ENDORSED

CM.4 Gross and Net Measures

CM.4 Promoting the production and application of *Net* instead of *Gross* product, income and savings[1]

April 2023

The role and prominence of the Net measures in macroeconomic statistics has increased significantly in recent years as users demand an enhanced set national accounts that support well-being and sustainability analysis. This Guidance Note (GN) examines the challenges of moving from an emphasis on Gross measurement to Net measurement in the System of National Accounts and highlights the need for higher quality and reliable Net estimates. The two main elements of the Gross-Net adjustment proposed in the GN are consumption of fixed capital and depletion of natural assets.

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 – another key recommendation to increase the focus on Net measures. In addition, GN (WS.6 on Accounting for the Economic Ownership and Depletion of Natural Resources) covers in more detail the recommended recording of natural resource depletion in the 2025 SNA. Finally, GN WS.1 – A Broader SNA Framework for Well-being and Sustainability also stresses the importance of placing a greater emphasis on net measures. This GN reflects feedback from the Global Consultation as well as the AEG Meetings in October 2022 and March 2023.

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 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 the Gross-Net distinction in this GN includes both consumption of fixed capital and the depletion of natural resources.

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3.   On several occasions, the 2008 SNA concludes that income and savings are net concepts but notes that for various reasons gross estimates are to be emphasised when communicating national accounts. For example, Para. 2.142 explains why gross domestic product and not net domestic product is commonly used:

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, in order 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 estimating *Net* measures of income and saving. Section 4 covers work done to date and further suggestions on how to address 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.

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

BEYOND GDP

6.   One way to give more prominence to "Beyond GDP" measures is to place more emphasis on Net Domestic Product when communicating national accounts statistics. 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 emphasises 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 necessarily made by national accountants.

7.   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 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 include recommendations that support this effort.

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] These G-20 DGI recommendations run the risk of making the SNA 2025 less relevant.

RECORDING OF DEPLETION OF NATURAL RESOURCES

10.   The 2008 SNA records natural resource depletion as 'an other change in the volume of assets'. Both GNs WS.6 Accounting for the Economic Ownership and Depletion of Natural Resources and WS.8 Accounting for Biological Resources both recommend that the depletion of natural resources in the next version of the SNA align to the SEEA-CF recommended recording. The proposal is to elevate the recording of natural resource depletion to a cost of production by identifying the element of gross value added addressing these natural resource asset value losses. 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 intellectual property (IP) produced on own account, this entanglement becomes evident by the necessity to add IP capital services to its sum of costs.

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[2] https://www.fsb.org/wp-content/uploads/P081021-1.pdf

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 known 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 capitalise additional IP items (data, marketing assets) as expenditure formerly recorded as intermediate consumption will be redefined as gross fixed capital formation.

13.   NDP will not be undesirably affected by the spinning wheel of knowledge and adding newly classified 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 large amounts of IP to Ireland, was to introduce a new metric called "Modified Gross National Income".[3] In this new metric, the attempt was made to overcome some of the distorting effects of globalisation in the Irish national accounts. Elements of the modifications included the removal of depreciation on intellectual property and depreciation of aircrafts owned by lease companies residing in Ireland. The subtraction of depreciation was meant to counterbalance the output of capital services (IP services, aircraft leasing 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 CHALLENGES?

15.   Traditionally, GDP, and not NDP, is used to measure the size of an economy and as the denominator of several key fiscal and socioeconomic indicators, e.g., government deficit and debt to GDP. 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, the quality of the estimates of CFC have provided the rationale to use GDP as the denominator for such ratios allowing for better comparability. In regions like the European Union such indicators are key and underpinned by regulation.

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

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[3]Central Statistics Office | Modified GNI.

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 call for Net Measures.

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 capitalise 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 gross fixed capital formation, product by industry table. 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. At this point in time, it would be useful to do a stocktaking exercise to show how many statistical institutes are compiling the accounts for capital services.

18. To be clear, the use table showed 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. One of the new chapters in the 2008 SNA is devoted to capital services in the national accounts (Chapter 20). However, these recommendations are under-emphasised in the 2008 SNA. In summary, although many users may not complain about the absence of Net measures they will become more important 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 clear 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). This wording is unfortunate but otherwise typical of its 'depreciated' status at present. This should be changed.

