



MEASUREMENT OF LAND ON A COUNTRY'S BALANCE SHEET

TASK FORCE ON LAND AND OTHER NON-FINANCIAL
ASSETS

*l'Association de Comptabilité Nationale
Paris*

21 November 2014

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Overview

- Background
- Classification
- Data sources
- Overview of estimation methods
- Overview of service lives and depreciation



Motivation for creating a Task Force on land and non-financial assets

- Created in response to:
 - G-20 data gaps initiative;
 - Recommendation 15 “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.”
 - ESA 2010 requirements for additional mandatory items for table 26 “Balance sheets for non-financial assets”
- A joint Eurostat/OECD Task Force, including participation from the European Central bank (ECB), was created in June 2012.



Mandate of Task Force

- The goal of the Task Force is to elaborate on the conceptual and measurement issues related to the estimation of non-financial assets
- Recognition that the valuation of land and dwellings is a central issue when compiling balance sheets for non-financial assets
- A major goal of the Task Force is to provide a better understanding of how countries estimate stocks of land



Shares of financial & non-financial gross wealth of households & NPISH

Country ¹	Financial wealth	Non-financial wealth		
			Housing wealth	Value of land
Italy	40	60	57	27
Germany	43	57	52	16
The Netherlands	54	46	43	21
United States	69	31	25	-
France	35	65	63	33

¹ Data for Italy, The Netherlands and France refer to 2011. Data for Germany and United States refer to 2012

Sources: Banca d'Italia, DESTATIS, Deutsche Bundesbank, ONS, CBS, FED; ECB



Structure of the Guide

- Chapter 1- Why do we need this guide?
- Chapter 2- Concepts and definitions
- Chapter 3- Classification
- Chapter 4- Data sources
- Chapter 5- Direct estimations
- Chapter 6- Indirect estimations
- Chapter 7- Sectorisation and cross classification
- Chapter 8- Special estimation cases
- Chapter 9- The value of land and its contribution to wealth



Classification

- Currently, there is no commonly used approach to the sub-classification of land
- Proposed minimum classification

Classification of land

1. Land underlying buildings and structures (AN.2111)

1.1 Land underlying dwellings (AN.21111)

1.2 Land underlying other buildings and structures (AN.21112)

2. Land under cultivation (AN.2112)

2.1 Agricultural land (AN.21121)

2.2 Forestry land (AN.21122)

2.3 Surface water used for aquaculture (AN.21123)

3. Recreational land and associated surface water (AN.2113)

4. Other land and associated surface water (AN.2119)



Data sources

- Major constraint in estimating land is the lack of data from a single source
- Administrative sources (cadastre maintained by a land registry office, tax authority, or land information centre)
- Collection sources (population and housing census, business survey, or other type of survey including data collected by another government agency)
- Price sources



Estimation methods

- Estimation method used is driven by available source data
- Direct method: area of each parcel of land is multiplied by an appropriate price
- Indirect method: obtains either the value of the land indirectly or obtains the price of the land indirectly
 - Residual approach
 - Hedonic approach
 - Land-to-structure ratio approach



Direct estimation method

- $LV_t = \sum_{i=1}^n p_{i,t} * x_{i,t}$,
- Where LV_t is the total value of land in the observed year t
- p_{it} reflects the price for land type i in the observed year t
- x_{it} the corresponding area measure



Strengths & weaknesses of direct method

- Strength
 - Focus on area measure ensures complete coverage of land within the SNA asset boundary
 - Not as sensitive to key assumptions as results estimated using indirect method (i.e., PIM)
- Weakness
 - Huge data requirements (detailed land area and price)
 - Sometimes difficult to obtain current market price information for each parcel of land



Residual Approach

- $LV_t^i = CV_t^i - C_t^i$
- Where LV_t is the total value of land at time t for each category of constructions
- CV_t^i combined value of structures and land at time t for each category of constructions
- C_t^i the value of constructions (i.e., the net stock of structures only)



Components of residual approach calculation

- Combined value can be estimated by
 - Appraisal method
 - Quantity times price (e.g., number of dwellings in a country * price of real estate)
 - Net present value of future rentals
- Construction (net stock of structures value)
 - Normally based on Perpetual Inventory Method (PIM)



Strengths & weaknesses of residual approach

- Strength
 - Viable option if separate data sources don't exist for the structure and land underlying
 - Values of the real estate are frequently available as well as the PIM value of structures
- Weakness
 - Every bias in the PIM and/or methodology used to calculate the combined value affects the resulting value of underlying land
 - Inaccurate and inconsistent estimates of CV and C can lead to negative values of land!



