Cost of capital for non-market producers

Developing guidelines for estimating the net return to capital for non-market production

Paper prepared for the meeting of the Advisory Expert Group on National Accounts meeting of 28-30 October 2025, Washington DC[1]

Introduction

At its 10-12 July 2023 meeting, the Advisory Expert Group (AEG) on National Accounts (AEG) supported a range of recommendations to improve the consistency in the measurement of output when using the sum of cost approach in the 2025 SNA, including to incorporate a net return to capital[2] in the sum of costs approach for non-market producers.[3] This followed on from a discussion of this issue at the March 2023 AEG meeting and subsequent global consultation which supported including a net rate of return for non-market production.

The meeting stressed the need to develop practical guidance on calculating the net rate of return to use in estimating non-market output to facilitate the implementation of the recommendations and particularly to ensure internationally comparable results.

The recommendations for improving the consistency in measurement using the sum of costs approach, including the incorporation of a net rate of return for non-market producers, were included in the list of recommendations for changes to the SNA that were endorsed by the United Nations Statistical Commission at its meeting 55th session.[4] The Commission stressed the importance of continuing to develop implementation guidance on the new recommendations generally to facilitate the implementation of the 2025 SNA in an internationally comparable way.

The purpose of this paper is to propose recommendations for calculating the net rate of return for use in the estimation of non-market production. Following the AEG discussion, the paper will be updated and will undergo global consultation. It will then be finalised for submission to the 56th session of the Statistical Commission as a background paper.[5]

By definition, the net return to capital for non-market production is equal to the rate of return to capital multiplied by the value of non-financial assets used in production. It is important to

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[2] The term 'net return to capital' is used in preference to 'return to capital' to make it clear that depreciation/depletion is excluded.

[3] Including a net return to capital in the sum of cost approach for estimating non-market output increases the value of production for non-market entities. However, it does not impact upon net lending/borrowing, as the increase in the value of production is offset by a concomitant increase in the sum of final consumption expenditure and gross-fixed capital formation for the affected sectors.

[4] The 55th session was held from 27 February and 1 March 2024.

[5] The 56th session is scheduled to be held from 4 to 7 March 2025

establish guidelines for estimating the rate of return to capital for non-market producers, as this is new in the 2025 SNA. Therefore, the initial focus of this paper is on determining an appropriate rate of return to capital for non-market producers. The value of non-financial assets used in production comes from balance sheets and do not present new issues from a conceptual perspective. However, although balance sheets are part of the sequence of economic accounts, they are not produced by all countries. This has practical consequences which are discussed below.

Overview of potentially relevant documents

There is a range of documents regarding rates of return to capital. Most of these relate to market producers, although some documents specifically address the rate of return for government, or the closely related topic of determining an appropriate discount rate for government. While 'rates of return' and 'discount rates' are used for different purposes, they both essentially relate to the cost of capital and therefore the same issues arise when considering appropriate rates for each of them.

Some documents that are considered particularly relevant are described below.

OECD *Measuring Capital*

The OECD's *Measuring Capital* Manual (2009) directly addresses the issue of measuring the rate of return for the government sector.[6] It suggests three possibilities:

- A measure that combines the rate of return used for the market sector, which could be an ex-post or ex-ante rate, and an explicit or implicit rate of return associated with owner-occupied housing.[7]
- A measure based on the financing costs of government projects. In this regard, the Manual notes: "it may be appropriate to use a smoothed series of government bond rates of different maturities where the latter could be chosen in accordance with the structure of government assets."
- A measure that identifies the government rate of return with the household rate of return, with the latter measured as the social rate of time preference (SRTP). The SRTP is a measure of society's willingness to postpone private consumption now in order to consume later. It is not directly observable and requires the use of parameters which are also not observable. The Manual provides a table showing estimates for OECD countries using different values for the parameters. Based on the Manual's preferred parameter combination, and average SRTP of 2.6% is generated for OECD countries covering the period 1970-2005. It should be noted that this is a real rate of return. To obtain a nominal rate, an estimate for inflation would need to be added.

Measuring Capital does not make a recommendation.

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[6] *Measuring Capital* is based on the 2008 SNA, which did not include a net return of capital in the calculation of the value of output for non-market producers. However, the Manual considered that making such an estimate would be useful from an analytical perspective.
[7] For EU countries, there is specific guidance for determining the rate of return for owner-occupied housing.

