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RESULTS OF THE SURVEY ON NATIONAL PRACTICES IN ESTIMATING DEPRECIATION AND NET CAPITAL STOCKS BY THE TASK FORCE ON LAND AND NON-FINANCIAL ASSETS

Joint meeting

To be held on 1-2 October 2013
OECD Conference Centre
Beginning at 2:00 p.m. on the first day

This document has been prepared by Jennifer Ribarsky (OECD - STD/NAD) and will be presented under item 23 of the draft agenda

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RESULTS OF THE SURVEY ON NATIONAL PRACTICES IN ESTIMATING DEPRECIATION AND NET CAPITAL STOCKS BY THE TASK FORCE ON LAND AND NON-FINANCIAL ASSETS

Introduction

1. In response to the 2008 financial crisis the Group of Twenty (G-20) Finance Ministers and Central Bank Governors Working Group on Reinforcing International Co-operation and Promoting Integrity in Financial Markets called on the International Monetary Fund (IMF) and the Financial Stability Board (FSB) to explore information gaps and provide appropriate proposals for strengthening data collection. As a response, the G-20 Data Gaps Initiative (DGI) focuses on 20 recommendations that aim to deal with the information gaps exposed by the crisis.¹ In particular, recommendation 15 of this report calls for the development of “a strategy to promote the compilation and dissemination of the balance sheet approach (BSA), flow of funds, and sectoral data more generally, starting with the G-20 economies.”

2. This strategy highlights the usefulness of balance sheet data in providing economic policy makers information on (the inter-linkages between) groups of actors which may have different economic objectives, functions, and behavior within an economy. The importance of sectoral coverage of national balance sheets provides a way for economic policy makers to better monitor the vulnerability of domestic economies to shocks.

3. Not only can balance sheet data be used to monitor economic activity but it can also provide a measure of sustainability. The Stiglitz/Sen/Fitoussi *Report of the Measurement of Economic Performance and Social Progress* states that while GDP and production measures provide important information on market production and employment there should also be an emphasis on well-being. In this regard, measures of well-being should be put in context with sustainability because increases in current well-being might occur at the expense of future well-being.² The consequences of such behaviour would, amongst others, be captured in balance sheet data.

4. The concept of compiling national balance sheets for countries is not new, but the availability of data is often limited, in particular for non-financial assets by sector. In response to the growing interest on balance sheet data, the revised transmission programme for the European System of Integrated Economic Accounts (ESA 2010) requires additional mandatory items for table 26 “Balance sheets for non-financial assets”.

¹ For information on the report to the G-20 Finance Ministers and Central Bank Governors go to www.imf.org/external/np/g20/pdf/102909.pdf

² Stiglitz/Sen/Fitoussi *Report of the Measurement of Economic Performance and Social Progress* recommendation 3 “Consider income and consumption jointly with wealth” at www.stiglitz-sen-fitoussi.fr/en/index.htm

5. Discussions on various fronts have been undertaken to strengthen the sectoral balance sheet data.³ One important finding from discussions with European Union (EU) Member States and discussions with non-EU countries was the recognition that the valuation of land and dwellings is a central issue when compiling balance sheets for non-financial assets. Central to this issue is the difficulty of most countries to separately identify the value of the land underlying the structure from the value of the structure on it.

6. Recognizing the need for more practical guidance on the estimation of non-financial assets, in particular for land and structures, a joint Eurostat/OECD Task Force, including participation from the European Central bank (ECB), was created in June 2012. A major goal of the Task Force is to provide a better understanding of how countries estimate stocks of land. According to the 2011 OECD Survey on Land Valuation in the National Accounts, many countries estimate (or are considering to estimate) net stocks of land through a “residual approach”: they use estimates on the total stock of land and structures, and then subtract an estimate of the stock of structures obtained through a perpetual inventory model. Under this residual approach, inaccurate assumptions about service lives and depreciation rates of dwellings and structures can lead to unrealistic estimates of stocks of land. Therefore, the Task Force endorsed a survey of general methods for estimating depreciation and net capital stocks to provide a better understanding of the methods countries employ to estimate net capital stocks of dwellings and other buildings and structures in national accounts.

7. This paper summarizes the initial responses to the survey provided by the national statistical offices of countries represented on the Task Force.

