Article

Inclusive capital stock, UK: 2019 and 2020

Bringing together estimates of productive capital, natural capital and human capital, this article gives a picture of the UK's inclusive capital stock for 2019 and 2020.

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1 . Main points

- This article presents a bridging table, bringing together the assets in the National Accounts, the environmental assets in the natural capital accounts and the human capital stock to deliver a coherent and consistent picture of the inclusive capital stock.

- The UK's inclusive capital stock, including productive assets, environmental assets, human capital, and financial assets, was £72.5 trillion in nominal prices in 2020.

- The UK's inclusive net worth, including productive assets, environmental assets, human capital, financial assets and financial liabilities was £36.2 trillion in nominal prices in 2020.

- Environmental assets, as measured in the natural capital accounts, were worth £1.7 trillion in 2020, while human capital was worth £23.8 trillion or more than double the value of the traditional non-financial capital stock captured in the national accounts.

- While the table excludes certain data that are unavailable, such as environmental liabilities, and uses market prices and is therefore incomplete, it is presented to stimulate debate and inform future development.

2 . Measuring the data

Assets are central to economic life in the UK and come in a variety of forms. They are also measured in different ways under different accounting standards. This article presents a "bridging table" based on the UN System of Environmental-Economic Accounting's (SEEA) Table 11.2. This table is presented as a balance sheet, and brings together the productive assets in the national accounts, the environmental assets in the natural capital accounts and the human capital stock values to provide a coherent and consistent picture of the UK's wider range of assets. The total stock of all these assets has been labelled the "inclusive capital stock". Asset values for 2019 are used as the opening values and 2020 values are used as the closing values. These data have been presented to summarise what is currently possible with the data produced by the Office for National Statistics (ONS), to stimulate debate and inform further development work.

Inclusive capital stock and inclusive wealth (as defined in the [Dasgupta Review into the Economics of Biodiversity](#)) are not the same. Inclusive wealth is the social value of an economy's total stock of natural, produced and human capital assets, measured in accounting prices. Accounting prices (or shadow prices) reflect the true value to society of any good, service or asset. Accounting prices capture externalities, which are costs or benefits of an economic activity that are incurred by a third party.

Although labelled as inclusive capital stock, the data in this article are based on market prices rather than accounting prices. Financial assets have also been included in inclusive capital stock whereas financial assets are treated as enabling assets in inclusive wealth, which confer value to produced, natural and human capital by facilitating their use.

A value for inclusive net worth has also been calculated for 2019 and 2020. Inclusive net worth is distinct from net worth. Net worth, as calculated in the current UK national balance sheet, measures the value of produced assets, non-produced assets and financial assets less liabilities. Inclusive net worth, however, incorporates the value of environmental assets and human capital as additional components.

These data are essential to prepare the inclusive income measures we aim to publish in 2023, as outlined in our [Beyond GDP workplan](#) earlier this year.

There are three main capitals: productive capital (buildings, machines, ICT hardware and software and so on), which is captured in the national accounts, natural capital or environmental assets (freshwaters, land, oceans, minerals and the atmosphere), which is captured in the natural capital accounts, and human capital, which represents the skills and attributes embodied in people that enable the creation of economic, social and personal well-being. Financial assets are also calculated in the national accounts and have been included in this article.

These capitals are calculated in different accounts that follow different standards. The national accounts follow the [UN System of National Accounts](#) (SNA), the natural capital accounts follow the [UN System of Environmental-Economic Accounting](#) (SEEA), and human capital estimates follow the [UNECE Guide to measuring human capital](#). While these are designed to be generally consistent and coherent, the detail of how these data are produced is important to ensure no double counting occurs between the three frameworks. This prevents overestimation of the inclusive capital stock.

