

FOR GLOBAL CONSULTATION

**CM.4 Gross and Net Measures: Promoting the
Production and Application of Net instead of Gross
Value Added (including Domestic Product), Income
and Savings**

CM.4 Gross and Net Measures: Promoting the Production and Application of Net instead of Gross Value Added (including Domestic Product), Income and Savings¹

The role and prominence of the focus on Net measures has increased significantly through greater user needs and analytical uses as well as policy uses, particularly related to sustainability and the statistical measurement of climate change, its impact and related policies. This Guidance Note (GN) examines the challenges of improving the steps between the Gross measurement and Net measurement to support the need for higher quality and reliable Net estimates and recommends steps for the way forward. The two main elements of the Gross-Net adjustment proposed in the GN are consumption of fixed capital and depletion of natural resources.

There is a separate GN (CM.2 on Terminology and Branding of the Economic Accounting Statistical Standards) that covers the need to apply clearer and stricter application of terminology regarding the terms Net and Gross – this is also a key ingredient in increasing the focus on Net measures. In addition, Guidance Note WS.6 on Accounting for the Economic Ownership and Depletion of Natural Resources and Guidance Note WS.8 Accounting for Biological Resources cover in more detail the recommended recording of the costs of depletion of natural resources in the 2025 SNA.

1- INTRODUCTION

1. The terminology ‘netting’ and ‘net’ used in the 2008 SNA are explained in paragraphs 2.71 and 2.72 and the guidance on the use of the terms ‘net’ and ‘gross’ are covered in the Guidance Note (GN) CM.2. It is important to note, there are differences between these terms. In this GN, ‘net’ is understood as value added (including Domestic Product), income and savings net of the consumption of fixed capital (CFC) as explained in 2008 SNA para. 2.141:

“In principle, the concept of value added should exclude the allowance for consumption of fixed capital. The latter, in effect, is not newly created value, but a reduction in the value of previously created fixed assets when they are used up in the production process. Thus, theoretically, value added is a net concept. This conclusion applies to domestic product as well; theoretically, domestic product should be a net concept. Net domestic product (NDP) is obtained by deducting the consumption of fixed capital from GDP.”

2. Taking into consideration the recommendations in GN WS.6, in the 2025 version of the SNA, the Gross-Net distinction will in addition to consumption of fixed capital expected to include the depletion of non-produced natural resources.

3. On several occasions, the 2008 SNA conclude that income and savings are net concepts. Para. 2.142 explains why gross domestic product and not net domestic product is commonly used:

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“However, gross measures of product and income are commonly used for various reasons. The depreciation of fixed assets as calculated in business accounting does not generally meet the requirements of the SNA. The calculation of consumption of fixed capital requires that statisticians estimate the present value of the stock of fixed assets, the lifetime of various types of assets, patterns of depreciation, etc. Not all countries make such calculations, and when they do there may be differences in methodology (with some of them using business data even when inadequate). Consequently, gross figures are more often available, or available earlier, and they are generally considered more comparable between countries. So GDP is broadly used even if it is, on a conceptual basis, economically inferior to NDP. However, NDP should also be calculated, with improved estimates of consumption of fixed capital when necessary, to provide a significant tool for various types of analysis.”

4. In short:

- Depreciation in business accounting is mainly recorded on a historical cost basis which does not align to the SNA requirements of current replacement cost basis.
- CFC calculations are challenging and data demanding. Countries use different methods and assumptions, so CFC estimates may not be comparable across countries. In many countries the estimates of CFC may not even be available.
- Thus, Gross figures are more comparable and considered preferable for international comparisons.

5. Today, for a range of users and uses, the 2008 SNA para. 2.142 reflects an outdated situation. The world has rapidly changed justifying the need to reconsider the SNA’s position on *Gross* versus *Net*. Section 2 explains some of the relevance and importance behind these changing circumstances. Section 3 reviews some of the challenges to address when estimating *Net* measures of income and saving. Section 4 covers work done to date and further suggestions on how to overcome these challenges. Section 5 summarises a range of suggestions to anchor net income and saving more strongly into the next SNA. Section 6 presents the conclusions and recommendations. There is also a separate annex showing the recording of CFC in the 2008 SNA and an example of the proposed recording of the cost of depletion of natural resources through the Supply and Use Tables in the 2025 version of the SNA.

2 - WHY THE TIME HAS COME TO EMBRACE NET INCOME AND SAVING

BEYOND GDP

6. The first and most obvious step to go Beyond GDP is replacing it by NDP. Chapter 1, Para. 13 of the Stiglitz, Sen & Fitoussi Report (2009) argues that a first step towards mitigating some of the criticisms of GDP as a measure of living standards is to emphasise national accounts aggregates other than GDP, for example, by accounting for depreciation and feature *net* rather than *gross* measures of economic activity. The report emphasizes that sustainability is more closely related to Net rather than Gross measures, although it is important to note that the claim that GDP is a measure of living standards is not made by national accountants.