International Public Sector Accounting Standards

The issue of discount rates for government arises in the application of International Public Sector Accounting Standards (IPSAS); most particularly in regard to IPSAS 39 – Employee Benefits. A rate is needed to discount post-employment benefit obligations (such as those associated with defined benefit pension schemes). In its *Basis for Conclusions for IPSAS 39*, the International Public Sector Accounting Standards Board (IPSASB) notes: "The IPSASB considered that the time value of money may be best reflected by reference to market yields on government bonds, high quality corporate bonds, or any other financial instrument."

Eurostat *Pension Guide*

The issue of an appropriate discount rate to be used in estimating pension entitlements is also discussed in Eurostat's *Technical compilation guide for pension data in national accounts* (2020) – the *Pension Guide*. The *Pension Guide* notes:

> For government-managed pension schemes, it is generally agreed that central government debt securities provide a suitable basis for the discount rate. Furthermore, the choice of the discount rate is ideally based on the following criteria:
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>> 1) In order to obtain a suitable proxy for a risk-free interest rate, it is advisable to base it not on central government debt securities of one single country but on a basket of e.g. European central government debt securities.
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>> 2) The maturity of these debt securities should be similar to that of pension entitlements, i.e. at least 10 years, but preferably longer.
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>> 3) In order to guarantee comparability across countries, the same discount rate should be applied to all EU countries and all government-managed pension schemes (including social security pension schemes) at whatever level of government.
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>> 4) A stable discount rate should be applied to avoid the noise resulting from frequent changes.

The *Pension Guide*, drawing on work by the EU Ageing Working Group of the Economy Policy Committee, recommends a real discount rate of two percent. The *Pension Guide* notes that the Ageing Working Group sets a nominal discount rate of four percent (two percent being the target inflation rate) as a standard rate for EU countries, with exceptions for a small number of countries with higher inflation targets.

IMF Working Paper *Public versus Private Cost of Capital with State- Contingent Terminal Value*

In more general literature, there is no agreed way of establishing a rate of return for government. An IMF Working Paper *Public versus Private Cost of Capital with State-Contingent Terminal Value* (2023) notes:

> "There has been a long-standing dispute about the relative costs of public versus private finance. Many studies, including the influential paper by Arrow and Lind (1970), have

suggested that the public costs are lower, providing different reasonings for this belief. On the other side of the discussion, Hirshleifer (1964) and several recent authors (Lucas, 2012; Engel, Fischer and Galetovic 2013) have argued that the argument is incorrect because, in efficient markets, investors can diversify risks on their own, a downwardly biased public discount rate can provide distorted incentives to the government, and governments can ultimately increase taxation to subsidize projects. Thus, even though the cost of government finance may be lower, the overall cost of capital to the ultimate principal—i.e., the public—could well be higher."

The Paper observes that different approaches are used in different countries to value government projects, with some countries using government bond rates and others using market-based costs of capital.[8] The Paper concludes that "a lower public than private discount rate should be applied to the feasibility analysis of provision modes in public infrastructure and utilities."

Recommendations for the 2025 SNA

It is clear from the above that there is no definitive answer from literature as to what rate of return should be used to estimate the net return to capital for calculating the value of output for non-market producers. However, notwithstanding some differences of view, a rate of return based on, or consistent with, government bond rates for government at least seems to be most appropriate for government non-market output at least. Such rates are generally observable and align with the fact that government do not make profits per se.

One question is should the bond rate be the bond rate(s) underlying the existing stock of government debt, or should it be the rate the government faces for new borrowing? As the net return to capital represents the opportunity cost for government in using capital in production, it is considered that the latter (i.e. the rate the government faces for new borrowing) is most appropriate conceptually.[9]

A possibility would be to allow each country to calculate its own rate of return based on its own government borrowings. However, this approach might lead to arbitrary and volatile results and would not promote international comparability.