This article also describes those areas of detail where these standards, or their applications in the UK, require adjustment to provide a coherent picture when presented in a single table. More specifically, the article identifies where double counting of the same asset, or some aspect of the same asset, may exist between these accounts and needs to be resolved. The results are presented in Table 1, which unifies the available data into a single clear picture of the UK's inclusive capital stock beyond the national accounts' asset boundary to cover natural and human capital. Explanations of overlaps considered most beneficial to users regarding the key areas of detail include:

- recreation values related to land

- agricultural biomass

- permits for extraction of natural assets

- timber

- renewable energy resources

- mineral extraction

- fish capture

- fossil fuel extraction

It should be noted that some data are not currently available. Natural capital and human capital data are not currently available for 2021. Assets that are currently omitted from the national accounts stocks estimates are valuables, goodwill and marketing assets. In addition, uncapitalised intangible assets, which are currently not captured in the national accounts, have not been included. While ONS produces investment data, it currently does not produce stocks estimates for these data.

Subterranean ecosystems, environmental damage and liabilities are currently not measured in the UK natural capital accounts. Environmental damage covers non-market damage to the environment from economic activity, which should be netted off against the assets associated with that activity. For instance, the health damage from the stream of air pollution expected over the lifetime of those factories should be estimated and netted off against the value of those factories. Environmental liabilities are environmental assets, which have been degraded to the point at which they yield a net cost, such as the atmosphere changed by greenhouse gasses.

Table 1 also contains "transitional" ecosystem assets alongside marine ecosystem assets. These are ecosystem assets that transition from freshwaters to saltwaters and cannot be attributed to either freshwater or marine ecosystems.

Human capital stock values in this article are measured using the net present value of lifetime earnings of those of working age. ONS are currently developing estimates for the other aspects of human capital to estimate the full value of the UK's human capital asset.

3 . Key asset details

This section explains the challenge faced in certain areas and the methods used to generate Table 1. Users should note that as data collections and statistics evolve, some judgements may change, particularly in those instances where the decision to include an item has been taken on the basis that the equivalent concept in one of the other accounts is currently blank because of data gaps or similar reasons.

Recreation values related to land

In the UK, the value of land in the national accounts is calculated by a "residual" method. That is, the cost of rebuilding any buildings or structures on the property is removed from the total property value and the remainder, the "residual", is allocated to land.

This method, while under improvement to address new sources and methods to better align to the UN System of National Accounts (SNA) requirements (see our Improving estimates of land underlying other buildings and structures in the national balance sheet, UK: 2022 article), results in land values which vary noticeably by use, particularly between urban and rural land. This is because the residual method captures several factors, as shown in the following formula:

$$P = C + O + S + L + \varepsilon$$

Where P represents the price of the property, C represents the cost of rebuilding any buildings on the property, O represents the option value of being able to extend the existing building, or build additional buildings, S represents the shadow price of local amenities (for example, being in the catchment area of a good school drives up the price of properties), L is the pure value of land and is an error term which on average should be zero (for every house above average there will be another below average possibly for a range of reasons).

Using a residual method to calculate a residual factor, R, that removes the cost of replacing existing buildings, it can be seen that if:

$$P - C = R$$

(2)

Then, substituting equation (2) into (1):

$$R = O + S + L + \varepsilon$$

(3)

And hence taking expectations of both sides, which causes to equal zero:

$$E(R) = E(O + S + L)$$

(4)

While the national accounts contain R as the value of land, the natural capital accounts contain a value for the amenity value of green space. This can be considered a component of the shadow price, S, of local amenities. The natural capital accounts' amenity value currently excludes important factors such as road and rail connection, the quality of local schools and hospitals, the proximity of shops and so on. As such, this amenity value from the natural capital accounts is shown as a component of the national accounts' land value in Table 1 but does not completely account for all amenities. It has also been removed from the terrestrial ecosystems' asset value in Table 1 to prevent double counting.