7. Ignoring this recommendation within the scope of the current SNA update would be rather provocative and runs the risk of reducing the relevance of the 2025 SNA. Advocating for net income and saving will put the System in a much better position to understand the relationship between income and changes in wealth. The [Changing Wealth of Nations](#) publications of the World Bank underscore, probably more prominently than any other publication, the importance of accounting for the changes in capital stocks including depreciation and depletion. The first recommendation in the 2021 publication is:

“Measure and monitor wealth to boost sustainability and prosperity. Governments should measure and monitor wealth, alongside GDP. They can use the System of National Accounts (SNA) framework and the System of Environmental-Economic Accounting (SEEA) standards to integrate wealth accounting systematically into national balance sheets. CWON (Changing Wealth of Nations) provides the world’s most comprehensive and SNA compatible international data on wealth that can be used as a benchmark and proxy in the absence of detailed bottom-up national wealth accounts.”

8. The absence of bottom-up wealth accounts is a concern. Most of the data used by the World Bank originates from global data sets such as the [Penn World Table](#) (Feenstra et al., 2015) which is extremely rich in terms of country coverage, time series and variables coverage but cannot be expected to keep track of all relevant country details. As recommended by the World Bank, governments should take on the responsibility to measure the changes of wealth in the national accounts of countries themselves. The 2025 SNA should address these aspects in inspiring them to do so.

9. Net measures are also important for the creation of balance sheets and sectoral accounts. The recent G-20 Data Gaps Initiative recommends the estimation of sectoral accounts, which include measures of net lending and balance sheets with stocks of non-financial assets (net of depreciation).²

RECORDING OF DEPLETION OF NATURAL RESOURCES

10. The 2008 SNA recommendation is to record the costs of depletion of non-produced natural resources as ‘an other change in the volume of assets’ which gives the value losses of natural resources due to their extraction a rather insignificant appearance in the accounting framework. The GNs on “Accounting for the Economic Ownership and Depletion of Natural Resources” (WS.6) and “Accounting for Biological Resources” (WS.8) pave the road for a recording of depletion of natural resources in the next version of the SNA which is in accordance with the SEEA-CF. The proposal is to elevate the recording of depletion of natural resources as a cost of production by identifying the element of gross value added addressing any reduction (or increase) of natural resources in the production of goods and services. Obviously, this further amplifies the significance of Net income instead of Gross income.

THE WHEEL OF KNOWLEDGE

11. The wheel of knowledge is a metaphor for the crucial role of knowledge as an input into knowledge creation. R&D in the form of basic research is critical for carrying out new basic research or for product development, yet another form of R&D. Even so, R&D may support software creation, while the latter may facilitate R&D. With data and marketing assets as possible newcomers, the ‘entanglement of intangibles’ (i.e., intellectual property products) becomes more and more apparent. When valuing the

² <https://www.fsb.org/wp-content/uploads/P081021-1.pdf>

intellectual property (IP) produced on own account, this entanglement becomes evident by the necessity to add IP capital services to its sum of costs.

12. However, expanding the fixed asset boundary, as introduced in the last two SNA updates (1993, 2008), implies that newly defined GDP standards start to include further elements which were previously recorded as intermediate consumption. In addition, it will include supplementary elements of CFC, i.e., the capital services inputs to own account capital formation as referred to above. This concern may be addressed as '*GDP inflation*': its estimation is upwards adjusted, however only due to its redefinition. This concern of double counting will be further amplified by the decision to capitalize additional IP items (e.g., data, and possibly marketing assets)³ as expenditure formerly recorded as intermediate consumption which are likely to be redefined as gross fixed capital formation.

13. NDP will not be undesirably affected by the spinning wheel of knowledge and adding new classed of fixed assets. This is because NDP will continue to systematically remove the costs of capital (CFC) from income. This further adds to the case of promulgating NDP.

OWNERSHIP TRANSFER SHOCKS

14. One response of the Irish Central Statistics Office to overcome the GDP volume growth spike in 2016, resulting from the instant reallocation of enormous amounts of IP to Ireland, was to introduce a new metric called "Modified Gross National Income".⁴ In this new metric, the attempt was made to overcome some of the distorting effects of globalization in the Irish national accounts. Elements of the modifications included the removal of depreciation on intellectual property and depreciation of fleets of aircraft owned by lease companies residing in Ireland. The subtraction of depreciation was meant to counterbalance the output of capital services (IP services, aircraft lease services), most of which were exported. This example shows that net income is less prone to shocks due to the reallocation of 'mobile' fixed assets (mainly transport equipment and intellectual property) whose change in economic ownership requires in physical terms not much more than a mouse click.

3 - WHAT ARE THE OBSTACLES?

15. Traditionally, GDP, and not NDP, is used to measure the size of an economy and as the denominator of several key indicators, e.g., government deficit and debt to GDP to obtain a first impression of a government's financial state. Even though the 2008 SNA explains that value added should exclude the allowance for CFC and that value added resembles conceptually a net measure, unfortunately, measurement difficulties seem to have held us back from 'net accounting'. At this point in time, we should ask ourselves if this status quo must be maintained and if not, what could be done to overcome these obstacles.

³ The Guidance Notes on Data and Marketing Assets are at different stages of their progress before final decisions are made. Further details can be found in GN DZ.6 Data and GN G.9 Payments for Non-produced Knowledge-Based Capital (Marketing Assets).

⁴[Central Statistics Office | Modified GNI](#).

NO ONE COMPLAINS?