Survey on National Practices in estimating depreciation and net capital stocks

8. The questionnaire asks respondents to describe the assumptions (such as service lives, depreciation functions, and retirement patterns) and methods used to estimate depreciation and net stocks of dwellings and other buildings and structures. Appendix A provides the questionnaire sent to national statistical offices.

9. Fifteen countries responded to the survey and the results show that all of the respondents at least partly rely on the Perpetual Inventory Method (PIM), based on available time series of gross fixed capital formation (GFCF). In fact, most countries rely entirely on PIM using available time series of GFCF. Five out of the 15 respondents use census-based estimates in benchmark years and two countries rely on an imputed time series of GFCF for earlier years. At least one country utilizes a mixed approach where PIM was used for ownership transfer costs and other structures and administrative property records for dwellings and other buildings.

10. Respondents reported a range of approaches to measure depreciation. Eight out of the 15 respondents reported using a linear type of depreciation; four countries reported using geometric depreciation; and three countries reported using a mixed approach. For those countries that reported the use of linear depreciation, the retirement patterns varied across respondents with no one type of retirement pattern being most commonly used.

11. The level of detail provided in the survey varied across responses. Some respondents provided a very detailed break out of assumptions while other countries use a less detailed set of assumptions. Assumptions may vary by asset type, industry, and/or sector. Some countries reported a detailed set of assumptions for estimating net stocks while other countries reported averages or ranges of assumptions over broad categories of assets.

³ The OECD and IMF jointly organized a conference in March 2011 on “Strengthening Sectoral Position and Flow Data in the Macroeconomic Accounts”, www.imf.org/external/np/seminars/eng/2011/sta/

12. Comparing assumptions for narrow categories of assets can be difficult but the following tables and graphs make an attempt to compare the results. For a specific asset, respondents may report similar service lives, but use different geometric depreciation rates or retirement functions. Some respondents report only geometric depreciation rates, others only service lives making comparisons difficult because the relationship between service lives and depreciation are often unclear.

13. Because of the importance of dwellings in household wealth there is a particular interest in how the net stock of dwellings is estimated. Table 1 summarizes country responses on the assumptions and methods used for dwellings. As seen in table 1, all the countries shown on the table (with the exception of Denmark) estimate the value of the net stock of dwellings using the PIM method. The assumptions on service lives for dwellings varied across countries. Countries reported service lives ranging from 50-60 years (Finland, Korea and United Kingdom) up to 100 years (Norway), the median being in the range of 70-80 years. One wonders whether this is a statistical artefact, or a reflection of different characteristics of the relevant dwellings.

14. Graphs 1 through 7 present assumptions on services lives and depreciation rates for selected countries. The depreciation rates shown in the graphs are geometric with the exception of Korea.