Agricultural biomass

The national accounts and the natural capital accounts capture slightly different concepts in this area. The national accounts contain "cultivated biological resources" which, under the SNA 2008, cover "animal resources yielding repeat products and tree, crop and plant resources yielding repeat products whose natural growth and regeneration are under the direct control, responsibility and management of institutional units".

The natural capital accounts contain "agricultural biomass", defined as plant-based agricultural production plus natural grazing used in livestock production. While conceptually there should be no duplication, there is a question of whether there is empirical consistency, which requires an in-depth review of the exact nature of the data items contained in the Department for Environment, Food and Rural Affairs' (Defra) Annual Farm Business Survey, which is the source for the national accounts estimate. However, as cultivated biological resources are valued at £8.4 billion for 2020, or around 5.5% of agricultural biomass, at this time it can be assumed there is little to no double counting between the two estimates.

Permits for extraction of natural assets

The national accounts include the value of permits which have usually been issued by the government for the right to extract raw materials or other natural assets, whereas the natural capital accounts attempt to capture the total value of extracted assets.

An example of this is the relationship between the value of fish captured and the permits acquired by the fishing sector, which can be considered as follows:

Value of captured fish equals the cost of catching fish plus value of permit plus profit

These permits could be considered as a component, or an "of which" category, underlying the total value of fish, in the same way that the amenity value is a component of the value of land, as described previously.

However, because the national accounts do not currently contain a value for this type of permit, there is no double counting.

Timber

While the natural capital accounts contain a value for timber, this is currently not captured in the national accounts, so there is no risk of double counting.

Renewable energy resources

The national accounts capture the value of the machines and capital used to extract and generate the renewable energy resource. The natural capital accounts, however, remove the capital component in their estimates and measure the value of the resource itself. Therefore, there is no double counting between the two accounts here.

Mineral extraction

There is an important distinction between the data contained in the natural capital accounts and the national accounts for mineral extraction, namely that the national accounts will include the value of the machines used to mine the minerals, whereas the natural capital accounts capture the value of the mineral extracted itself, so there is no double counting to resolve. The national accounts also contain a value for mineral exploration which is geological and other similar activity to identify which mineral assets exist in which locations. However, this value is distinct from the value of the mineral itself so there should be no double counting. Due to the small size of mineral exploration we have not explored this further.

4 . Results

Table 1 presents the stock values for productive assets, financial assets, environmental assets and human capital for 2019 and 2020 as a balance sheet. This table is based on the UN System of Environmental-Economic Accounting (SEEA) Table 11.2.

Table 1: Capital stocks and net worth augmented to include natural and human capital
UK, 2019 and 2020, £million, nominal prices

Asset			Data source	Opening value (2019 nominal £million)	Closing value (2020 nominal £million)
Produced assets					
	Fixed assets	**Dwellings**	National Accounts (this excludes the value of the land underneath the assets)	£1,791,052	£1,812,736
		Other buildings and structures	National Accounts	£1,757,091	£1,778,261
		Machinery, equipment and weapons systems	National Accounts	£667,739	£651,959
		Intellectual property products	National Accounts	£321,827	£332,375
	Inventories		National Accounts	£293,840	£290,752
	Valuables			£-	£-
Non-produced assets					
	Ecosystems				
	Terrestrial ecosystems (IUCN GET EFG T1-T7)		Natural Capital UK Account	£1,176,182	£1,206,738
	Freshwater ecosystems (IUCN GET EFG F1 - FM1)		Natural Capital UK Account	£78,032	£84,525
	Marine ecosystems (IUCN GET EFG M1-MFT1)		Natural Capital UK Account	£4,277	£5,409
	Transitional		Natural Capital UK Account	£167,161	£167,942
	Subterranean ecosystems (IUCN GET S1-SM1)			£-	£-
	Other environmental assets				
	Cultivated biological resources		National Accounts	£7,912	£8,419