16. Compilers and users alike have become accustomed to GDP and GNI, even though the use of capital in production remains principally unaddressed in these indicators. Many users do not complain about the lack of net measures. However, it is not entirely true that “no one complains.” As mentioned, commentators such as Stiglitz, Sen & Fitoussi argue in favor of net income and savings to better address the well-being or sustainability perspectives measured in the national accounts. The recommendations from the Changing Wealth of Nations and the G-20 Data Gaps Initiative seek more detail on a net basis.

17. The growing use of supply and use tables may also give rise to complaints about the partial or incomparable reflection of capital used in the economy. The decision to capitalize R&D implied that in many countries the information on the uses of R&D services is no longer available in the use table, albeit should be made available in the underlying table on gross fixed capital formation broken down by industry and product. In many countries, the recording of capital will not go beyond the column for gross fixed capital formation in the final uses section of use table. These are concerns that need to be addressed.

18. To be clear, the use table in the 2008 SNA (Table 14.12) includes entries by the industry entries for CFC, gross fixed capital formation and closing stocks of fixed assets. These entries are meant to put capital on a similar footage as labour. In summary, although many users may not complain about the absence of Net measures, it important to note that they continue to gain more importance over time,

CFC IS THE OUTCOME OF A MODEL

19. National accountants have a strong and healthy tendency to tie the national accounts to the information that can be observed and collected in source statistics. For example, Lynch and Thage (2017) argue that the confidence in national accounts is undermined by expanding the conceptual framework to serve the needs of productivity analysis and the movement towards increased recognition of capital formation of knowledge in the core system of national accounts. This concern is one of a sliding scale, and some level of analysis and modelling will be inevitable. For example, for good reasons it was decided to follow in the SNA an accrual recording of transactions. Yet, many entities whose accounts serve as an input into the national accounts are on a cash basis. The required cash-accrual conversions already entail quite a bit of data analysis. Converting transactions as observed in current prices to previous period's prices is another example of analytical constructs.

20. A similar need for modeling exists in the context of CFC, for which a variety of methods (e.g., straight-line, declining balance, sum-of-the-years' digits, units of production) is found in the company accounts literature in which the valuation of assets (e.g., historical costs, replacement values) may equally vary. This implies, to arrive at meaningful national totals, collecting information on CFC on a company-by-company basis is not a helpful nor a cost-effective way forward. So, for very good reasons, the 2008 SNA (para. 6.252) recommends the use of a perpetual inventory method (PIM) to calculate in an integrated fashion measures of CFC and capital stocks.

21. The widely accepted manuals on national accounts provide clear, easily understood guidance for modeling and estimating CFC and Net measures. This guidance seems at least as clear as guidance for modeling other data in national accounts and should be enough to address understandable concerns about basing national accounts estimates on observable data as well as modelled data where appropriate. The 2008 SNA (Para. 6.252) indicates that detailed conceptual guidance on how to apply the PIM for calculating capital stocks and CFC in a coherent way is found in Measuring Capital (OECD,

2009). The OECD Manual proves that our understanding of capital accounting is well-established. What is less understandable is why the 2008 SNA classifies CFC as a *by-product* of the PIM (para's 6.251 and 6.252) rather than as a key output of the PIM. This wording is unfortunate but otherwise typical of its 'depreciated' status at present. This should be changed.

CFC CALCULATIONS ARE DATA DEMANDING

22. The OECD Measuring Capital Manual does not solve the issue of data requirements which is undeniably a substantive one:

- Long consistent time series of: GFCF by asset type; by type of (investing) industry; and, if appropriate, by institutional sector.
- Long consistent time series of price indexes of newly purchased capital goods by asset type.
- Other changes in the volume of assets (e.g., accidents, disasters, forest fires, floods, earthquakes, etc.).
- Average service lives or survival functions by asset type.
- Age-efficiency profiles or age-price profiles.

23. The required information is of course mostly country specific although, as the Penn Tables show, some of it may be applicable across countries. For example, the depreciation rates of certain assets, e.g., a freight lorry, may be reasonably comparable in a wider range of countries while the service lives of other types of capital goods such as roads, may still be country specific due to differences, e.g., weather conditions, traffic intensity, quality, maintenance and so on.

24. The techniques and proxy variables selections for back casting of time series (gross fixed capital formation and prices) may also be comparable in a wider range of countries. Comparing and pooling information on depreciation rates may be one way to overcome some of the domestic data availability restrictions. Knowledge sharing may also prove to be a cost-effective way to commonly identify changes in service lives of the various asset types over time.

25. We also discuss below that a large and growing number of countries have these data and already estimate CFC and net stocks. Despite the clear challenges of these estimates, they seem within the reach of far more countries than in the past.

WE SHOULD NOT BE PREDICTING THE FUTURE

26. 2008 SNA Para. 6.247 explains the following:

“Consumption of fixed capital is a forward-looking measure that is determined by future, and not past, events namely, the benefits that institutional units expect to derive in the future from using the asset in production over the remainder of its service life. Unlike depreciation as usually calculated in business accounts, consumption of fixed capital is not, at least in principle, a method of allocating the costs of past expenditures on fixed assets over subsequent accounting periods.”

