

Housing: Approach and Data Requirements

For the housing basic headings, like the other basic headings, two broad components must be addressed: (1) how to estimate household expenditures on dwelling services in the gross domestic product (GDP), and (2) how to calculate purchasing power parities (PPPs) in accordance. Before delving into the methodology, it is important that readers understand what needs to be computed for which basic headings.

According to the International Comparison Program (ICP) Classification, two categories¹ relate directly to dwelling services (see table 9.1). Under these two categories, two basic headings—110411.1, actual and imputed rentals for housing, and 130111.1, housing—require price data on rentals. For the rest of the basic headings, economies collect prices through the household final consumption survey. Because basic heading 130111.1, housing, under the government section uses the PPPs for 110411.1, actual and imputed rentals for housing, as reference PPPs, it is sufficient to focus on how to compute PPPs for actual and imputed rentals.

What distinguishes dwelling services from other segments of the ICP and makes them comparison-resistant is that the price collection method is not straightforward. To further explain, dwellings fall into two subsets—rented dwellings and owner-occupied dwellings. For rented housing, it is easier to tell how much tenants are paying for dwelling services, whereas owner-occupied housing is more complex.

Regardless, households' consumption expenditures should include both the actual expenditure by households on rents for dwellings and an estimate of how much owner-occupiers would have to pay if they had to pay rent for their dwellings instead of owning them, as defined in the System of National Accounts (SNA).

DEFINITIONS OF HOUSING STOCKS

Definitions and stratifications of housing stocks differ significantly across economies. The ICP has adopted the structured product description (SPD) approach for the household final consumption survey. Definitions of housing stocks help ensure consistency of comparisons across economies and regions. The information in this section is intended to serve as a guideline; national coordinating agencies would clearly indicate where national usage differs from the guideline and specify their treatment in the national accounts.

Dwelling Type

Modern Dwellings

Modern dwellings are generally built by professional building enterprises. The walls are made of durable materials such as concrete, ceramic bricks, cement blocks, plywood, or wooden planking, and the roofs are covered in tiles,

Table 9.1 Housing Classification, ICP 2011

110000	INDIVIDUAL CONSUMPTION EXPENDITURE BY HOUSEHOLDS
110400	HOUSING, WATER, ELECTRICITY, GAS, AND OTHER FUELS
110410	ACTUAL AND IMPUTED RENTALS FOR HOUSING
110411	<i>Actual and imputed rentals for housing</i>
110411.1	Actual and imputed rentals for housing
110430	MAINTENANCE AND REPAIR OF THE DWELLING
110431	<i>Maintenance and repair of the dwelling</i>
110431.1	Maintenance and repair of the dwelling
110440	WATER SUPPLY AND MISCELLANEOUS SERVICES RELATING TO THE DWELLING
110441	<i>Water supply</i>
110441.1	Water supply
110442	<i>Miscellaneous services relating to the dwelling</i>
110442.1	Miscellaneous services relating to the dwelling
110450	ELECTRICITY, GAS, AND OTHER FUELS
110451	<i>Electricity</i>
110451.1	Electricity
110452	<i>Gas</i>
110452.1	Gas
110453	<i>Other fuels</i>
110453.1	Other fuels
130000	INDIVIDUAL CONSUMPTION EXPENDITURE BY GOVERNMENT
130100	HOUSING
130110	HOUSING
130111	<i>Housing</i>
130111.1	Housing

Source: ICP, <http://icp.worldbank.org/>.

wooden shingles, or metal sheeting. Such dwellings usually have facilities such as electricity, piped water, and indoor toilets. Most dwellings in urban areas are classified as modern.

Typically, modern dwellings are classified as houses or apartments. However, this breakdown is not always captured in dwelling stock enumerations or used in national account estimations.

A house stands alone in its own grounds, separated from other dwellings by at least half a meter (although a flat, such as a granny flat, may be attached to it or a converted garage).

Some economies may distinguish between a separate house and a semidetached, row, or terrace house or a townhouse that is attached to one or more similar dwellings, typically sharing a common wall or walls. These dwellings have their own private grounds and no other dwelling above or below them. The owners of such dwellings are responsible for maintaining and repairing the roof and exterior walls.

Flats, units, and apartments are dwellings that are usually multistory and do not have their own private grounds. Generally, they share a common entrance foyer or stairwell. Units in multistory buildings may also be owned as condominiums and cooperatives or rented. In either case, the maintenance costs for external and common areas are included in the rents or fees.

Traditional Dwellings

Traditional dwellings are generally built by family members or other unpaid labor. The walls are made of less durable materials such as dried clay, bamboo, or latticework, and the roof is made of reeds, straw, or palm fronds. Traditional dwellings may or may not have electricity or piped water, let alone other facilities. These dwellings are generally located in rural areas. Some complications associated with this typology are the following:

- Many dwellings in or very near to large cities such as shanty towns or *favelas* meet the definition of a traditional dwelling. These may be rented or owner-occupied. If these dwellings are built of durable materials such as cinder blocks and have electricity and piped water, they should be classified as modern housing.
- Many dwellings in rural areas may be built with family labor but use cinder block or other durable wall and roof construction, often with at least piped water and electricity. Furthermore, self-built housing in urban areas may be of modern construction, often of high quality. Such dwellings should be classified as modern housing.
- Some economies characterize structures as of poor, fair, or good construction, which does not fit neatly into the modern-traditional dichotomy. However, poor construction in rural areas may safely be classified as traditional housing.