CFC CALCULATIONS ARE DATA DEMANDING

22.   The 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 deprecation 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, surveys of national accounts show 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.

27.   Revealed market prices (may change awaiting decisions on the Guidance Note AI.1 Valuation principles and methodologies) 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. The second-hand market for motor cars is an example were 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. Abstaining from capital measurement by arguing that such forward-looking assessments should not be part of the national accounts, would leave behind its users with incomplete sets of accounts and partial income and savings indicators.

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 final report of this Task Force, which is in draft form and to be approved around April 2023, 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
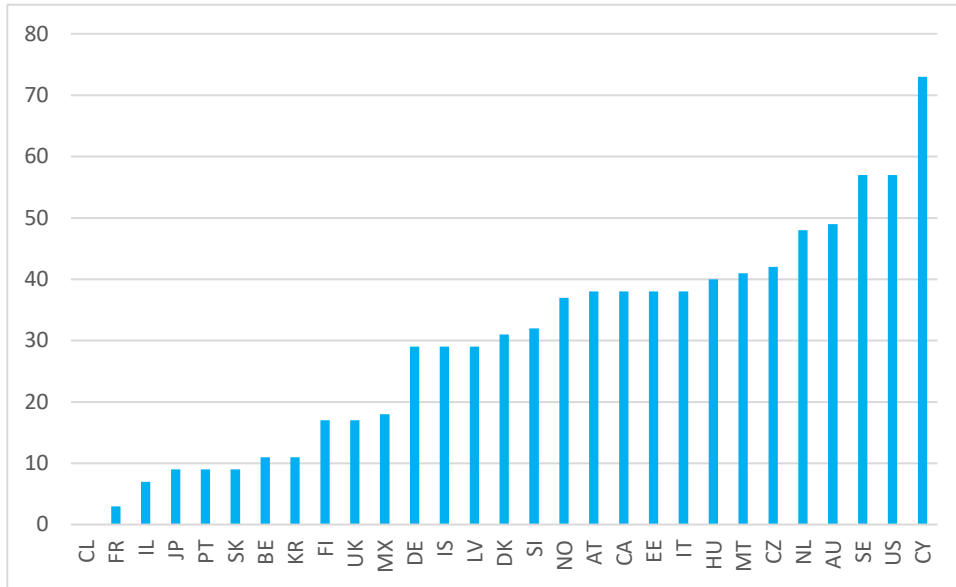
source: Eurostat/OECD (2015)

Chart 2
Ratios of net stocks of dwellings to GDP
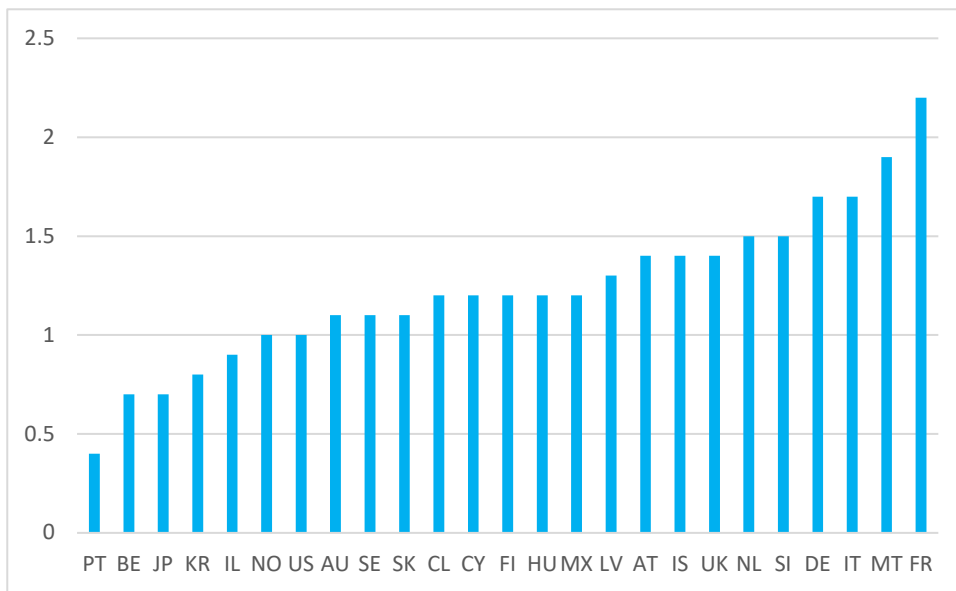
source: Eurostat/OECD (2015)