Instead, it is considered that would be preferable to determine a proxy rate of return for general government that could be applied consistently across countries. To determine such a proxy rate, it is useful to develop criteria along the lines of those in Eurostat's *Pension Guide*. Accordingly, the following criteria are put forward:

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[8] In Australia, for example, the Department of Prime Minister and Cabinet's guidance note on *Cost-benefit analysis* (2020) advocates an annual real discount rate of seven percent, based on academic research undertaken by Australia's Productivity Commission in 2010. It should be noted that in Australia, and in some other countries, there is a strong view that government projects should use cost of capital rates similar to private projects to ensure an 'even' comparison between the two.

[9] Besides, while previous debt will have coupon interest payments that may differ from interest rates on new borrowings, in a properly functioning market the value of the bonds outstanding will change to ensure that the ex-post rates of return are equalized.

1) In order to obtain a suitable proxy for the real rate of return for government, it is advisable to base it not on central government debt securities of one single country but to consider the experience across countries.

2) The maturity of these debt securities should be similar to the expected lives of the assets that are being used by the government in production, i.e. at least 10 years, but preferably longer.

3) In order to guarantee comparability across countries, it is recommended that the same real rate should be applied to all countries unless there are compelling reasons to apply a different rate.

4) A stable rate should be applied to avoid noise resulting from frequent changes.

5) The nominal rate should be calculated on the basis of the real rate plus the target inflation rate applicable in a country.

Taking these criteria into consideration, and based on analysis undertaken in the EU, it is recommended that a two percent be used as the default real rate of return for estimating the net return for government non-market output. Where a country's real bond rate is persistently and significantly in excess of two percent, it is recommended that a real bond rate specific for that country be estimated.[10]

As indicated in (5) above, the nominal rate would be equal to the real rate of return plus the country's target inflation rate. This would mean a nominal rate of return of four percent for countries with a target inflation rate of two percent, assuming that the default real rate of return is used.

This recommendation is broadly consistent with paragraph 4.296 of the draft 2025 SNA. The last sentence in this paragraph states: "The latter approach [i.e. to use a rate based on the interest rate paid for the borrowing of funds] would be preferable for non-market producers, who do not aspire to make profits."[11]

It is proposed that there be a regular review of the default real rate of return. The EU Working Group reviews its advice on the real discount rate very three years, although changes are less frequent.[12] It is suggested that a trigger for the review of the real rate of return for SNA purposes could be any change in the EU Working Group's advice.

Several countries do not have target inflation rate. In these cases, it a default rate of three percent could be used for these countries. (Using a three percent rate of inflation and the default real rate of two percent would give five percent as the default nominal rate of return for countries without an inflation target.) This could be justified on the basis that the 'ideal' rate of inflation is generally seen as being between two to three percent. An alternative would be to use a country's actual inflation rate; however, this could be volatile over time. Another alternative

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[10] This would be based on a smoothed series of government bond rates of different maturities and a smoothed measure of inflation.

[11] If the recommendations in this paper are accepted, this paragraph will need to be clarified.

[12] In approximately 15 years, there has only been one change.

would be to use an average of the inflation rate over several years. While this would be more stable, it could be influenced by past periods of hyper-inflation that is no longer prevailing.

All things considered, to minimise volatility and maximise international comparability, it is recommended that a rate of three percent be used as a default for the inflation component of the nominal rate of return for countries without an inflation target[13], with countries able to choose a different rate if it is considered that it is warranted in their particular circumstances.

It is acknowledged that for some countries using the default rates of return may produce conservative estimates (notwithstanding the option for a country to choose an alternative if it considered warranted in its circumstances). However, given the benefits of this approach in terms of stability and international comparability, as well as not running the risk of inadvertently overstating the rate of return, it is considered that such an approach is justified.

The general government is not the only sector that produces non-market output. Non-market output is also produced by the central bank and by non-profit institutions serving households (NPISHs).

For central banks (whose output is unlikely to be significant) it is proposed to use the same rate of return as for general government.

For NPISH's, as a pragmatic solution and in the absence of being able to identify anything more suitable, it is proposed to use as the real rate the average SRTP of 2.6 percent from the OECD's Measuring Capital. The target inflation rate would be added to get the nominal rate of return. An alternative would be to use the general government rate of return; however, it is considered that the SRTP is more relevant in the context of NPISHs.

Calculating the net return to capital in practice

As indicated above, by definition the net return to capital is equal to the rate of return to capital multiplied by the value of non-financial assets used in production of non-market output. For current price estimates, nominal values (for both the rate of the return to capital and the value of non-financial assets) should be used. For volume estimates, the nominal rate of return to capital in the base period should be used, with the value of assts calculated using the prices of assets in the base period.