Conclusions and Next Steps

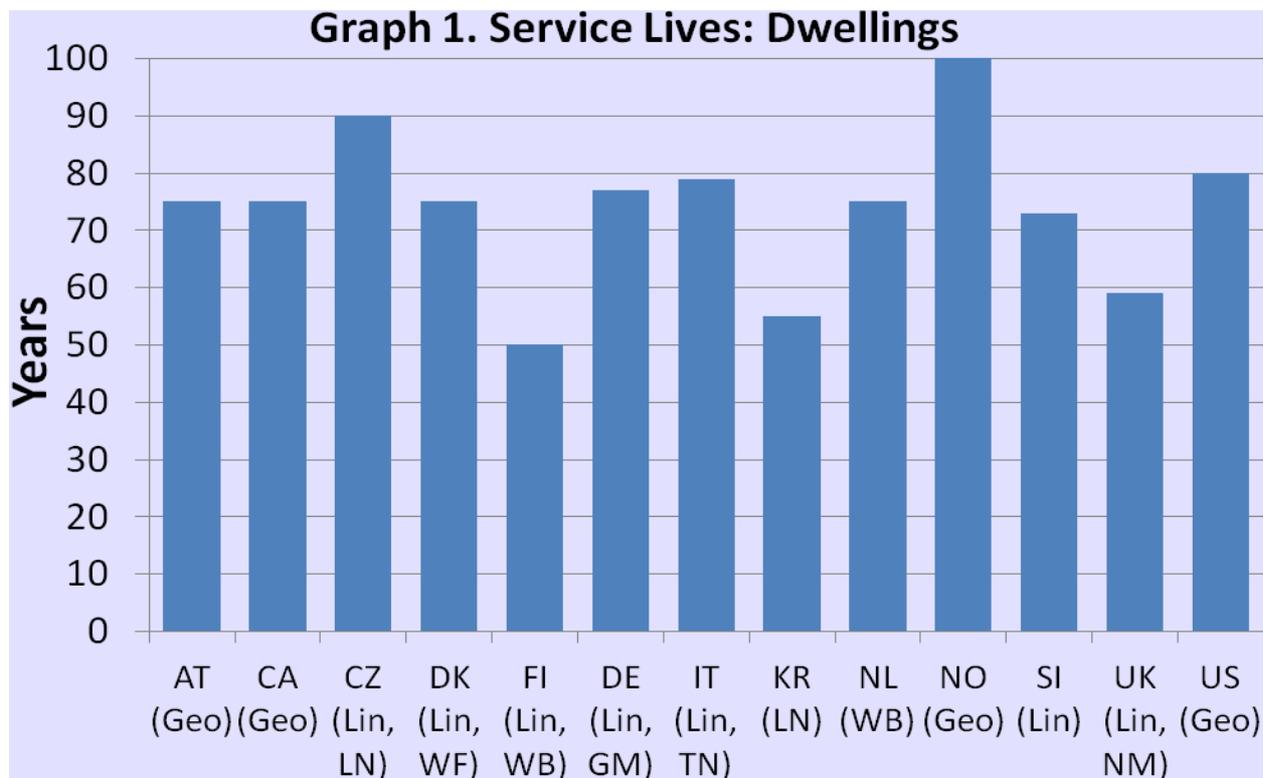
15. This paper briefly summarizes the initial responses to the survey provided by the national statistical offices of countries represented on the Task Force. Responses to the survey were evaluated and the questions were somewhat tweaked for a wider distribution of the survey to all EU Member States and OECD countries. The revised survey will be conducted in September 2013.

16. In order to more easily compare countries' assumptions and the impact of those assumptions on net stocks, the revised survey will ask respondents to provide enough information so that the Task Force can compare across countries' national accounts how specific types of assets depreciate and retire over time. For example, for a specific type of building the Task Force would like to measure how much of an initial investment remains in the capital stock after 10 years, 20 years, etc.

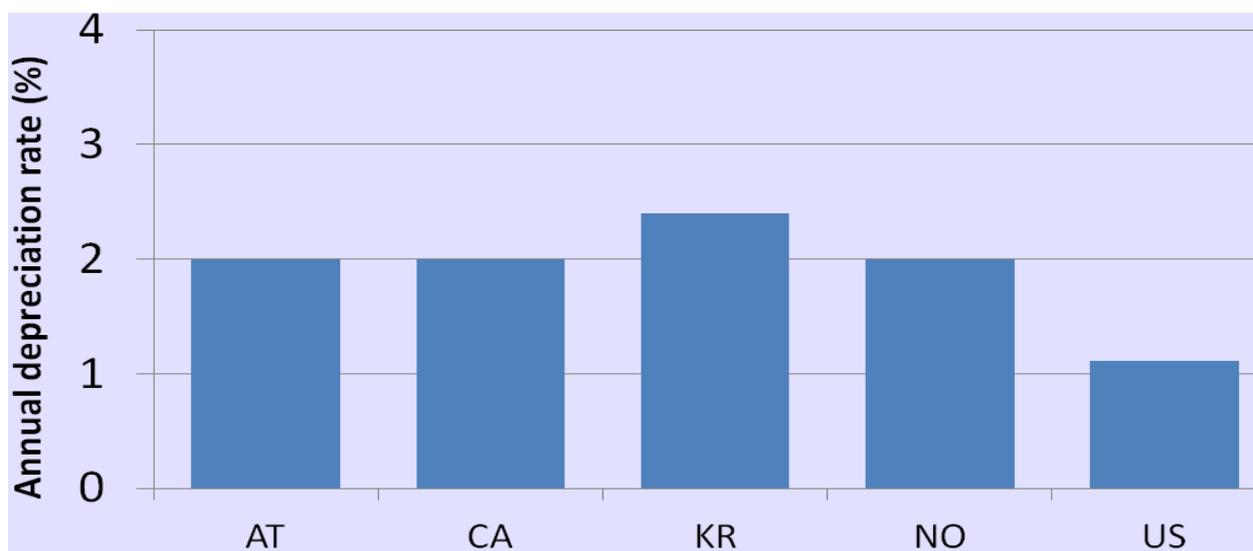
Table 1. Summary of OECD-Eurostat survey: DWELLINGS