Facilities

This section describes the types of facilities that may be found in a modern dwelling.

Electricity is usually the main electricity supplied by a generating company. However, electricity may also be generated by the household itself such as from a diesel or gasoline generator or wind power.

Inside water is either running water that is piped into the dwelling itself or water from an underground spring or well that is for the exclusive use of the household. A dwelling that takes water from a communal standpipe or well should not be counted as a dwelling with inside water.

A *private toilet* may be either a water-flushing WC-type toilet or a chemical toilet. It is for the exclusive use of the occupants of the dwelling unit and has running water. The toilet may be inside the dwelling or in a separate structure.

Central heating, air-conditioning, or both are found primarily in modern construction in urban areas. Because information about these facilities will be helpful in linking economies with different qualities of housing stock, the economies should provide whatever information is available. Air-conditioning may be a central system or room systems covering most of the living area.

Living Space

Economies record living space in terms of number of rooms, square meters, or both. The rental survey (to be covered later) uses square meters as a measure; the dwelling services questionnaire also asks for number of rooms. In the calculations of PPPs, the unit of measure is the actual or imputed rent per square meter by dwelling type, size of dwelling, or in total. Economies that record only the number of rooms in their regular survey are asked to supply a rough estimate of the relationship of the number of square meters to the number of rooms, taking into account the definition of rooms. (Rooms include bedrooms, sitting rooms, dining rooms, study rooms, play rooms, and the like, but exclude kitchens, hallways, shower rooms, bathrooms, and toilets.)

Usable surface is the floor area of living rooms, kitchens, utility rooms, shower rooms, bathrooms, toilets, and hallways, minus the wall thickness and door and window recesses. Stairs, open balconies and terraces, and cellars and lofts (when not equipped as usable premises) are not included. For attics, only the section with a ceiling height of at least 1.7 meters is included. In practice, few economies have housing statistics that use this exact definition, but approximations are accepted.

Location

There is no standard international definition of *urban* and *rural*. Economies should use their own definitions of large and small urban and classify all other areas as rural.

ESTIMATING HOUSEHOLD EXPENDITURES ON DWELLING SERVICES

According to the System of National Accounts, household consumption expenditures should include both the actual expenditures by households on rents for dwellings and an estimate of how much owner-occupiers would have paid in rent if they had to rent their dwellings instead of own them.

This estimate is referred to as an "imputation," and the SNA suggests that the best way to make the imputation is to use the rents actually paid for similar dwellings. Thus, for example, the rent of an owner-occupier living in her own two-story, six-room detached house with 200 square meters of floor space in a suburb of the capital city is to be imputed at the average rent actually paid for a similar dwelling in a similar location.

To make these imputations, the national accounts compiler will need information on the rents being paid for different kinds of houses and apartments in different parts of the economy.

In many economies, however, dwellings are only available for rent in a few locations, and the few that are available for rent may not be typical of the majority of dwellings in the economy. For example, they may be only luxury dwellings for the highly paid expatriate

managers of foreign-owned companies, or they may be basic dwellings with few amenities for low-paid migrant workers.

Also in many developing economies, people in rural areas construct their own houses using traditional materials such as bamboo, mud, wattle, thatch, or palm leaves, and these buildings are almost never rented.

Because of these problems, the estimates in the national accounts for dwellings are very often understated in many economies. Some economies make no imputation for rents of owner-occupied dwellings, and others impute only rents for owner-occupied dwellings in urban areas and do not make any imputation for traditional dwellings in rural areas.

CALCULATING PPPs FOR DWELLING SERVICES

This section reviews two methods for calculating PPPs for dwelling services: the standard method and the quantity method.

Standard Method

The standard method for calculating PPPs for dwelling services is exactly the same as that for any other service: PPPs are obtained by averaging price relatives (in this case rent relatives) for identical, or very similar, dwelling services in each economy. This method has been found to work well in economies in which the dwellings actually rented are representative of the stock of dwellings as a whole and in which the statistical agencies collect information on rents paid for the different kinds of dwellings that are rented in most parts of the economy.

For ICP 2011, all economies were asked to provide information on rents for dwellings using the rental survey questionnaire prepared by the Global Office. This questionnaire asked economies to report the average rents paid for several different types of dwellings (e.g., houses and apartments) with several different kinds of amenities (e.g., electricity and private toilet).

Rents were to be reported separately for dwellings in rural and urban areas. Information from the rental survey was used to calculate PPPs for dwelling services for those economies

able to complete all or most of this questionnaire. These are economies in which many different kinds of dwellings are rented and in which the statistical office has a national rental survey. These economies can then calculate the average rents for the dwelling specified in the questionnaire.