27. Revealed market prices reflect the expectations of the purchaser of the stream of services a second-hand good of certain age is still able to provide. Unfortunately, often such markets do not exist as

well as fixed assets are used relating to a certain production process which can be specific to a business or an industry. The second-hand market for motor cars is an example where the price information of specific car models of a different age could be combined in a so-called age-price profile. If accessible, this information is probably useful to account for its CFC. Unfortunately, many types of assets omit such vivid second-hand markets. This means an age-price profile must be projected by assessing age-efficiency and obsolescence developments. Such assessments can only be based on historic developments. Future uses of assets may and probably will differ as well as be revised as time goes by.

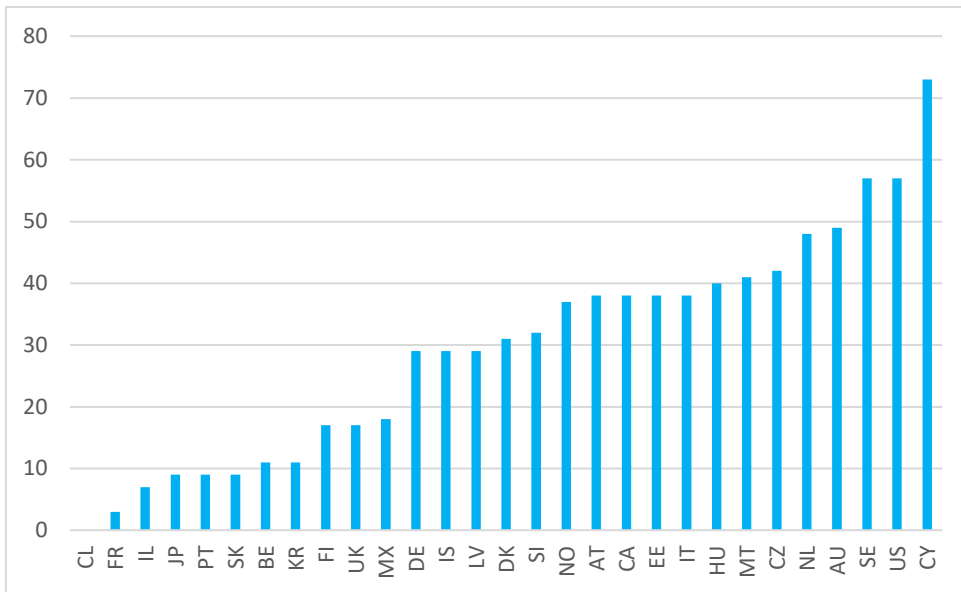
4 - WHAT HAS BEEN DONE AND WHAT ARE POSSIBLE NEXT STEPS REGARDING CFC

28. An EU Task Force is currently examining the concordance of estimations of CFC under ESA 2010. With respect to service life assumptions, the goal is to avoid arbitrary differences without removing justifiable differences. Hopefully, the Report of this Task Force will be able to provide stronger practical guidance on the service lives of the various types of fixed assets and the bandwidths within these services lives are expected to be found.

29. In 2013, Eurostat and the OECD conducted a survey of national practices of measuring the wealth stocks of Dwellings (AN.111), Buildings other than dwellings (AN.1121) and Other structures (AN.1122) such as roads and railways. The survey asked national accountants to provide, for a detailed list of structures, the assumptions and methods used for the PIM. The goal was not to select a single 'best' approach for the PIM but to promote discussion, facilitate detailed comparisons of PIM assumptions and provide concrete options for those, seeking to produce improved, internationally comparable estimates of net stocks of structures and underlying land.

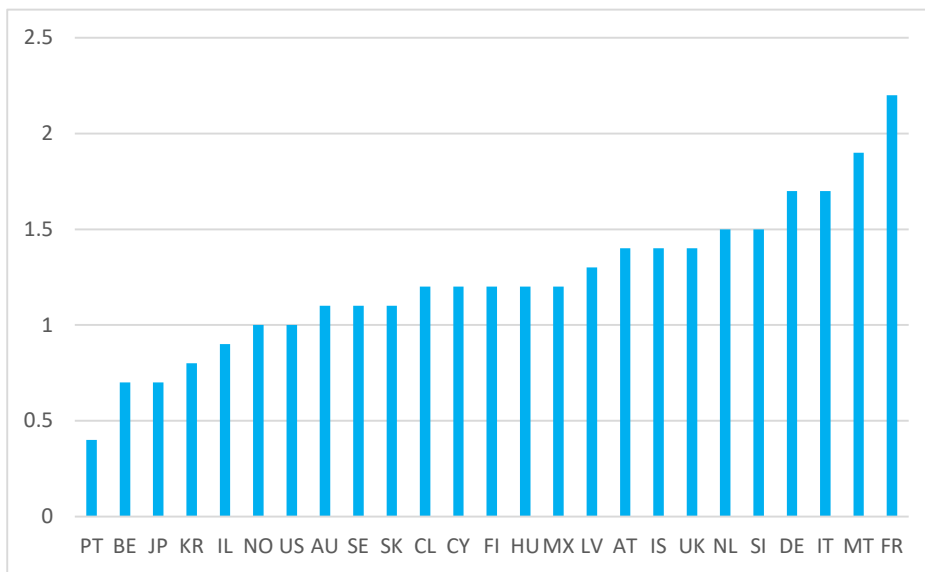
30. Responses were received from 32 countries. Across these countries, the applied depreciation methods varied covering linear depreciation (with and without the combination of retirement functions), geometric depreciation and other functional forms. To obtain a common denominator, for each country it was estimated which proportion of the initial wealth stock of dwellings would still be in the balance sheet after a period of 50 years. Some of the results are presented in Charts 1 and 2.