For countries with sectoral balance sheets, which are usually complied using the perpetual inventory method (PIM), the calculation is reasonably straightforward. However, allowance needs to be made for any assets used in market production, which for the sectors under consideration is likely to be only a small proportion.[14] A breakdown by asset-type is not necessary as the same rate of return to capital is applied to all asset classes.

Clearly, where sectoral balance sheets do not exist, the preferred approach is not possible. It should be noted at the outset that this is a broader issue. Balance sheets are an integral part of

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[13] For countries without an inflation target, using the higher value of two to three percent range seems justified.
[14] In the absence of specific information about the value of a sector's non-financial assets used in market production, this could be estimated by multiplying the sector's share of revenue from market production by the total value of the sector's non-financial assets.

the sequence of economic accounts. The PIM that produces balance sheet estimates also produces estimates of depreciation (formerly known as consumption of fixed capital) which is also necessary to calculate the value of non-market output. Importantly, depreciation estimates are also needed to calculate net measures such net domestic product and net national income. In the 2025 SNA, net measures are given greater prominence. It is recognized that this broader issue is one that will require focus in the implementation of the 2025 SNA. To this end, the IMF is developing guidance and a supporting tool for countries using the simplified PIM set out in Annex C of *Measuring Capital*. It is hopes that initiatives such as this will improve the availability of balance sheets and via this provide information to use in measuring the net return to capital for non-market production.

However, it is likely that by the time the 2025 SNA is implemented that there will be some countries that will still not have balance sheets. Such countries, in the absence of balance sheets, must be currently resorting to using surrogate measures for producing estimates of consumption of fixed capital for 2008 SNA purposes, generally based on simple models that are heavily driven by assumptions (which are either implicit or explicit).

Inevitably, in the absence of balance sheets, surrogate measures will also be required for estimating the net return to capital for valuing non-market output. Here, there would seem to be two possible ways to proceed. One would be to have a simple 'rule of thumb' by which the net rate of return to capital would be set to some pre-determined ratio of the associated depreciation estimate. Under a not implausible set of circumstances, the net rate of return to capital would be very similar to the estimate of depreciation, so a 1:1 ratio could be considered appropriate.[15] A somewhat more sophisticated approach would be to consider a range of scenarios with different assumptions that would establish various ratios of net return to capital to depreciation, and a country could chose the ratio for the assumptions that best matched its circumstances. It should be relatively straightforward to develop these scenarios well before the implementation of the 2025 SNA. It should be stressed though, that whatever approach is adopted, it should be seen as stop-gap measure pending the implementation of a PIM, simplified or otherwise.

Summary of recommendations

This paper makes the following recommendations:

1. The preferred method of determining the net return to capital for non-market production is to multiply a rate of return to capital by the value of non-financial assets used in non-market production.
2. To promote stability and international comparability, it is proposed that for estimating general government non-market output a real rate of return of two percent be used, unless there are compelling reasons to choose a different rate.
3. The nominal rate of return for a country should equal the real rate of return plus the country's target inflation rate. If a country does not have a target inflation rate, a default

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[15] In a 'back-of-an-envelope' analysis, for both Australia and the United States the depreciation on fixed assets for the general government sector is about five percent. If the nominal rate of return is also five percent, then the value of depreciation and the net return to capital is the same.

rate of three percent can be used, unless there are compelling reasons to use a different rate.

4. For central bank non-market output, it is proposed to use the same nominal rate of return as for general government.

5. For NPISH non-market output, it is proposed to use a real rate of return of 2.6 percent, with the nominal rate of return calculated using the same inflation measure that is applied in calculating the nominal rate of return for government.

6. Where countries do not have balance sheets to enable the preferred method of calculating the net return to capital for non-market production, it is proposed that a surrogate measure be developed based on a pre-determined relationship between the net return to capital and depreciation (with the specifics of this to be developed). Such countries are strongly encouraged to adopt at least a simplified PIM, not only to provide balance sheet information that could be used to calculate the next return to capital for non-market production, but also to provide higher quality estimates of depreciation for both estimating the value of non-market output and for deriving important net measures such as net domestic product and net national income.