Many economies may have been able to complete only a few parts of the questionnaire, but all economies were asked to try to complete as much as possible. For example, it is often possible to use even limited rental surveys for selected areas, such as major urban centers, as a useful check on rental PPPs derived from the quantity approach (see next section). The global rental specifications for the standard method of surveying dwelling services appear in table 9.2.

For ICP 2011, eight criteria were used to classify dwellings, including traditional dwellings, into 64 categories: (1) dwelling type, (2) size, (3) electricity, (4) inside water, (5) private toilet, (6) private kitchen, (7) air-conditioning or central heating, and (8) structure age (see table 9.2). The "reference size" was the size for which average rents were to be provided if possible, but rents for dwellings falling within the ranges shown in the preceding column could also be accepted. Very few characteristics were used because economies would not be able to supply the information if a more detailed classification were included. Nevertheless, the classification theoretically covered the large majority of dwellings in the economies taking part in the comparisons.

Location—a key characteristic in determining rents—is not specified as a part of SPDs; it is a separate column to be filled in by the national coordinating agencies. Ideally, economies would be able to provide averages of the rents paid in all locations. However, because of data availability in most cases, what economies have been able to provide may not take into account the differences in rents that arise because dwellings are in more or less desirable locations.

When employers provide their employees with free or inexpensive accommodations, these rents must be adjusted to market levels in calculating the final expenditure on dwelling services. Thus the rents paid by such employees should not be used in estimating rents for specified types of dwellings unless they can be adjusted to full market prices. The same

Table 9.2 Global Rental Specifications, ICP 2011

Dwelling type	Size (m ²)	Approx. size (sq. ft.)	Reference size (m ²)	Approx. reference size (sq. ft.)	Electricity	Inside water	Private toilet	Private kitchen	A/C or central heating	Structure age
Villa/ single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	<5 years
Villa/ single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	>5 years
Villa/ single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	<5 years
Villa/single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	>5 years
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	Yes	<5 years
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	Yes	>5 years
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	No	<5 years
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	No	>5 years
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	Yes	<5 years
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	Yes	>5 years

Source: ICP, <http://icp.worldbank.org/>.

Note: A/C = air-conditioning.

consideration applies to rents that are subsidized by government. Subsidized rents should not be reported as rents for specified types of dwellings unless they can be adjusted to full market prices (i.e., the rent actually paid plus the subsidy).

Rental surveys can be carried out in different ways. In some economies, they are based on household budget/expenditure surveys, but more commonly the information on rents is derived from inquiries addressed to real estate agents. It is also possible to use information from classified advertisements in the general press or specialized publications. If an economy does not already have an ongoing rental survey that provides comprehensive information on rents, it cannot use the standard approach; it must use the quantity method.

Quantity Method

The ICP 2005 round revealed that many economies cannot supply information on rents that can be used to calculate PPPs by the standard method. When economies are able to complete only a few parts of the dwelling services questionnaire (as was the case with some economies in ICP 2005), an alternative method of calculating PPPs is applied—the quantity method. This approach involves calculating volumes of housing services in each economy and requires completion of the dwelling services questionnaire.

For each pair of economies, bilateral PPPs are obtained by dividing the ratios of the volumes

of dwelling services into their "expenditures relatives"; these relatives are the ratios of the two economies' expenditures on actual and imputed rents for dwellings taken from the national accounts.

The volume of dwelling services is obtained in two stages. First, the quantity of dwelling services is calculated using a simple measure: either the floor space or the number of rooms in a dwelling. Quality indicators referring to amenities such as electricity and running water are then used when these quantity measures are converted into volume measures. In the ICP 2011 round, all economies were required to complete the dwelling services questionnaire, which collects the information needed to calculate these volume measures. Economies able to calculate PPPs directly using rent statistics were also requested to complete the dwelling services questionnaire for linking purposes. Comparison of the PPPs for the economies from the standard method and the quantity method is a useful validation step.

The accuracy of the PPPs obtained using the quantity method depends on the accuracy of both the volume ratios and the expenditure ratios. This is an additional reason why economies should improve their estimates of expenditures on rents using the user cost method. If the expenditure ratios are wrong, the indirect PPPs obtained will also be wrong in the same way that indirectly obtained quantities obtained from direct rental PPPs will be inaccurate if the

expenditures are not measured correctly (see chapter 9 for the user cost method).

The key points when constructing the volume index (note that the quantity approach uses both quantitative and qualitative data) are as follows:

- The quantitative data are, in order of preference, the usable surface of dwellings, the number of rooms, and the number of dwellings. One of these quantity measures is taken as the quantity index.
- The qualitative data are the percentages of dwellings with facilities such as electricity, an inside water supply, private toilets, and air-conditioning or central heating. The percentages of dwellings with these various facilities are averaged to produce a quality index.
- The quantity index is multiplied by the quality index to obtain the volume index, which in turn is used to measure the relative volumes of dwelling services provided in each economy.

The mechanics of the quantity approach are explained by means of the worked example in table 9.3. In this example, the quantity index is the usable surface of the dwelling and the quality index is the average of the percentages of dwellings that have one of the three facilities shown—electricity, inside water, and inside toilet.