Land-to-structure ratio approach

- Land-to-structure ratio = Value of land / Value of structures
- Value of land = Value of structures * Land-to-structure ratio
- Value of structures normally based on PIM method



Strengths & weaknesses of residual approach

- Strength
 - Avoids the potential issue of negative values for land (doesn't control to combined value)
- Weakness
 - Degree of representative of sample used to derive the land-to-structure ratios



Hedonic approach (simplest form)

- $P_i^P = P^B * B_i + P^L * L_i + \epsilon_i \quad i=1, \dots, n.$
- Where P^B is the price per square meter of building
- P^L is the price for one square meter of land
- Input to the model:
 - P_i^P is the property price for observation number i
 - B_i is size of the building measured in square meters for observation number i
 - L_i is size of the land measured in square meters for observation number i .
 - ϵ_i is the error term

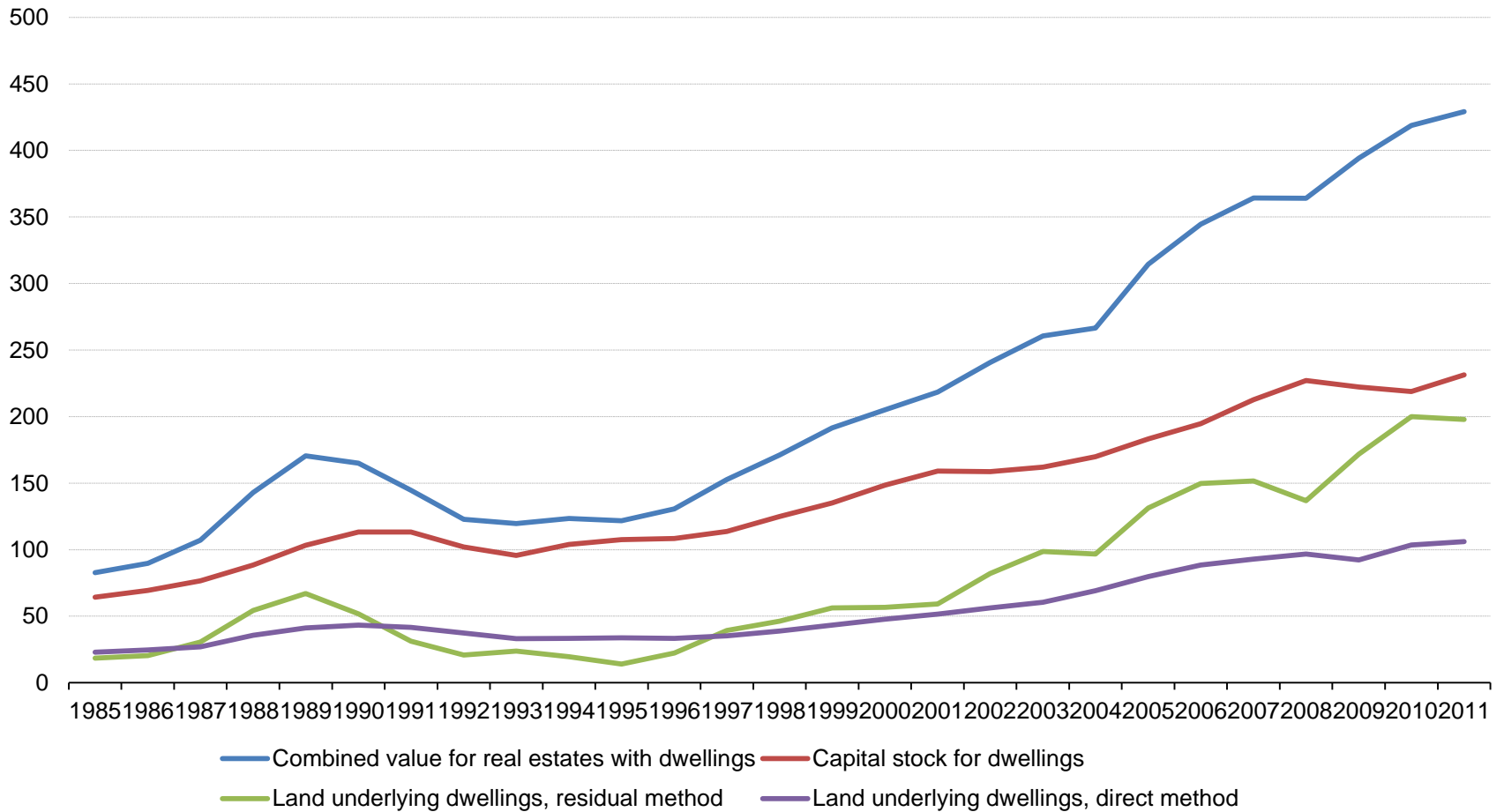


Strengths and weaknesses of hedonic approach

- Strength
 - Provides a set of consistent figures for land, buildings, and the combined value
- Weakness
 - Technically difficult and very data intensive
 - High risk of multicollinearity