	Land (as provision of space) (includes SNA value of land under buildings)		National Accounts	£5,883,937	£6,326,373
		Of which amenity value	Natural Capital UK Account	£83,849	£83,849
	Renewable energy resources		Natural Capital UK Account	£1,550	£2,178
	Water resources		Natural Capital UK Account	£105,991	£134,001
	Mineral and energy resources		Natural Capital UK Account	£80,222	£107,823
	Atmospheric systems		Natural Capital UK Account	£19,834	£27,865
	Other non-produced assets				
	Contracts, leases and licences		National Accounts	£3,409	£3,667
	Goodwill and marketing assets			£-	£-
	Human capital		Human Capital Accounts	£22,880,000	£23,760,000
Financial assets			National Accounts (Total Financial Assets)	£31,876,130	£35,848,372
Financial liabilities			National Accounts (Total Financial Liabilities)	£32,450,292	£36,333,160
Environmental liabilities				£-	£-
Inclusive net worth				£34,665,894	£36,216,235

Source: Office for National Statistics

The UK's inclusive capital stock (or inclusive assets), including productive assets, environmental assets, human capital, and financial assets was £72.5 trillion in 2020.

The UK's inclusive net worth, including productive assets, environmental assets, human capital, financial assets and financial liabilities was £36.2 trillion in 2020 up from £34.7 trillion in 2019.

In 2020, the UK's traditional non-financial assets, which are captured in the national accounts, were worth £11.2 trillion in nominal prices. By contrast, the UK's inclusive non-financial assets, which includes productive assets, environmental assets and human capital, was £36.7 trillion in 2020.

The key aggregates for 2020 from Table 1 are summarised in Table 2.

Table 2: Summary statistics, decompositions and key aggregates
UK, 2020, £million, nominal prices

	2020 nominal values (£million)	of which National Accounts	of which Natural Capital Accounts	of which Human Capital Accounts
Produced capital stock	£4,866,083	£4,866,083	£-	£-
Non-produced 'ecosystem' assets	£1,464,614	£-	£1,464,614	£-
Non-produced 'other environmental' assets	£6,606,659	£6,334,792	£271,867	£-
Non-produced 'other' assets	£23,763,667	£3,667	£-	£23,760,000
Inclusive non-financial assets	£36,701,023	£11,204,542	£1,736,481	£23,760,000
Financial assets	£35,848,372	£35,848,372	£-	£-
Inclusive assets	£72,549,395	£47,052,914	£1,736,481	£23,760,000
Financial liabilities	£36,333,160	£36,333,160	£-	£-
Environmental liabilities	£-	£-	£-	£-
Inclusive net worth	£36,216,235	£10,719,754	£1,736,481	£23,760,000

Source: Office for National Statistics

Setting aside financial assets and liabilities, which broadly balanced in 2020, three conclusions can be drawn from these data. Firstly, although there are some omissions because of data not being available, coherent data can be produced for the UK. With the exception of uncapitalised intangible assets and environmental liabilities, these omitted data are unlikely to change the picture substantially. Secondly, while the contribution of the natural capital accounts to inclusive net worth is the smallest of the three contributing accounts, it is still equivalent to 16.2% of the national accounts contribution and merits inclusion. Thirdly, however, is the clear dominance of human capital in inclusive net worth - contributing 65.6% of the £36.2 trillion total in 2020. This demonstrates the value of compiling this table to support decision-makers and provide users with a clearer picture of the worth of the nation.

5 . Inclusive capital stocks data

[Preliminary UK national balance sheet estimates](#)
Dataset | Released 05 May 2022
Annual estimates of the market value of financial and non-financial assets for the UK, providing a measure of the nation's wealth.

[UK natural capital accounts 2022](#)
Dataset | Released 10 November 2022
Estimates of the financial and societal value of natural resources to people in the UK.

[Human capital estimates: supplementary tables](#)
Dataset | Released 25 April 2022
Human capital stock and per head values, equating to lifetime labour earnings, supplementary to human capital stock publications.