	Net stock estimation method		Service life	Other assumptions		Variation of Service life and other assumptions	Source of information	Used in estimating land stock?
		(Benchmark-year based on)		Depreciation	Retirement			
Austria	PIM, based on available time series		75	Geometric		No	Other countries' estimates	No
Canada	PIM, based on available time series	Population census	75	Geometric		No	Related studies	Yes
Czech Republic	PIM, based on imputed time series		90	Linear	LN	No	Expert advice, Tax lives, Census, Survey	No
Denmark	Other		75			Yes	Related studies, Administrative records	No
Finland	PIM, based on available time series		50	Linear	WB	No	International experiences, Expert advice	No
Germany	PIM, based on available time series	Population census	77 (avg)	Linear	GM	Yes	Tax lives, Administrative records, Expert advice	No
Italy	PIM, based on available time series		79	Linear	TN	No	Expert advice	Yes
Korea	PIM, based on available time series	Initial stock as of 1953	55	Present Value of Efficiency approach	LN	Yes	Housing Census, Own estimate	Δ (Not directly)
Netherlands	PIM, based on available time series		75		WB	No	Expert advice	Yes
Norway	PIM, based on available time series		100	Geometric		No	Expert advice, Other countries' estimate	No
Slovenia	PIM, based on available time series	Population census	73.4	Linear		No	Census, Tax lives, Administrative records, Expert advice	No
United Kingdom	PIM, based on available time series		59	Linear	NM	Yes	Tax lives, Company accounts, Related studies	No
United States	PIM, based on available time series		80	Geometric		No	Survey, Expert advice, Related studies	No

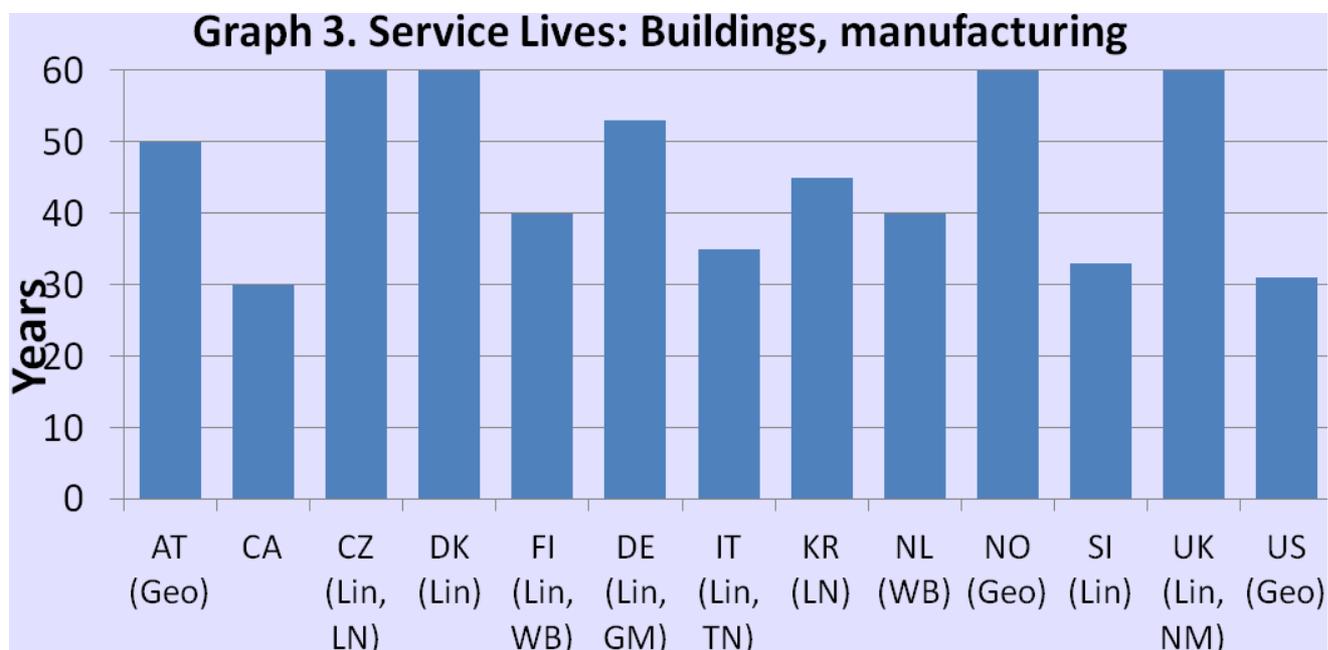
Notes: Retirement (or mortality) patterns may be Normal (NM), Winfrey (WF), Weibull (WB), Log-normal (LN), Gamma (GM), Truncated-normal (TN), Delayed linear (DL), or Poisson (PS).