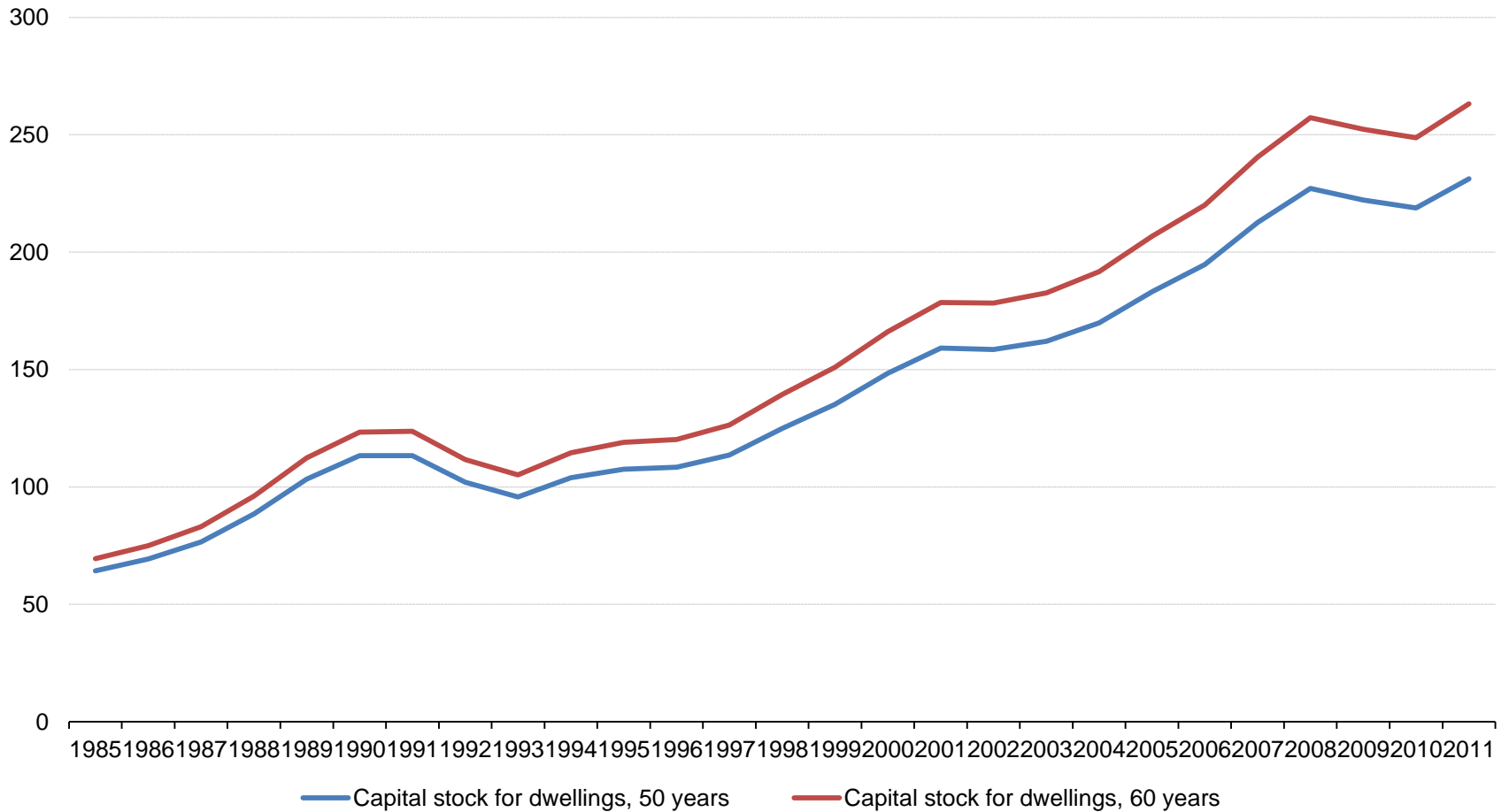


Case study- Dwellings in Finland



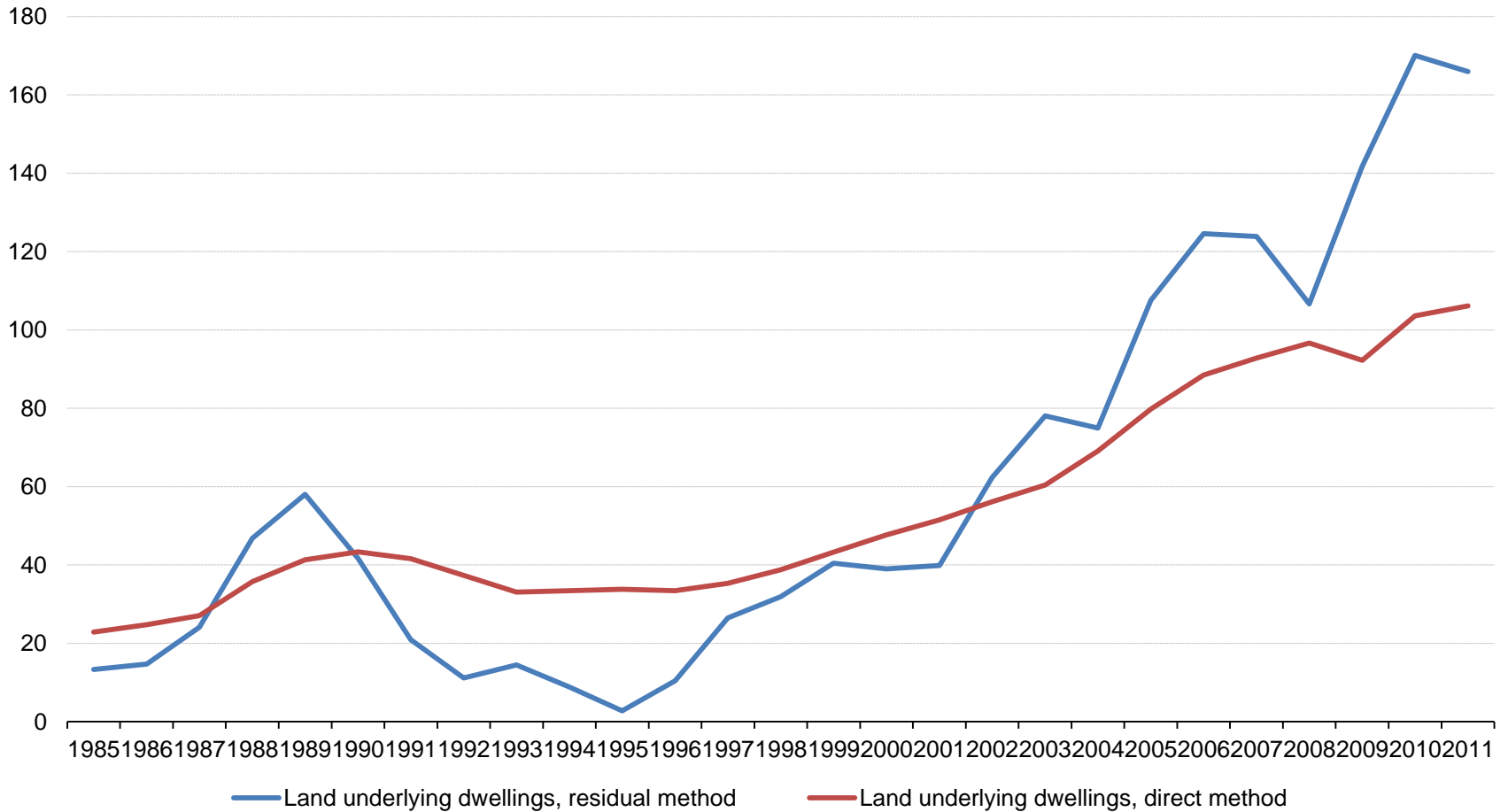


Capital stock for dwelling- Finland