Chart 1
Proportion of initial stocks of dwellings remaining after 50 years



source: Eurostat/OECD (2015)

Chart 2
Ratios of net stocks of dwellings to GDP



source: Eurostat/OECD (2015)

31. To estimate patterns of depreciation and retirement, respondents relied on several sources of information, including tax authorities, company accounts, administrative property records, expert advice, econometric studies, other countries' estimates, and statistical surveys. It is difficult to compare the reliability of these sources of information and of course, service lives of dwellings may differ between

countries. However, Chart 1 leaves the impression that more should be done to harmonize the computation of wealth stocks and thereby the computation of CFC.

32. Looking at wealth stocks for dwellings as a percentage of GDP, the outcomes look equally divergent. Chart 2 shows that 16 out of 25 countries (64%) report a dwelling stock of the size of 1 to 1.5 times GDP. These divergences shown in Chart 2 are a concern and worth further investigation.

33. Conceptually capital measurement is well-advanced. Yet, in practical terms, more work is needed. Apart from ESA 2010, the international standards do not prescribe the application of a specific depreciation pattern. The ESA 2010 para's 3.143 and 3.144 read as follows:

“Consumption of fixed capital shall be calculated according to the ‘straight line’ method, by which the value of a fixed asset is written off at a constant rate over the whole lifetime of the good.”

“In some cases, the geometric depreciation method is used when the pattern of decline in the efficiency of a fixed asset requires it.”

34. It is important to note that linear depreciation will provide at the individual asset level quite different results than geometric depreciation. Furthermore, the ESA 2010 does not prescribe whether amortization functions must be combined with linear depreciation. Straight-line depreciation alone is not easily defensible (cf. OECD Measuring Capital Manual, para.13.2) on economic grounds. The ESA 2010 leaves some flexibility in which the EU Member States can operationalize these guidelines.

35. At first sight, straight-line depreciation looks simple. In the PIM, linear depreciation is a bit less simple as it requires a vintage (or cohort) model which defines how much of a certain vintage is in each period still in stock and depreciated. If the composition of vintages remains unchanged, the periodic depreciation amount is constant. However, this convenience is gone as soon as new vintages come into being (e.g., capital formation) or old ones are discarded or have become obsolete. Moreover, linear depreciation models probably require including retirement functions distributed over a bell-shaped curve, further complicating the use of straight-line depreciation.

36. Geometric depreciation is much easier to implement as each period a constant fraction of the capital stock will be depreciated, irrespective of the composition of vintages in stock. Even more important, para. 13.3 of the OECD Measuring Capital Manual explains that whatever the choice of mortality and age-efficiency functions, in combination they always exhibit a convex form. The Measuring Capital Handbook comes to the following conclusion.

“...a simple geometric depreciation pattern may be a very reasonable choice, because it tends to be supported empirically and because it facilitates implementation immensely.”

37. This brings us to the following recommendations:

(i) With economic soundness, simplicity and making capital measurement accessible to a wider range of countries in mind. The next SNA should explicitly recommend geometric depreciation⁵ as the default option than described in 2008 SNA para. 20.22-20.24.

38. The practical guidance as developed by the EU Member States could be expanded to other countries as well. This may take the form of a 'Capital Measurement Information Hub' by which such practical guidance can be worldwide disseminated and which can be used to keep track of country practices. Such a hub may also serve as a centralized platform for capacity development to support those countries for which capital measurement is still in its infancy.

(ii) The stronger positioning of Net income in the 2025 SNA should coincide with further practical guidance on capital measurement, for example by way of establishing an international 'capital measurement internet-based information hub'. This hub should also serve in providing guidance on how to measure natural resource assets and their depletion.

5 – SUGGESTED SNA UPDATES

39. The purpose of this section is to formulate recommendations on how measures of *Net* income, CFC etc. should be covered in the 2025 SNA. In many cases enhancing the emphasis or improving upon what is covered in the 2008 SNA. For example, 2008 SNA, para. 1.17:

“Value added and GDP may also be measured net by deducting consumption of fixed capital...”

40. This sentence should be rephrased to explain that value added and domestic product are preferably recorded on a 'net' basis by deducting consumption of fixed capital.

41. Similarly, 2008 SNA Para. 6.9 could be re-drafted to reflect the conceptual strength of the 'net' basis, reflect there is a notable measurement challenge and that it is surmountable:

“As value added is intended to measure the value created by a process of production, it ought to be measured net, since the consumption of fixed capital is a cost of production. However, as explained later, consumption of fixed capital can be difficult to measure in practice and it may not always be possible to make a satisfactory estimate of its value and hence of net value added.”

42. However, given the above caveats, the 2008 SNA para. 6.72 explains that:

“Consumption of fixed capital is one of the most important elements in the SNA”

43. Although the gross figures may be easier to measure, this aspect should not form the rationale over the preferred conceptually stronger net approach. The branding of net measures, for example, as described in 2008 SNA para's 8.21 and 9.10 can be improved.