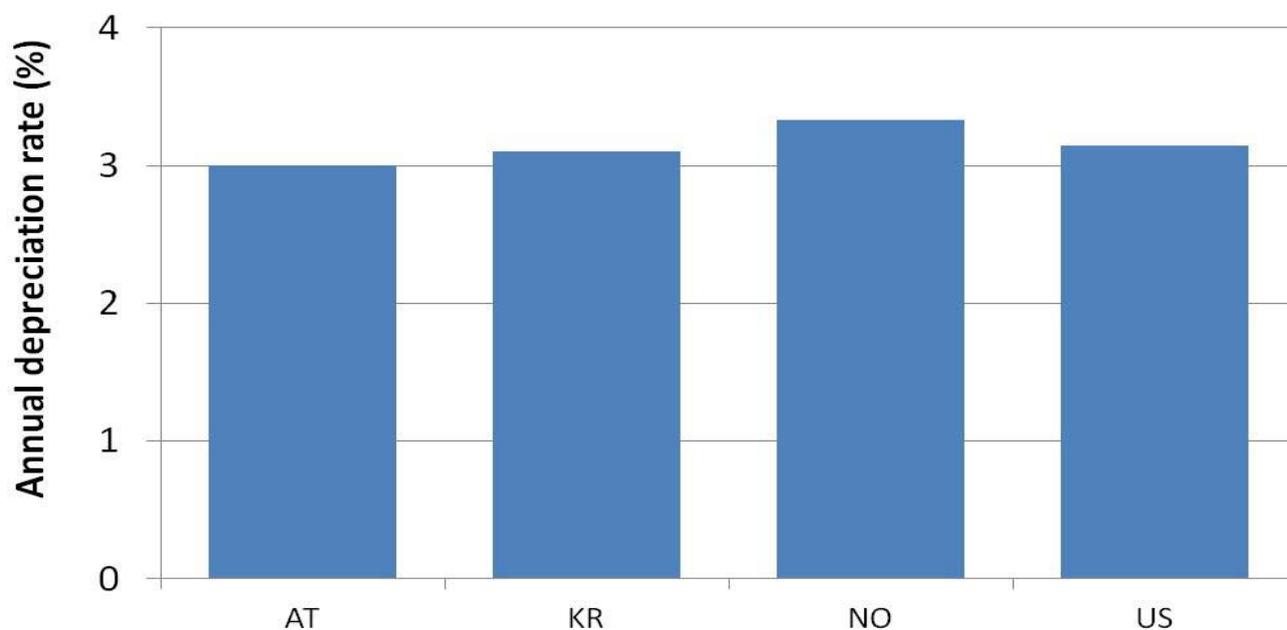
Graph 2. Depreciation Rates: Dwellings



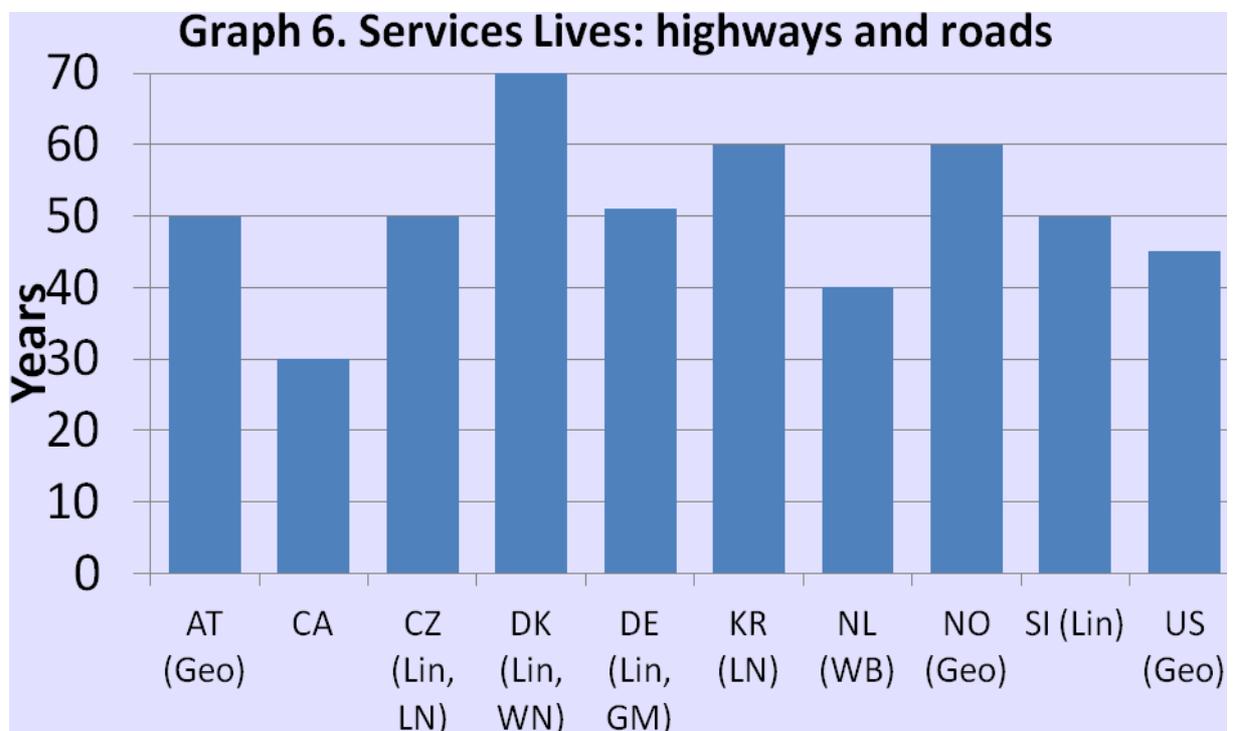