As shown in table 9.3, the volume index of the dwelling stock is obtained by multiplying

the quantity index by the quality index. Note that although economy B has a much larger usable surface of dwellings than economy A, in this example, the quality of economy B's dwellings is lower than that of economy A. When the amount of floor space is adjusted for differences in quality, the volume of dwelling services in the two economies is nearly the same. Although the worked example is for two economies, the volume measures derived would be made transitive in a multilateral comparison.

RENTAL SPECIFICATIONS

To select the dwelling types for the rental survey, the Global Office began by formulating a list of rental specifications based on research findings and international classifications, including those compiled by the United Nations (2008, 209–11) and by the Eurostat–Organisation for Economic Co-operation and Development (OECD). The initial list was then modified based on the ICP 2005 experience in several regions in order to better serve regional needs. Proposed dwelling services were presented, discussed, and endorsed in meetings of the ICP's Technical Advisory Group (TAG) and regional coordinating agencies. The rental specifications for dwelling services appear in table 9.4.

Table 9.3 Worked Example of the Quantity Approach, ICP 2011

1. Estimation of quantity index for economy B relative to economy A	Usable surface of dwellings in economy A: 240 million m ²					
	Usable surface of dwellings in economy B: 375 million m ²					
	Quantity index for economy B relative to economy A: $375/240 = 1.56$					
2. Estimation of quality index for economy B relative to economy A	Facility	No. of dwellings with given facility (thousands)		Weight	Share of dwellings with given facility (%)	
		Economy A	Economy B		Economy A	Economy B
	Electricity	2,900	6,411	0.333	100	84
	Inside water	2,863	4,503	0.333	99	59
	Inside toilet	2,729	3,739	0.333	94	49
	Total	2,900	7,632	1.000	98	64
	Quality index for economy B relative to economy A: $64/98 = 0.65$					
3. Estimation of volume index for economy B relative to economy A	Volume index equals quantity index times quality index: $1.56 \times 0.65 = 1.01$					

Source: ICP, <http://icp/worldbank.org/>.

Table 9.4 Global Rental Specifications, Dwelling Services, ICP 2011

GLOBAL SPECIFICATIONS											OBSERVATIONS		
Dwelling type	Size (m ²)	Approx. size (sq. ft.)	Reference size (m ²)	Approx. reference size (sq. ft.)	Electricity	Inside water	Private toilet	Private kitchen	A/C or central heating	Structure age	Yearly rent (LCU)	Location (urban/rural)	Comments
Villa/single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	< 5 years			
Villa/single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	> 5 years			
Villa/single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	< 5 years			
Villa/single-family house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	> 5 years			
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	Yes	< 5 years			
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	Yes	> 5 years			
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	No	< 5 years			
Villa/single-family house	180–240	1,950–2,600	210	2,300	Yes	Yes	Yes	Yes	No	> 5 years			
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	Yes	< 5 years			
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	Yes	> 5 years			
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	No	< 5 years			
Villa/single-family house	240–360	2,600–3,900	300	3,300	Yes	Yes	Yes	Yes	No	> 5 years			
Villa/single-family house	360–460	3,900–5,000	400	4,300	Yes	Yes	Yes	Yes	Yes	< 5 years			
Villa/single-family house	360–460	3,900–5,000	400	4,300	Yes	Yes	Yes	Yes	Yes	> 5 years			
Villa/single-family house	360–460	3,900–5,000	400	4,300	Yes	Yes	Yes	Yes	No	< 5 years			
Villa/single-family house	360–460	3,900–5,000	400	4,300	Yes	Yes	Yes	Yes	No	> 5 years			
Attached house/row house	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	Yes	< 5 years			
Attached house/row house	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	Yes	> 5 years			
Attached house/row house	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	< 5 years			
Attached house/row house	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	> 5 years			

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Table 9.4 (Continued)

GLOBAL SPECIFICATIONS											OBSERVATIONS		
Dwelling type	Size (m ²)	Approx. size (sq. ft.)	Reference size (m ²)	Approx. reference size (sq. ft.)	Electricity	Inside water	Private toilet	Private kitchen	A/C or central heating	Structure age	Yearly rent (LCU)	Location (urban/rural)	Comments
Attached house/row house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	< 5 years			
Attached house/row house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	Yes	> 5 years			
Attached house/row house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	< 5 years			
Attached house/row house	120–180	1,300–1,950	150	1,600	Yes	Yes	Yes	Yes	No	> 5 years			
Attached house/row house	180–240	1,950–2,600	210	2,200	Yes	Yes	Yes	Yes	Yes	< 5 years			
Attached house/row house	180–240	1,950–2,600	210	2,200	Yes	Yes	Yes	Yes	Yes	> 5 years			
Attached house/row house	180–240	1,950–2,600	210	2,200	Yes	Yes	Yes	Yes	No	< 5 years			
Attached house/row house	180–240	1,950–2,600	210	2,200	Yes	Yes	Yes	Yes	No	> 5 years			
Studio apartment	15–35	160–380	25	270	Yes	Yes	Yes	Yes	Yes	< 5 years			
Studio apartment	15–35	160–380	25	270	Yes	Yes	Yes	Yes	Yes	> 5 years			
Studio apartment	15–35	160–380	25	270	Yes	Yes	Yes	Yes	No	< 5 years			
Studio apartment	15–35	160–380	25	270	Yes	Yes	Yes	Yes	No	> 5 years			
Studio apartment	35–60	380–650	45	480	Yes	Yes	Yes	Yes	Yes	< 5 years			
Studio apartment	35–60	380–650	45	480	Yes	Yes	Yes	Yes	Yes	> 5 years			
Studio apartment	35–60	380–650	45	480	Yes	Yes	Yes	Yes	No	< 5 years			
Studio apartment	35–60	380–650	45	480	Yes	Yes	Yes	Yes	No	> 5 years			
One-bedroom apartment	40–60	430–650	50	540	Yes	Yes	Yes	Yes	Yes	< 5 years			
One-bedroom apartment	40–60	430–650	50	540	Yes	Yes	Yes	Yes	Yes	> 5 years			