⁵ Those countries who are able to estimate for the various fixed assets the actual age-price / age-efficiency profiles as well as mortality distributions are encouraged to continue using those. As explained by the OECD Measuring Capital Manual such advanced measurements will usually correspond closely to geometric depreciation patterns. This is why geometric depreciation is recommended as a default for those countries for which these data are not available.

44. The new Chapter 2 in the proposed 2025 SNA covering measures of well-being and environmental sustainability should distinctively address the preference for Net income. The content of Section 2 of this GN provides some points of direction.

45. The current coverage and balance in the 2008 SNA of CFC in Chapter 6 (6.240 – 6.257) on the production account should be reviewed in the context of the 2025 SNA Chapter 17 (revised numbering) on Capital Measurement. The 2008 SNA argues in favor of this (para. 6.257):

“Consumption of fixed capital should not be estimated in isolation from the derivation of a set of capital stock data. Such data are needed for the balance sheet and as shown in chapter 20, trying to identify consumption of fixed capital in isolation from the level of the stock of the asset and its patterns of price and efficiency decline is likely to be error prone.”

46. So, the next recommendation is:

(iii) Present in the 2025 SNA a much higher profile on the necessity of net income and savings according to the suggestions made above.

47. There are several implications for compilers and users alike of shifting towards net income and savings which should not be overlooked. One may consider addressing those issues in the introductory chapter of the 2025 SNA. These are discussed below.

SCOPE OF THE GROSS-NET ADJUSTMENT

48. The recording of depletion of natural resources as recommended in the GNs (WS.6) and (WS.8) implies the Gross-Net distinction in the 2025 SNA will have a different scope than in the 2008 SNA. This should not be left unnoticed, not in the 2025 SNA but also not in the national accounts as disseminated by the national statistical institutes. The following supplementary classifications may help to make the proper distinctions:

| Transaction / Balancing item | Code | 2008 SNA data set |
|------------------------------------|------------------|-------------------|
| Gross Domestic Product | B1g | 1 854 |
| Consumption of fixed capital (-) | P51c | 222 |
| Depletion of natural resources (-) | K21 ⁶ | 14 |
| Net Domestic Product | B1n_P51c+K21 | 1 618 |

49. Statistical offices who can compile for their economies data on capital stock for fixed assets and estimates for CFC should be encouraged to publish net domestic product, even if they are not (yet) able to compile estimates of the costs of depletion of natural resources. The above presented terminology and coding may help to explicate the scope of Gross-Net adjustments. The next recommendation is as follows:

⁶ There will be a need to reflect revision to the coding for this entry.

(iv) In the national accounts as published by countries, the scope of Gross-Net adjustments should be shown explicitly which of the two elements (P51c, K21) it capsulates.

50. The expenditure side of NDP as exposed in the use table will not automatically address the costs of depletion of natural resources. With the help of supply and use tables, the Annex of this GN illustrates how NDP is defined from the production, income and expenditure approaches.

51. In Box 1 of the 2025 SNA example, using the expenditure approach, Net Capital Formation (NCF) is defined net of CFC whereas the cost of depletion of natural resources (DNR) is not deducted from GCF to get NCF but only at the aggregate expenditure level, i.e., from GDP to NDP. This is a new SNA concept and reflects that the cost of DNR is an input to the value of many goods and services consumed by households, government, etc. as well as exports, thus cannot be deducted just from GCF. Since natural resources are non-produced, some national accountants may consider the subtraction of a depletion element from GCF troublesome. On the other hand, from the production and income approaches, the cost of DNR are deducted alongside CFC from GVA to get NVA.

52. A further aspect to note covers new discoveries and natural growth of migrating non-produced biological resources and any concerns of asymmetry should be placed into perspective. The growth of non-migrating biological natural resources is expected to be recorded in the 2025 SNA as an addition to inventories (cf. Guidance Note WS.8) – noting a distinction is made between the underlying asset (e.g., the resource rent generating capacity of forest land) and the growth of trees itself (inventories). While mineral assets probably remain to be classified as non-produced, part of its value is considered being produced, namely mineral exploration. Clearly, mineral exploration is being conceived as a self-standing knowledge asset, however it would not obtain any value without the discovery of new mineral asset deposits. In the natural resource accounting framework (cf. SEEA-CF, Table 5.10), the CFC of mineral exploration assets is, like the CFC of all fixed assets, recorded as a charge against the resource rent, and subsequently, against the natural resource's value.

MEASURING THE VOLUME GROWTH OF NDP

53. The measurement of the volume change of NDP is feasible and a meaningful concept which represents the changing amounts of goods and services periodically available for net export, consumption and deepening of the non-financial assets balance sheet. When CFC is estimated with the help of a PIM, the estimates will usually be available in current and in volume terms. Yet, such estimates are at present not widely disseminated. However, the Penn World Table, is an example illustrating the derivation of the volume change estimates of NDP (net of CFC), in addition to those of GDP. The outcomes are plotted for the six largest economies in the chart 3.⁷

54. The chart shows that there may be periods in which the acceleration of economic growth is strongly driven by capital expansion. This is when NDP growth rates are typically lower than GDP growth rates. Otherwise, the chart shows that annual movements are comparable. That is to be expected as CFC estimates are generally not prone to shocks.