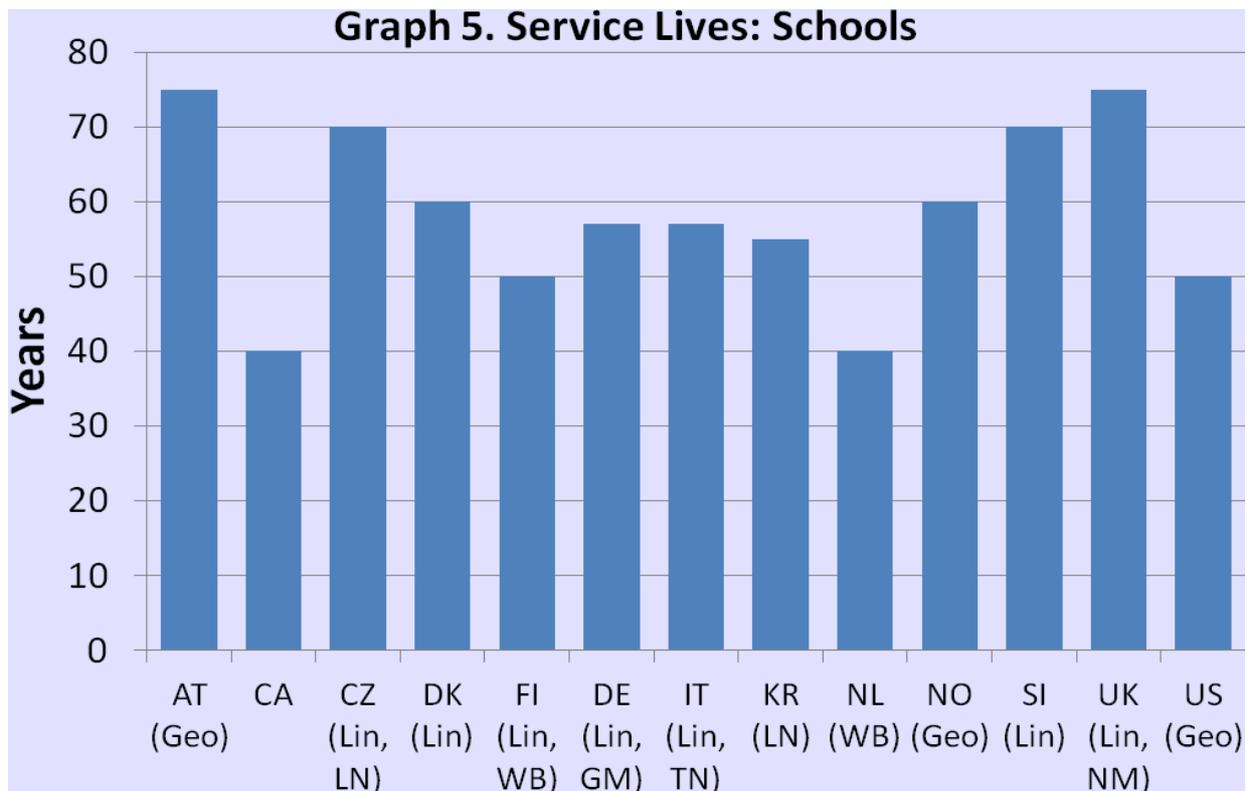
Note. AT, CA, NO, and US are geometric depreciation rates. KR does not use a geometric approach.