Table 9.4 (Continued)

GLOBAL SPECIFICATIONS											OBSERVATIONS		
Dwelling type	Size (m ²)	Approx. size (sq. ft.)	Reference size (m ²)	Approx. reference size (sq. ft.)	Electricity	Inside water	Private toilet	Private kitchen	A/C or central heating	Structure age	Yearly rent (LCU)	Location (urban/rural)	Comments
One-bedroom apartment	40–60	430–650	50	540	Yes	Yes	Yes	Yes	No	< 5 years			
One-bedroom apartment	40–60	430–650	50	540	Yes	Yes	Yes	Yes	No	> 5 years			
One-bedroom apartment	60–80	650–850	70	750	Yes	Yes	Yes	Yes	Yes	< 5 years			
One-bedroom apartment	60–80	650–850	70	750	Yes	Yes	Yes	Yes	Yes	> 5 years			
One-bedroom apartment	60–80	650–850	70	750	Yes	Yes	Yes	Yes	No	< 5 years			
One-bedroom apartment	60–80	650–850	70	750	Yes	Yes	Yes	Yes	No	> 5 years			
Two-bedroom apartment	60–80	540–850	70	750	Yes	Yes	Yes	Yes	Yes	< 5 years			
Two-bedroom apartment	60–80	540–850	70	750	Yes	Yes	Yes	Yes	Yes	> 5 years			
Two-bedroom apartment	60–80	540–850	70	750	Yes	Yes	Yes	Yes	No	< 5 years			
Two-bedroom apartment	60–80	540–850	70	750	Yes	Yes	Yes	Yes	No	> 5 years			
Two-bedroom apartment	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	Yes	< 5 years			
Two-bedroom apartment	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	Yes	> 5 years			
Two-bedroom apartment	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	< 5 years			
Two-bedroom apartment	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	> 5 years			
Typical/traditional dwelling	25–75	270–800	50	540	Yes	Yes	Yes	Yes	No	< 5 years			
Typical/traditional dwelling	25–75	270–800	50	540	Yes	Yes	Yes	Yes	No	> 5 years			
Typical/traditional dwelling	25–75	270–800	50	540	Yes	Yes	No	No	No	< 5 years			
Typical/traditional dwelling	25–75	270–800	50	540	Yes	Yes	No	No	No	> 5 years			
Typical/traditional dwelling	25–75	270–800	50	540	No	No	No	No	No	< 5 years			

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Table 9.4 (Continued)

GLOBAL SPECIFICATIONS											OBSERVATIONS		
Dwelling type	Size (m ²)	Approx. size (sq. ft.)	Reference size (m ²)	Approx. reference size (sq. ft.)	Electricity	Inside water	Private toilet	Private kitchen	A/C or central heating	Structure age	Yearly rent (LCU)	Location (urban/rural)	Comments
Typical/traditional dwelling	25–75	270–800	50	540	No	No	No	No	No	> 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	< 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	Yes	Yes	Yes	Yes	No	> 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	Yes	Yes	No	No	No	< 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	Yes	Yes	No	No	No	> 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	No	No	No	No	No	< 5 years			
Typical/traditional dwelling	80–120	850–1,300	100	1,000	No	No	No	No	No	> 5 years			

Source: ICP, <http://icp.worldbank.org/>.