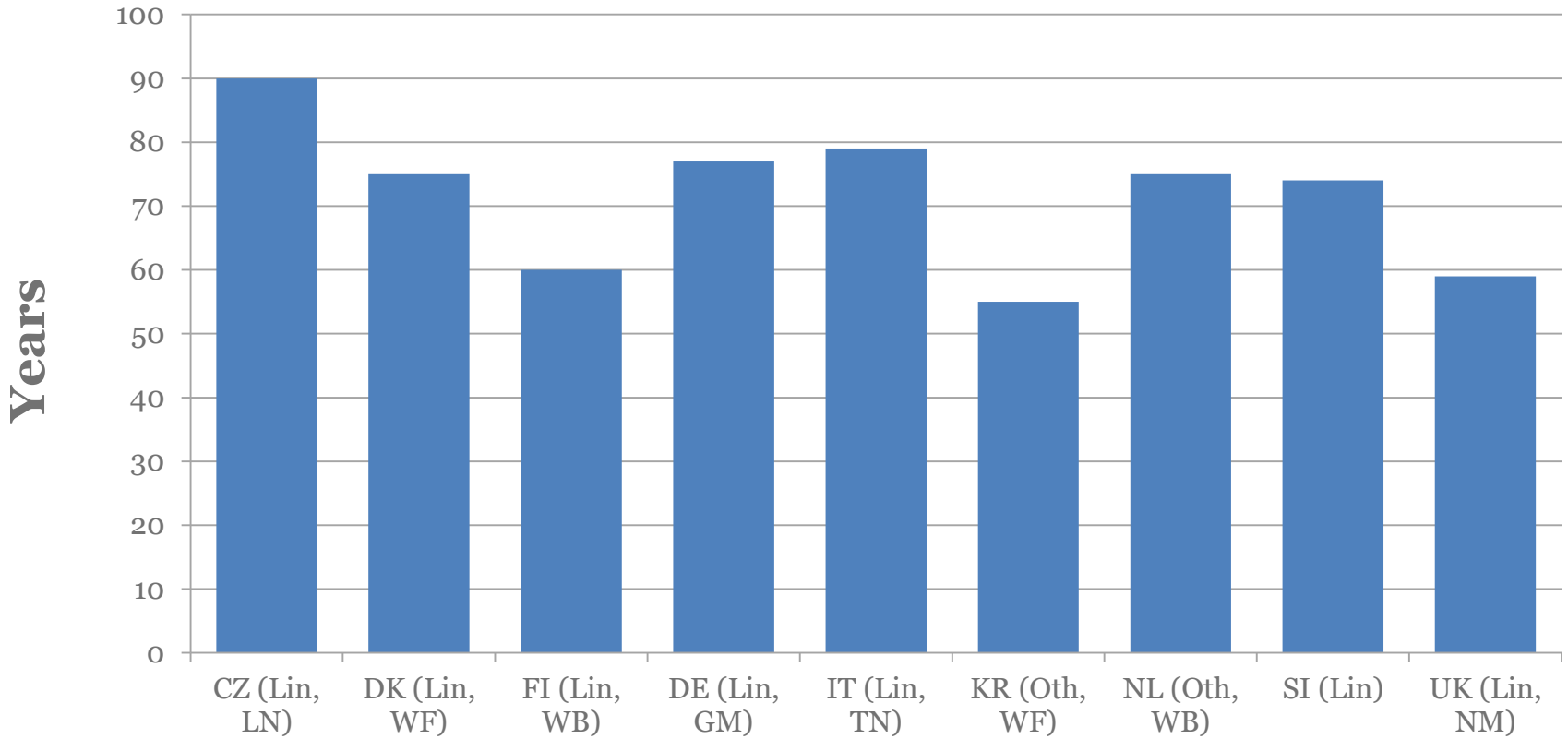


Land value direct vs residual, 60 years Service life





Service lives for dwellings





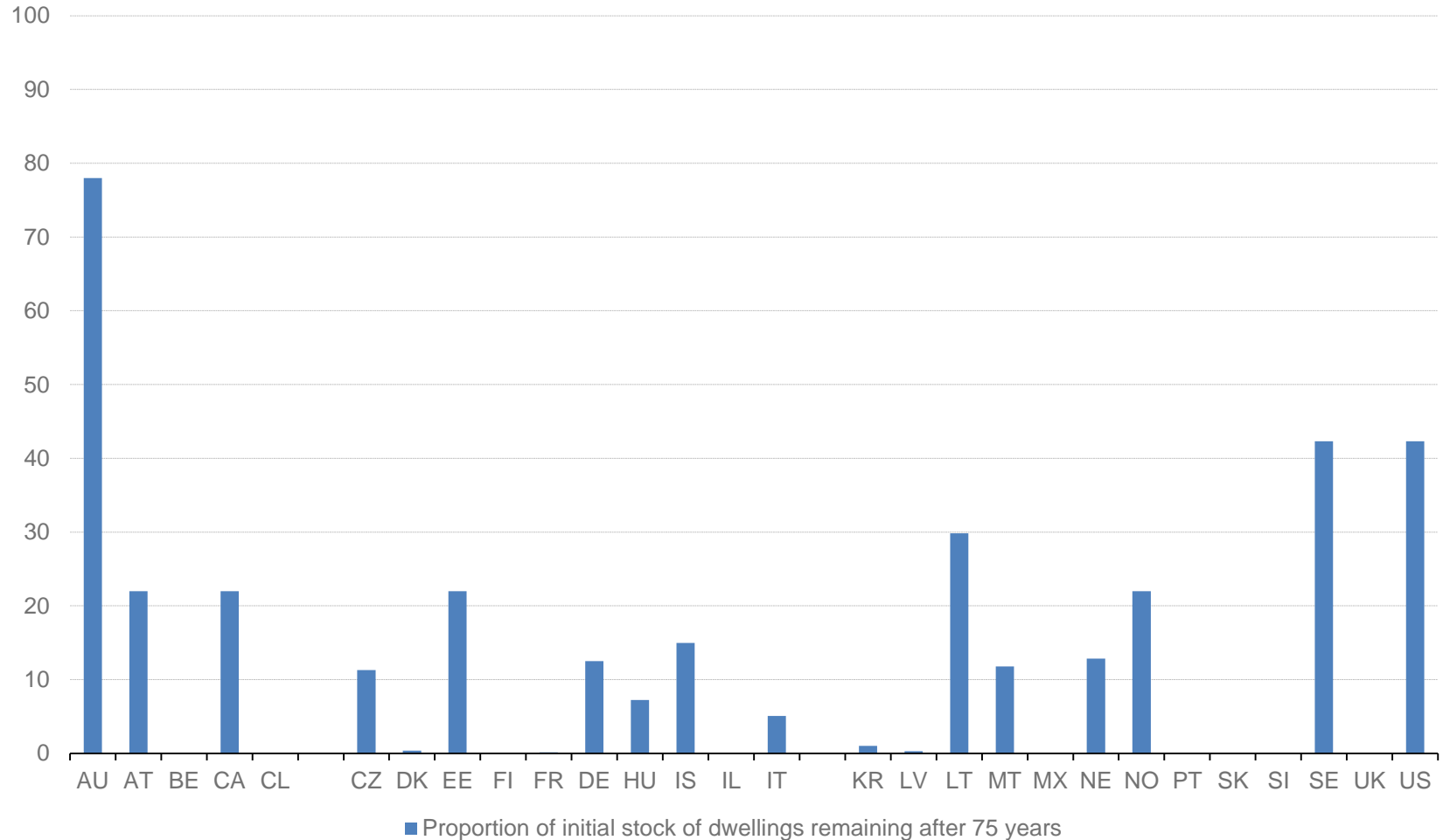
Depreciation rates dwellings



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



Proportion of initial stock of dwellings remaining after 25, 50, 75





Next steps

- Guide in final stages of review
- To be published in early 2015
- Eurostat mandatory data submission on land for the combined household & NPISH sector beginning in 2017