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 harmonise 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 amortisation functions must be combined with linear depreciation. Straight-line depreciation alone is not easily defendable (cf. Measuring Capital, par.13.2) on economic grounds. So, even the ESA 2010 leaves open quite some space in which the EU Member States can operationalise 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, 'Measuring Capital' para. 13.3 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:

(a) For the sake of economic soundness, simplicity and making capital measurement accessible to a wider range of countries, the next SNA should recommend geometric depreciation as the default option. [4]

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[4] Those countries who are able to estimate for the various fixed assets 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.

38.   From the Global Consultation, it should be noted that EU countries are recommended to follow the use of a convex (cohort) depreciation function and the 2025 SNA should reflect this aspect of allowing country discretion. Country collaboration to estimate CFC can take place on the forthcoming "compilers hub" or other digital collaboration platforms developed by international and national statistical organisations as well as keeping track of country practices. Such a hub may also serve as a centralised platform for capacity development to support those countries for which capital measurement is still in its infancy.

(b) The stronger positioning of *Net* income in the 2025 SNA should be supported with further practical guidance on capital measurement (e.g., capital stocks, CFC, capital services) and depletion

5 – SUGGESTED SNA UPDATES

39.   The purpose of this section is to formulate recommendations on how measures of *Net* income, CFC and wealth stocks should be covered in the 2025 SNA. The 2008 SNA index shows that CFC is addressed in many parts of the System but often quite briefly. Also, the language used can be quite soft or hesitant. 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 'net' by deducting consumption of fixed capital. 2008 SNA Para. 6.9 does not do a very good job in defending *Net* measures by explaining bluntly that measuring consumption of fixed capital may not be possible:

"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."

41.   Yet, 2008 SNA para. 6.72 explains that:

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

42.   However, 2008 SNA concludes one paragraph later that the gross figure is easier to estimate and so may be more reliable. This text is confusing and not conceptually sound. The fact that output (turnover) is easier to estimate than intermediate consumption does not imply the SNA should recommend aggregates for domestic *output* instead of domestic *product*.

43.   This negative branding of net measures is also found elsewhere in the 2008 SNA, for example, para's 8.21 and 9.10.

44.   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 may give points of direction.

45.   The newly proposed 2025 SNA Chapter 17 on capital services should cover both capital services and *all* aspects of capital measurement: productive stocks, wealth stocks, consumption of fixed capital and capital services. The title should probably be "Capital measurement". Its position would connect well to the previous Chapter 16 on labour accounts. The advantage of a broader scope of Chapter 17 is that all aspects of capital measurement are presented as the outcome of one coherent measurement framework, i.e., the PIM. Such set up would also closely correspond to the OECD Handbook. Much of the content of the 2008 SNA Chapter 20 on capital services also addresses the measurement of CFC and of wealth stocks:

- age-efficiency, age-price profiles;

- relationship capital service – CFC (Table 20.1);

- geometric profiles; and

- practical considerations.

46.   The current coverage in the 2008 SNA of CFC in Chapter 6 (6.240 – 6.257) on the production account is quite brief. In the 2025 SNA, this could be replaced by simply adding a reference to the new Chapter 17 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.

47.   The newly proposed 2025 SNA Chapter 17 on capital measurement should also clarify the distinction between wealth stocks (for net national accounts measures, institutional sector accounts and balance sheets) and productive stocks (for productivity measurement). Wealth stocks represent the market value of the capital stock and show how these add to the net worth of institutional sectors. Productive stock measures, adjusted for current and past declines in efficiency, are appropriate for estimating productivity and the contribution of the capital stock to economic growth. The distinction between wealth and productive stocks can be important as they serve different analytical purposes. While both measures are constructed from similar (or even identical) capital flows, they both should be addressed in the new Chapter 17 particularly as currently many compilers do not clearly distinguish between the two. Ideally compilers should produce both wealth and productive capital stocks, and clearly distinguish between the two.