Note: A/C = air conditioning; LCU = local currency unit. In the table, the following clarifications about global specifications apply:

- Global specifications must be reviewed by the regional coordinating agencies (much as in the core list review process). The regional coordinating agencies pick from this list of specifications those that are relevant to their regions.
- For each specification, economies can record multiple observations for different geographic locations. An average yearly rent is calculated for urban, rural, and national.
- Urban and rural: there are no standard international definitions of *urban* and *rural*. Economies should use their own definitions of large and small urban and classify all other areas as rural.
- Prices should be based on market rents. Subsidized rents such as those paid by employees living in dwellings owned by their employers or by tenants in low-rent public housing are not market rents and should not be reported on this questionnaire. The market rents actually paid are collected by means of a price survey—the rental survey—for a selection of well-defined products—or dwellings—and the PPPs are calculated from the prices collected.
- Size refers to the inside usable surface of each dwelling. Usable surface is the floor area of living rooms, kitchens, utility rooms, shower rooms, bathrooms, toilets, and hallways, minus the wall thickness and door and window recesses. Stairs, open balconies and terraces, and cellars and lofts (when not equipped as usable premises) are not included. For attics, only the section with a ceiling height of at least 1.7 meters is included. In practice, few economies have housing statistics that use this exact definition, but near approximations can be accepted.
- Traditional dwellings are generally built by family members. The walls are made of less durable materials such as dried clay, bamboo, or latticework, and the roofs are made of reeds, straw, or palm fronds. Traditional dwellings do not usually have amenities.
- Electricity is usually the main electricity supplied by a generating company. Electricity may also be generated by the household itself from a diesel or gasoline generator, solar panels, or wind power.
- Inside water is either running water that is piped into the dwelling itself or water from an underground spring or well that is for the exclusive use of the household. A dwelling that takes water from a communal standpipe or well should not be counted as a dwelling with inside water.
- Private toilets are for the exclusive use of the occupants of the dwelling unit and have running water. The toilet may be inside the dwelling or in a separate structure.

The criterion of five years for the age of dwellings was proposed after discussions during the TAG meetings. TAG members noted that age structure was a price-determining characteristic and that new buildings were generally less than five years of age. However, this criterion can be adjusted by regions

according to their own situations. In other words, these are global specifications that should be reviewed by the regional coordinating agencies. For example, one region can contemplate distinguishing between dwellings less than 10 years of age and those more than 10 years of age. The regional coordinating

Table 9.5 Weight in Total Rental Stock, ICP 2011

Dwelling type	Percentage weight in total rental stock
Villa/single-family house	
Attached house/row house	
Apartment	
Typical/traditional house	

Source: ICP, <http://icp.worldbank.org/>.

Note: The weight in total rental stock for the broad dwelling types should be reported by each economy when available.

agencies can pick from this list of specifications those that are relevant to their regions. They can also customize the definitions and descriptions of rental dwellings. Because these rental data will not be used for linking, they can be region specific.

The rental specifications form includes the yearly rent in local currency and the percentage weight in total rental stock for each type of dwelling (table 9.5).

Possible sources for estimating weights in total rental stock are the consumer price index (CPI), household expenditure survey, population and housing censuses, and rental surveys. Sources may vary by region. They are not mandatory but are useful if available. They can be used to compute the weighted country product dummy (CPD-W) in the region.

ICP DWELLING SERVICES QUESTIONNAIRE

The ICP dwelling services questionnaire used for the quantity method appears in table 9.6.

GUIDELINES FOR APPLYING THE USER COST METHOD TO CALCULATE RENTS FOR OWNER-OCCUPIED HOUSING

The user cost method is recommended in economies where so few dwellings are rented that the rents actually paid cannot be regarded as typical. For example, in some economies most of the dwellings available for rent are occupied by foreigners or by employees of government or large public enterprises at rents that cannot be regarded as representative, whereas in other

economies dwellings may be available for rent only in the capital city or other principal urban areas.

Three main rules should be put in place to help economies decide when the standard method should not be used:

- Less than 25 percent of all dwellings in the economy are actually rented.
- More than half of the rented dwellings are occupied by foreigners paying high rents or by government or other employees paying low rents.
- Rented dwellings are not evenly distributed over all parts of the economy.

The user cost method consists of estimating each of the costs that owners of dwellings would need to take into account in fixing a market rent if they decided to rent their dwellings to other people rather than live in them themselves. These costs (with 1993 SNA codes in parentheses) are as follows:

- Intermediate consumption (P2)
- Other taxes on production (D29)
- Consumption of fixed capital (K1)
- Real net operating surplus (B2).

Table 9.7 lists the various data items required to impute expenditures on owner-occupied dwelling services by the user cost method. It is completed for each type of owner-occupied dwelling that can be separately distinguished in the housing statistics available in each economy. At a very minimum, it would be desirable to distinguish between

- Single-family dwellings (houses or villas)
- Apartments with less than a certain floor space (such as less than 30 square meters)
- Apartments with more than a certain floor space (such as 30 square meters or more).

Several difficulties are encountered in applying the user cost method as outlined in worksheet 1:

- Estimating the stock of owner-occupied dwellings, which is required to calculate both consumption of fixed capital (UC09) and the net operating surplus (UC14)
- Calculating the consumption of fixed capital (UC09) once the stock has been estimated

Table 9.6 Dwelling Services Questionnaire, Form A, ICP 2011

FORM A. ICP DWELLING SERVICES QUESTIONNAIRE: VOLUME OF HOUSING IN 2011

Country:

Year (if data are not available for 2011):

	All dwellings			Type of construction				Location of dwellings			
	Houses	Flats	Total	Modern construction		Traditional construction	Total	Urban areas		Rural	Total
				Houses	Flats			Large urban	Small urban		
Number of dwelling units ('000s)											
Number of rooms ('000s)											
Usable surface area in thousand square meters (specify other unit _____)											
Number of occupants ('000s)											
Land area occupied by dwellings in thousand square meters (specify other unit _____)											
Number of dwelling units with ...											
Electricity ('000s)											
Inside water ('000s)											
Private toilet ('000s)											
Central heating											
Air-conditioning											
Percentage of dwelling units ...											
Rented											
Owner-occupied											

Instructions:

Reporting year. Please provide information for 2011 or for the nearest year for which information is available.

