustainability perspective.

These can be calculated as:

$$Net\ Domestic\ Product\ =\ Gross\ Domestic\ Product\ -\ Consumption\ of\ Fixed\ Capital$$

$$Net\ National\ Income\ =\ (Gross\ Domestic\ Product\ +\ Net\ Foreign\ Factor\ Income)\ -\ Consumption\ of\ Fixed$$

The following list provides information on these gross and net concepts, including on their timeliness and frequency as part of the UK Annual National Accounts, reflecting some of the practical challenges around estimating the capital stock in the UK, and so the recording of the consumption of fixed capital. That is, how much of that capital stock is consumed through wear and tear as well as obsolescence in a period as part of the production process.

The indicators include:

- gross domestic product (GDP), which captures the total value of goods and services produced within a country with a focus on production, with a timeliness of t plus 6 weeks in the First Quarterly Estimate, t plus 13 weeks in the Quarterly National Accounts, and t plus 18 months in the Annual National Accounts

- gross national income (GNI), an indicator of welfare, captures the total income earned by a country regardless of where it was earned with a timeliness of t plus 13 weeks in the Quarterly National Accounts and of t plus 18 months in the Annual National Accounts

- net domestic product (NDP), an indicator of production, welfare, and sustainability, captures the depreciation of fixed assets used in the production process domestically, with a timeliness of t plus 18 months in the Annual National Accounts

- net national income (NNI), an indicator of welfare and sustainability, which captures the depreciation of fixed assets used in the production process nationally, with a timeliness of t plus 18 months in the Annual National Accounts

- adjusted net national income (ANNI), which is a broader measure of national income that would account for the depletion of natural resources by reflecting the decline in asset values associated with consuming natural resources; this is currently not produced as part of the UK National Accounts.

In the UK, we produce estimates of the gross and net capital stock once a year, which is available by asset and industry. The gross capital stock captures the amount of non-financial assets with a lifespan of more than a year, which contribute to the production of goods and services. The net capital stock reflects the depreciation of these non-financial assets in a year. It is this consumption of fixed capital that enables us to produce an estimate of NDP.

4 . The depletion of natural resources in the national accounts

The depletion of natural resources in the National Accounts is not currently recognised as a cost of production. Consumption of fixed capital is estimated for all fixed assets owned by producers, where these fixed assets have been produced as outputs from production processes. This does not cover the depletion of natural assets, which would cover land, coal, oil, or natural gas, for instance.

One proposal for the forthcoming 2025 System of National Accounts from the United Nations (UN) Stats guidance note (PDF, 414KB) is to “record depletion of natural resources as a cost of production”, which would bring this into scope of the consumption of fixed capital. As such, it would then be recorded in estimates of NDP and NNI, which would capture the running down of natural resources as part of the production process.

One approach from the World Bank is to calculate adjusted net national income (ANNI) to improve understanding the environmental impacts of the production process in an economy. ANNI would complement the GNI and NNI indicators by providing a broader measure of national income that accounts for the depletion of natural resources, by reflecting the decline in asset values associated with consuming natural resources. This is analogous to depreciation of fixed assets.

This can be calculated as:

$$Adjusted\ Net\ National\ Income\ =\ Gross\ National\ Income\ -\ Consumption\ of\ Fixed\ Capital\ -\ Depletion\ of$$

By accounting for the consumption of fixed and natural capital depletion, ANNI, conceptually, better measures the income available for consumption. Issues to consider are what would be in scope as ”natural resources”, which reflect the stock of the UK’s natural capital assets. For example, this might include renewables, minerals, timber, and water in the UK.

As and when the depletion of natural resources is recorded as a cost of production in the National Accounts, ANNI will be equivalent to NNI.

5 . Reflections on the UK context

The economic indicators of net domestic product (NDP), net national income (NNI), and adjusted net national income (ANNI) offers a more comprehensive view of welfare and sustainability in the UK, while also supplementing the more traditional measures such as GDP and GNI. However, there are also inherent practical challenges which partly explain why they have not typically been widely used in how we consider the economy.

The process of moving from GDP to NDP relies on the accurate estimation of how much capital is consumed as part of the production process. We need to capture the accumulation of past purchases of capital assets over their estimated service lives to estimate the gross capital stock, where information is needed on the asset service life and its retirement distribution. We also need to know the depreciation function by asset type, which is essential to producing estimates of the net capital stock. This has been further complicated given the more prominent role of intangible capital, where it is harder to observe how much of that asset is depreciated over time.

Transitioning to NNI additionally requires being able to accurately measure cross-border income flows on international financial assets, particularly as the size of these flows have increased in a more globalised economy. ANNI requires a further adjustment for the environmental impacts of production, where it is particularly challenging to value not only the stock of those natural resources in a country but also how much these are depleted each year.

6 . Conclusions

The existing [2008 System of National Accounts (SNA)] already provides a comprehensive integrated framework to capture production, income, and expenditure, incorporating some economic welfare and sustainability concepts. The planned updates to the 2025 SNA will look to further enhance how both welfare and sustainability is captured.

There is no one indicator that will singularly meet user needs, while there are still wider dimensions to a nation's welfare and sustainability that need to be considered, such as the income distribution in an economy. It will also be important to consider international comparability, given it might be less straightforward to compare net domestic product (NDP), net national income (NNI), or adjusted net national income (ANNI), which go beyond a production concept.

We are looking to be more explicit in how we communicate the range of complementary gross and net indicators that are produced as part of the UK National Accounts. We recognise the importance of timeliness, frequency, and accuracy in offering equivalence between gross domestic product (GDP), gross national income (GNI), and the net measures of NDP, NNI and ANNI.

7 . Cite this methodology

Office for National Statistics (ONS), released 24 October 2023, ONS website, methodology, Gross and net measures of the UK economy