6 . Glossary

Financial assets and liabilities

These are economic assets, comprising all financial claims, equity and the gold bullion component of monetary gold. Liabilities are established when debtors are obliged to provide a payment or a series of payments to creditors.

Productive assets

A collective term used here to describe produced and non-produced non-financial assets that are captured in the national accounts. This term does not include financial assets which are captured in the national accounts or environmental assets and human capital which are not captured in the national accounts.

Produced asset

These are outputs from production processes with a lifespan of more than a year (for example, buildings and machinery), which contribute to the production of goods and services, without being completely used up or transformed in the process.

Non-produced asset

These are economic assets that come into existence in ways other than through processes of production.

Ecosystem asset

A natural or semi-natural system which provides or supports the provision of one or more goods or services to people.

Human capital asset

The value of the UK's full human capital stock which accounts for the human capital of people who are either employed or unemployed. Human capital is defined as the knowledge, skills, competencies and attributes embodied in individuals which facilitate the creation of personal, social and economic well-being.

Environmental liability

An environmental asset which has been degraded to a point at which it is now expected to produce a consistent stream of costs into the future. For instance, land with peat soils in a poor condition will release greenhouse gasses into the atmosphere until they are restored, or the soil is exhausted.

Capital stock

Capital stock is the quantity of produced non-financial assets with a lifespan of more than a year (for example, buildings and machinery), which contribute to the production of goods and services, without being completely used up or transformed in the process. Capital stock produces a flow of capital services into the production process.

It is an important variable in multi-factor productivity, which looks at the efficiency with which an economy can transform inputs, such as labour and capital, into output.

Net worth

The value of assets owned, less the value of all outstanding liabilities.

7 . Data sources and quality

These data are sourced from national statistics publications. However, data that are currently not produced by the Office for National Statistics (ONS) have been omitted from this article. No effort has been made to present real rather than nominal estimates for this article.

Data on investment in uncapitalised intangible assets are produced in the UK, but stock values for these assets, which lie outside the national accounts' asset boundary, are not currently compiled by ONS and have not been included in this article. If uncapitalised intangible assets and goodwill and marketing assets had been included in the data, there would be a need for further adjustment, as double counting would likely occur.

Subterranean ecosystems are currently not measured in the UK natural capital accounts and have not been included in this article.

Further work is needed to understand any areas of double counting between human capital and the other capitals, particularly uncapitalised intangible assets such as training and organisational capital.

8 . Future developments

Initial work towards developing new measures of inclusive income is explained in our Beyond GDP workplan. Inclusive income is conceptually consistent with inclusive capital stock. However, while inclusive capital stock measures the value of the stocks of assets, inclusive income measures the value of the corresponding flows from produced, natural and human capital assets.

The Office for National Statistics (ONS) has also published an article outlining the concepts underpinning inclusive income. In 2023, the ONS aims to publish estimates of inclusive income. Further information can be found in our new Beyond GDP measures workplan.

9 . Related links

[Inclusive income methodology](#)
Article | Released 11 November 2022
An introduction to the concepts underlying two new measures being developed by the Office for National Statistics (ONS), gross inclusive income and net inclusive income.

[New Beyond GDP measures for the UK: a workplan for measuring inclusive income](#)
Article | Released 12 May 2022
Planned work, as well as timeline estimates, for projects feeding into a new measure of "inclusive income", aligned with the concept of "inclusive wealth".

[UK natural capital accounts: 2022](#)
Article | Released 10 November 2022
Estimates of the financial and societal value of natural resources to people in the UK.

[Overview of human capital estimates in the UK: 2004 to 2020](#)
Article | Released 25 April 2022
National estimates of human capital stock in the UK for years between 2004 and 2020. Includes full and employed human capital estimates for each year.

10 . Cite this article

Office for National Statistics (ONS), released 11 November 2022, ONS website, article, [Inclusive capital stock, UK: 2019 and 2020](#)