Rooms include bedrooms, sitting rooms, dining rooms, study rooms, play rooms, and kitchens that also serve as dining rooms, but exclude hallways, utility rooms, shower rooms, bathrooms, toilets, and kitchens that are only used for cooking.

Usable surface is the floor area of living rooms, kitchens, utility rooms, shower rooms, bathrooms, toilets, and hallways, minus the wall thickness and door and window recesses. Stairs, open balconies and terraces, and cellars and lofts (when not equipped as usable premises) are not included. For attics, only the section with a ceiling height of at least 1.7 meters is included. In practice, few economies have housing statistics that use this exact definition, but near approximations can be accepted. You are requested to provide information on the usable surface area of dwellings in square meters. You may also report in square feet or some other measure, but if so, please specify the unit on the questionnaire.

Houses and flats. Houses include villas, detached houses, and semidetached, terraced, and town houses. Flats (or apartments) are subdivisions of dwelling units, and the occupants are collectively responsible for the upkeep of the exterior of the building.

Type of construction. Modern dwellings are generally built by professional building enterprises. The walls are made of durable materials such as concrete, ceramic brick, cement blocks, plywood, or wooden planking, and the roofs are covered in tiles, wooden shingles, or metal sheeting. Modern dwellings usually have facilities such as electricity, piped water, and inside toilets. Most dwellings in urban areas will be classified as modern.

Traditional dwellings are generally built by family members. The walls are made of less durable materials such as dried clay, sun-dried bricks, bamboo, or latticework, and the roofs are made of reeds, straw, or palm fronds. Traditional dwellings do not usually have amenities.

Table 9.6 (Continued)

Urban and rural. There are no standard international definitions of *urban* and *rural*. Economies should use their own definitions of large and small urban and classify all other areas as rural.

Number of occupants. The number of occupants in all dwellings is equal to the total population.

Electricity will usually be the main electricity supplied by a generating company. Electricity may also be generated by the household itself from a diesel or gasoline generator, solar panels, or wind power.

Inside water is either running water piped into the dwelling itself or water from an underground spring or well that is for the exclusive use of the household. A dwelling that takes water from a communal standpipe or well should not be counted as a dwelling with inside water.

Private toilets are for the exclusive use of the occupants of the dwelling unit and have running water. The toilet may be inside the dwelling or in a separate structure.

Source: ICP, <http://icp.worldbank.org/>.

Table 9.7 Data Required to Estimate Expenditures on Owner-Occupied Dwelling Services: Worksheet 1, ICP 2011

Worksheet 1. Estimating expenditure on owner-occupied dwelling services			
Item no.	Description of item	Associated formula	Value
<i>Intermediate consumption</i>			
UC01	Expenditure on maintenance and repair of owner-occupied dwellings	NONE	
UC02	Gross insurance premiums paid on owner-occupied dwellings	NONE	
UC03	Insurance claims paid to owners (minus)	NONE	
UC04	Net insurance premiums paid by owners	UC02–UC03	
UC05	Total intermediate consumption	UC01 + UC04	
<i>Other taxes on production</i>			
UC06	Taxes paid by owners on dwelling services	NONE	
UC07	Taxes paid by owners on the value of owner-occupied dwellings and their associated land	NONE	
UC08	Total taxes paid by owners	UC06 + UC07	
<i>Consumption of fixed capital</i>			
UC09	Consumption of fixed capital on owner-occupied dwellings at current prices (excluding land)	NONE	
<i>Net operating surplus</i>			
UC10	Current market value of the stock of owner-occupied dwellings at beginning of year (including land)	NONE	
UC11	Current market value of the stock of owner-occupied dwellings at end of year (including land)	NONE	
UC12	Current market value of the stock of owner-occupied dwellings at midyear (including land)	(UC10 + UC11)/2 or (K6 + K8)	
UC13	Real rate of return on owner-occupied dwellings (including land) in percent per annum	NONE	
UC14	Real net operating surplus	(UC12 × UC13)/100	
<i>Expenditure on owner-occupied dwelling services</i>			
UC15	Expenditure on owner-occupied dwellings services	UC05 + UC08 + UC09 + UC14	

Source: ICP, <http://icp.worldbank.org/>.

Note: See table 9.8 for descriptions of K6 and K8.

- Choosing the real rate of return (UC13) to be applied to the current value of the stock of owner-occupied dwellings (UC 12) to calculate the net operating surplus (UC 14). Box 9.1 explains what is meant by a real rate

of return and why a real rather than a nominal rate is used.

The following sections address these difficulties in more detail.