⁷ For this analysis Penn World Table version 10.0 was used. Depreciation rates (*delta*) were used to calculate consumption of fixed capital values (in real prices) by its multiplication by the capital stocks (*mna*, in 2017 prices). These estimated were subsequently subtracted from GDP (*rgdpna*, in 2017 prices) to obtain NDP in 2017 prices. The results contained a limited number of outliers. Growth rates 100% and higher were removed from the results.

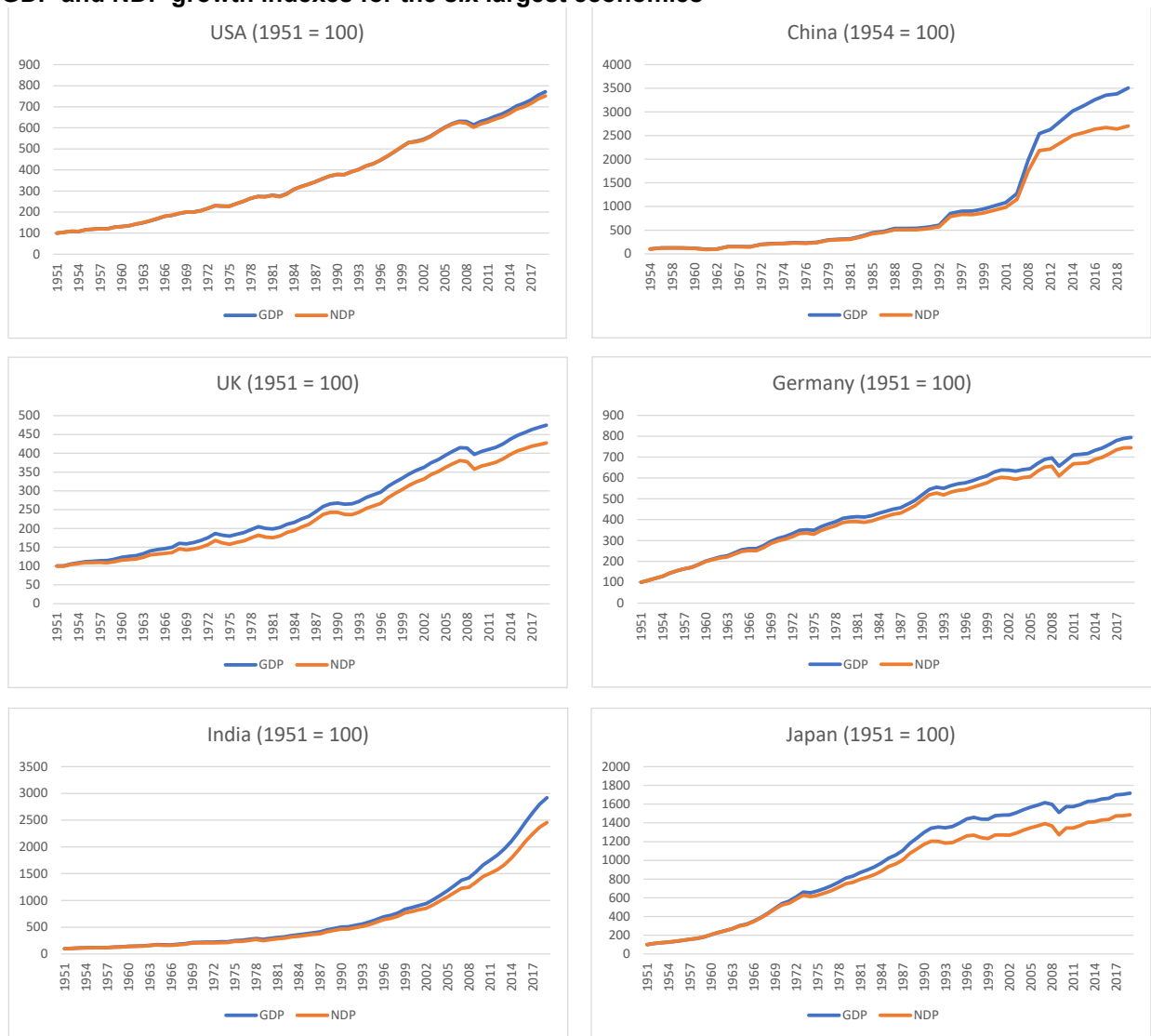
55. One may expect that the effects of the costs of depletion of natural resources on net GDP growth figures will be similar as those for CFC. When economic growth will be accelerated by rapid resource exploitation the net growth figures will expectedly be lower, which can be argued to be a desirable outcome.

56. The box in the supply and use tables annex shows how net domestic product, net of consumption of fixed capital *and* the costs of depletion of natural resources, can consistently be determined from the income, production and expenditure sides. Obviously, the consistency is obtainable in current and in volume terms which also allows for consistency in NDP growth rates.