48.   So, our third and fourth recommendations are:

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

(d) The newly proposed 2025 SNA Chapter 17 should provide an all-inclusive coverage of measuring capital: all stocks and flows of fixed assets, natural resources, and land. The new chapter should cover and explain the differences between both wealth and productive capital stocks.

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

50. The recording of depletion as recommended in the GNs (WS.6) and (WS.8) implies the Gross-Net distinction in the 2025 SNA will obtain 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
Net of CFC Domestic Product	B1n_P51c	1 632
Depletion of natural resources (−)	K21	14
Net Domestic Product	B1n_P51c+K21	1 618

51. 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 measures for natural resource depletion. The above-presented terminology and coding may help to explain the scope of Gross-Net adjustments, which was reflected with overwhelming support in the Global Consultation. So, the next recommendation reads as follows:

(e) 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.

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

53. In Box 1 of the 2025 SNA example, Net Capital Formation (NCF) is defined net of CFC and natural resource depletion. This is a new SNA concept. Since natural resources are non-produced, some national accountants may consider the subtraction of a depletion element from fixed capital formation troublesome. On the other hand, it is one of two, if we are prepared to define income from production net of resource depletion, we must also be prepared to define capital formation net of natural resource losses.

54. One disadvantage of this net capital formation concept is perhaps that it captures resource depletion while ignoring new discoveries and natural growth of migrating non-produced biological resources. Yet, such 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. GN WS.8). 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.

55.   The measurement of the volume change of NDP is feasible and a meaningful concept which represents the changing amounts of goods and service 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, previously referred to, can be used to derive 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.[5]

56.   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.

57.   One may expect that the effects of natural resource depletion 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.

58.   The box in the supply and use tables annex shows how net domestic product, net of consumption of fixed capital *and* natural resource depletion, 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.

59.   There are at least three implications which should not be left unnoticed:

- 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.

- However unlikely, there might be a possibility that mining is subject to a non-market activity. In such cases, due to the non-existence of a net operating surplus, the recording of a resource rent by way of the residual method, as recommended in the SEEA-CF, will simply be infeasible. In such cases, one can only conclude that a non-market mining operation implies a zero natural resource asset value.

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[5] 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 (*rnna*, 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.