Graph 4 Depreciation Rates: Buildings, manufacturing



Note. AT, NO, and US are geometric depreciation rates. KR does not use the geometric approach



Graph 7. Depreciation Rates: Highways and Roads



Note. AT, NO, and US are geometric depreciation rates. KR does not use the geometric approach.

APPENDIX A: THE QUESTIONNAIRE

Introduction

The Eurostat-OECD Task Force on land and other non-financial assets has endorsed a survey of general methods for estimating depreciation and net capital stocks (“wealth stocks”) of dwelling and other buildings and structures in national accounts. The purpose of this survey is to provide a better understanding of the methods countries employ to estimate net stocks, identify best practices, and promote international discussions on a number of issues.

A major goal of the Task Force is to provide a better understanding of how countries estimate stocks of land as a residual. According to the 2011 OECD Survey on Land Valuation in the National Accounts, many countries estimate net stocks of land through a “residual approach”: they estimate the total stock of land and structures, and then subtract an estimate of the stock of structures obtained through a perpetual inventory model. Under this residual approach, inaccurate assumptions about service lives and depreciation rates of dwellings and structures can lead to unrealistic estimates of stocks of land. To address this problem, the Task Force hopes to provide a compilation guide that provides practical guidance for statisticians seeking to provide improved data on stocks of land.

It is hoped that responses to this survey can be provided by no later than 15 April 2013 so that the TF will be able to develop an issues paper for discussion at its meeting on June, 24-26. For any assistance in completing the survey please contact Mr. Bob Kornfeld at Robert.Kornfeld@bea.gov. Completed forms should be returned to Mr. Hans Wouters (Johannes.Wouters@ec.europa.eu) and Mr. Bob Kornfeld (Robert.Kornfeld@bea.gov).

The survey is designed as a tool to motivate wider discussions at the international level and so we hope it does not raise any issues of confidentiality. If however your response raises confidentiality issues we ask you to please stipulate, if necessary, whether the responses provided should be considered as confidential and not to be circulated in the public domain.

For a detailed explanation of methods for estimating net stocks, the perpetual inventory method, and the terms used in this survey, please see OECD (2009) *Measuring Capital: OECD Manual*, Second edition. Link: <http://www.oecd.org/dataoecd/16/16/43734711.pdf>

OECD/Eurostat Survey of National Practices in Estimating Service Lives, Depreciation, and Net Stocks of Dwellings and other Buildings and Structures

Country:.....

In your responses to the next several questions, please describe the assumptions (such as service lives) and methods you employ to estimate depreciation and net stocks of dwellings and other buildings and structures. In the *System of National Accounts 2008 (SNA2008)* these assets are classified as (see Chapter 10, 10.68-10.77) :

- Dwellings (AN111)
- Other buildings and structures (AN112)
 - Buildings other than dwellings (AN1121)
 - Other structures (AN1122)
 - Land improvements (AN1123)

Part A: Basic Assumptions of the Perpetual Inventory Model (PIM)

Please answer the following questions (questions 1-7) in the format of the table below. Please provide as much information as possible. If it is not possible to use the table then please provide your answers after the questions in any other format.

1. Asset Category	2. Net Stock Estimation Method (PIM or other)	Assumptions of the PIM (if used)				7. Is this estimate used to estimate the stock of land?
		3. Service lives	4. Other assumptions (age-price profiles, depreciation functions, retirement patterns)	5. Do service lives and assumptions vary over time?	6. Source of information	

1. (Column 1 in the table above). Please list the most detailed asset categories of dwellings and other buildings and structures for which separate estimates of service lives, depreciation functions, net stocks and depreciation are available.