57. There are two further implications to reflect:

- Measures of quarterly economic growth belong to the set of most prominent indicators which are obtained from the national accounts. Yet, running a PIM at a quarterly basis may in many countries be too burdensome. The predictability of CFC estimates over time will assure that a quarterly PIM is not a precondition to generate reasonable quarterly CFC estimates. Quarterly depletion estimates will in most of the cases strongly correlate to quarterly mining output so estimation will not be overly burdensome.
- Using a net domestic product concept as defined above will have implications for measuring the volume growth of net value added at industry level, and in particular the mining industry. Expectedly, its diminished size due to the eliminated depletion element will lead to different results than the gross based growth measures.

Chart 3
GDP and NDP growth indexes for the six largest economies



Source: the Penn World Table 10.0

58. To conclude, the 2025 SNA should at least explain that conceptually NDP is the preferred measure of economic growth. NDP will reflect that consumption of fixed capital and depletion of natural resources are not sources of economic growth. The practical concerns of such a change are strongly related to the complexities of compiling CFC and depletion estimates in value terms. These current price estimates will need to be converted into volume terms and this should not form a conceptual issue but may be difficult in measurement terms. Similarly, measurement challenges will exist for other assets like intellectual property products.

59. Yet, from a user perspective, the proposed NDP measure for economic growth will require quite a bit of attention and explanation. As mentioned, particularly at industry level, the changes may be noticeable. Considering this, one may envisage a transition period in which statistical offices are encouraged to publish through this period both gross and net based economic growth estimates with additional metadata to aid users.

60. The recommendation could be formulated as follows:

(v) The next version of the SNA should identify the volume change of NDP as the preferred measure of economic growth, acknowledging that moving from gross to net product estimations will require a transition period and communication with users.

NDP AS DENOMINATOR

61. NDP as a measure is more conceptually appropriate than GDP albeit harder to measure but this should not hold back the use of NDP. However, level estimates of GDP have served as denominator in a wide variety of ratio's to be used as leading economic and financial indicators. The following variables are often expressed as per cent of GDP: Government debt, Government net lending / borrowing (surplus / deficit), Government revenue, Investment, Savings, Current account balance, External debt, just to name a few.

62. In line of what is proposed in this GN, the objective would be to have these ratios changed with NDP as the denominator. This is easier said than done. Some of these indicators are anchored in law, such as the Maastricht Criteria in the Euro Zone regarding government deficit and debt levels as percentage of GDP. Others are not necessarily compiled by statisticians (e.g., tax base) but by analysts and researchers, as in the case of many of the GDP related indicators in the IMF's World Economic Outlook. We need to be aware that the effects of the denominator change may be substantive as the Gross-Net distinction could be as high as 20% of GDP. In other words, this adjustment may equally take time and will require strong and enduring advocacy of the use of NDP from the side of national accountants, at national and international level.

63. Statistical producers should be encouraged to improve the quality of the estimates of capital stock, and in turn, CFC. Further prominence of "net" aggregates should be achieved through the official releases showing the "net" aggregates alongside the "gross" aggregates.

64. International organizations should also consider setting up a task force on improving the measurement and practicalities involved in measuring the depletion of natural assets with the aim of developing consistent assumptions and cross-country comparability. The work currently undertaken by the Eurostat Task Force is an excellent example which deserves a broadening of scope beyond the 27 EU Member States. The proposed information hub may be an effective way to disseminate the results of arriving at a common methodology and the sharing of country practices.

6. CONCLUSION AND RECOMMENDATIONS

65. The recommendations made in this GN are the following:

- (i) With economic soundness, simplicity and making capital measurement accessible to a wider range of countries in mind, the next SNA should recommend geometric depreciation as the default option.
- (ii) The stronger positioning of Net income in the 2025 SNA should coincide with practical guidance on capital measurement, for example by way of establishing an international 'capital measurement internet-based information hub'. This hub should also serve in providing guidance on how to measure natural resource assets and their depletion.

- (iii) Present in the 2025 SNA a much higher profile on the necessity of net income and savings according to the suggestions made in Section 2 of this GN.
- (iv) In the national accounts as published by countries, the scope of Gross-Net adjustments should be explicated to show which of the two elements (P51c, K21) it capsulates.
- (v) The next version of the SNA should advocate the volume change of NDP as the preferred measure of economic growth, acknowledging that moving from gross to net product estimations will require a transition period and communication with users.

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ANNEX 1

CM.4 Gross and Net - Annex.xlsx

ANNEX 2

Feedback was sought from the CMTT in September 2022.

(The most critical points are shown below with a first response provided in brackets)

- High estimates of depletion may hamper a sound measurement of economic growth.
(good point but the “hamper” aspect could occur with already existing components of GDP. Net components will be shown explicitly to allow users to interpret the underlying picture.)
- Depletion is different from regular production costs.
(this addresses the recommendations in GN WS.6)
- Calculating NDP from the expenditure side implies a net capital formation concept, net of the costs of depletion of natural resources. Such a concept seems unsound.
(good point and will have to be addressed together with other feedback, proposing an aggregate level adjustment only to the expenditure approach)
- Proposal: create a new / additional account in the sequence of accounts showing the depletion adjustments.
(showing both the net and gross balancing items for each account is open and transparent without the need for an extra account - consideration for the AEG)
- There are some situations where a GDP denominator is more appropriate for indicators.
(this may be the case on practical grounds, less clear why on conceptual grounds)