Chart 3
GDP and NDP growth indexes for the six largest economies
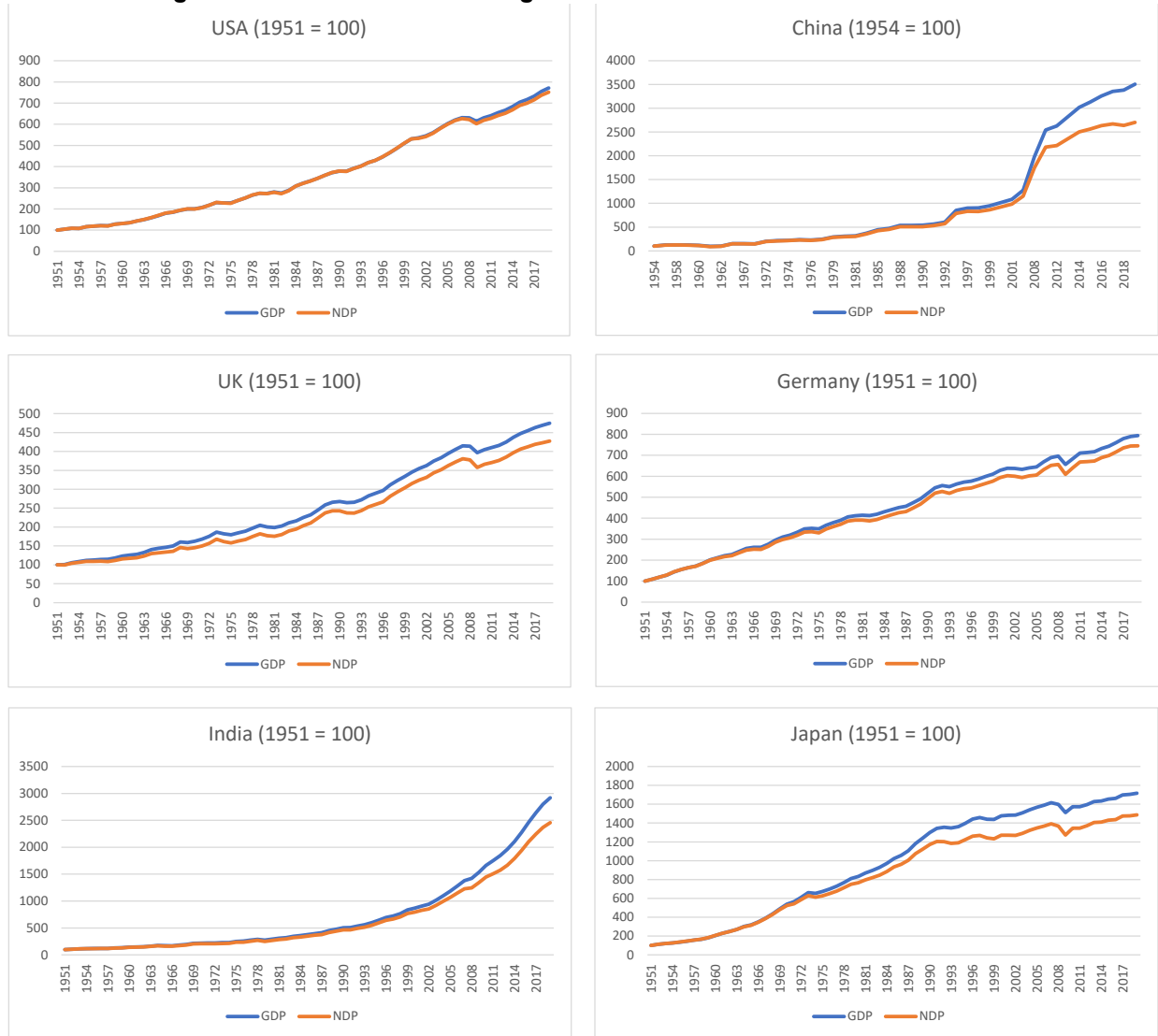
Source: the Penn World Table 10.0

60.   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. Except for intellectual property products for which estimates in volume terms are challenging, supplementing these current value estimates with estimates in volume terms does not seem to be an overly complicated subsequent step.

61.   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.

62.   The recommendation could be formulated as follows:

(f) (original) 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.

63.   However, reflection of the Global consultation and the feedback from the AEG Meeting in March 2023, this recommendation has been downplayed.

(f) (revised) Moving to the volume change of NDP as the preferred measure of economic growth is a significant challenge and a lot of preparatory work and compilation work is required and many countries are unable to do so. Thus the move to the conceptually preferred volume change of NDP should be pursued but in the context of, at best, sitting alongside GDP or if in the early stages of development as an experimental estimate.

NDP AS DENOMINATOR

64.   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.

65.   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 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.

66.   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.

67.   International organisations should be considering 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

68.   A summary of the recommendations made in this GN are as follows:

(i)   For quality and comparability, the next SNA should recommend geometric depreciation as the default option to estimating consumption of fixed capital.

(ii)   2025 SNA should emphasise that Net measures are the preferred measure for economic analyses and needs to be supported with more practical guidance for countries on capital measurement and accounting for depletion.

(iii)   The newly proposed 2025 SNA Chapter 17 should provide a comprehensive discussion of measuring capital including: stocks and flows of fixed assets, natural resources and land. The new chapter should cover and explain the differences between both wealth and productive capital stocks.

(iv)   In the national accounts, the scope of Gross-Net adjustments should be published separately, in this case the two elements P51c and K21.

(v)   The next version of the SNA should reflect the conceptually preferred volume change of NDP but in the context, at best, of sitting alongside GDP or if in the early stages of development as an experimental estimate.

69.   In line with the AEG on National Accounts Meeting in March 2023. This GN now incorporates the feedback from the Global Consultation and feedback from the AEG Meeting, thus can be considered as closed. The user testing will be covered under WS.6.

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ANNEX

CM.4 Gross and Net - Annex.xlsx