If possible, please also indicate whether, for each asset category, the methods and assumptions (such as service lives) vary by industry (ISIC, NAICS, NACE or similar industry categories.) or by institutional sector (in the SNA2008, sectors are non-financial corporations, financial corporations, general government, households and non-profit institutions serving households.)

If such a detailed list of assumptions is not available, please provide as much detail as possible. Options include a list of assumptions by asset category only (without industry/sector detail), or ranges of assumptions (for example, asset lives of 50-60 years) by asset category, industry and/or sector, or whatever detail is readily available.

1(b) What are the reasons for this categorization?

2. (Column 2 in the table above) Please select from the following list the method(s) of net stock estimation employed for each of the asset categories, industries, and institutional sectors for which distinct net stock estimation methods exist (see *Measuring Capital*, Chapter 15).

- a. Perpetual Inventory Model (PIM), based on an available time series of investment
- b. PIM, based on an imputed time series of investment (derived from an estimated relationship with GDP or other method)
Benchmark-year estimates based on
- c. Wealth surveys
- d. Population censuses
- e. Fire insurance records
- f. Company accounts
- g. Administrative property records
- h. Share valuations.
- i. Other, namely....

2(a) For responses b-h, please give further details about their nature.

3. (Column 3) Please list the service lives assumed for each of these asset categories (and sector and industry, if available). If a detailed list of specific assumptions is not available, please provide ranges (50-60 years, for example). For a discussion of service lives, please see Chapter 13 of *Measuring Capital*.

4. (Column 4) Please list the other assumptions (age-price profiles, depreciation functions, retirement patterns, etc) employed in estimates of depreciation for each of these asset categories (and sector and industry, if available). If a detailed list of specific assumptions is not available, please provide ranges.

For a discussion of age-price profiles, depreciation functions, retirement patterns, etc, please see Chapter 12-13 of *Measuring Capital*. Depreciation functions may be straight line or geometric, for example. Retirement patterns or “mortality patterns” may be Normal (NM), Winfrey (WF), Weibull (WB), Log-normal (LN), Gamma (GM), Truncated-normal (TN), Delayed linear (DL), or Poisson (PS).

5. (Column 5) Do the assumed service lives and other assumptions vary over time?

5(a) If yes, please explain how they are assumed to change.

6. (Column 6) How did your agency estimate or determine the service lives and other assumptions? (please refer to the methods and sources of information outlined in *Measuring Capital*: 13.1.1).

Choose from tax lives, company accounts, statistical surveys, administrative records, expert advice, other countries' estimates, implicit service lives in depreciation rates, or other sources

If others, please specify.

7. (Column 7) Is the estimate of this asset category (and sector or industry) used to estimate the stock of land, through the “residual method” described above?

Part B: Additional Questions

8. The estimates of net stocks also depend on estimates of Gross Fixed Capital Formation and prices.

8(a). Please describe (in general terms) the source data and quality of the estimates of gross fixed capital formation (GFCF) used for the PIM estimates.

8(b). Please describe (in general terms) the source data and quality of the price indexes for gross fixed capital formation used for the PIM estimates. Are chain prices used?

8(c). To your best knowledge, do the limitations in the GFCF data lead to problems in estimates of stocks of land? Please specify as much as possible the main problems.

9. How are transfer of ownership costs treated in estimates of structures? Are they included in GFCF (as the SNA 2008 recommends)? How are they defined and depreciated?

10. Are special methods used to estimate net stocks of historic buildings, and/or the underlying land? If so, please explain.

11. How frequently are the estimates of depreciation updated, and how soon are annual and quarterly estimates produced?

12. How confident are you in the assumptions (especially service lives and depreciation functions) used for these estimates? What would you say are the most significant problems in your estimates of net stocks of dwellings, other buildings, structures, and land? How could the estimates be improved?

13. What are your plans, for example in response to the transition to SNA 2008 or ESA 2010, for the future regarding estimates of net stocks of dwellings, other buildings, structures, and land?

14. Please submit details of any other national documentation, additional estimates, tables, and so on, you feel may be useful for the purposes of this survey.

15. Please supply the contact details of a person who could be approached for clarification and further information regarding your submission.