BOX 9.1

Why the Real Rate of Return Is Needed for the User Cost Method

Landlords usually expect the value of the dwellings they own to rise in line with the overall rate of inflation. This rise in the value of dwellings is a nominal holding gain for landlords, and it allows them to set the rent lower than they would have otherwise. Thus the user cost method should be written in full as

$$\begin{aligned} \text{user cost} = & \text{intermediate consumption} \\ & + \text{other taxes net of subsidies on production} \\ & + \text{consumption of fixed capital} + \text{nominal} \\ & \text{operating surplus} - \text{nominal holding gain.} \end{aligned}$$

The nominal operating surplus is calculated as the value of the dwelling multiplied by the nominal rate of interest.

The nominal holding gain is calculated as the value of the dwelling multiplied by the overall rate of inflation. Thus the last two terms in the above equation can be calculated in a single step by multiplying the

value of the dwelling by the nominal rate of interest minus the rate of inflation—that is, multiplying the value of the dwelling by the real rate of interest.

Thus, provided that a real rate of interest is used, the estimated rent is corrected for holding gains. It is lower than it would have been had there been no inflation and therefore no nominal holding gains for the landlord.

Both nominal interest rates and rates of inflation can be quite volatile from year to year, so that if the real rate of return each year is calculated, the estimated rent will also be volatile. In practice, however, rents tend to be rather stable from year to year because they are mostly based on long-term contracts that prevent sharp falls or increases. For this reason, it is better to use a real interest rate calculated as a long-term average of nominal interest rates minus long-term inflation rates.

Estimating the Stock of Owner-Occupied Dwellings

The standard procedure for estimating the stock of a capital asset is the perpetual inventory method (PIM). PIM requires long time series on gross fixed capital formation (GFCF) and on the prices of capital assets, as well as assumptions about the average service lives of assets and about how retirements of assets are distributed around this average. Most economies, however, do not have capital stock estimates or the means to derive them using PIM, and so an alternative method is needed.

Worksheet 2 (table 9.8) can be used to estimate the value at current market prices of the stock of each type of owner-occupied dwelling. It is designed for economies that have only information from a recent population census on the number of owner-occupied dwellings

classified by a few broad types of dwellings. Two steps should be followed:

- Draw up a classification of dwellings that distinguishes between the main types of owner-occupied dwellings in the economy.
- Estimate the stocks of owner-occupied dwellings separately for each type. A simple three-way classification—single-family dwellings (houses or villas) and two size classes of apartments—was suggested earlier.

More explanation of the items shown in table 9.8 follows:

- *K1*. Population censuses invariably collect some information on dwellings—at a minimum the number of owner-occupied dwellings, with some indications of their physical characteristics. The more recent the census, the better will be the estimate of the

Table 9.8 Data Required to Estimate Stock of Dwellings at Current Market Prices: Worksheet 2, ICP 2011

Worksheet 2. Estimating the stock of dwellings at current market prices			
Item no.	Description of item	Associated formula	Value
K1	Number of owner-occupied dwelling units at time of most recent census	NONE	
K2	Growth rate of owner-occupied dwellings between last census and middle of current year	NONE	
K3	Estimated number of owner-occupied dwellings in middle of current year	$K1 \times K2$	
K4	Average price of newly constructed dwellings, excluding land, in current year	NONE	
K5	Average net value (i.e., after deducting accumulated depreciation) of a dwelling, excluding land, in current year	$K4 \times (1 - A/L)$	
K6	Value at current market prices of the stock of owner-occupied dwellings, excluding land	$K3 \times K5$	
K7	Ratio of value of land to average net value of dwellings (excluding land) in current year	NONE	
K8	Value at current market prices of land underlying dwellings	$K6 \times K7$	

Source: ICP, <http://icp.worldbank.org/>.

stock of dwellings for the current year. Many economies also carry out some kind of living standards survey, and these surveys usually collect detailed statistics on the types of structure and the facilities in dwellings.

- *K2*. The growth rate in the number of owner-occupied dwellings since the last census could be derived from a number of sources. These include gross fixed capital formation statistics, data on the number of building permits issued, and administrative data on the completion and destruction of buildings. In the absence of information of this kind, it is reasonable to assume that the stock of owner-occupied dwellings grows at the same rate as the population.
- *K3*. The estimated number of owner-occupied dwellings in the middle of the year is obtained by multiplying the most recent number of owner-occupied dwelling units (*K1*) by the growth rate of owner-occupied dwellings between the last census and the one in the middle of the current year (*K2*).
- *K4*. Information on prices can be obtained from various sources, including real estate agents, property developers, and advertisements in journals and magazines that specialize in sales of dwellings. If these sources are used, the prices must be adjusted downward by subtracting the value of the land on which the buildings are situated, because the prices must refer only to the physical structure. An alternative is to obtain information on the

costs of new buildings from construction companies or from "public works" departments that in some economies build dwellings for government employees. If a cost method is used, the cost figure will have to be adjusted to market prices by adding the estimated profit margins. The advantage, however, is that the cost estimates will refer only to the physical structure and will exclude the cost of the underlying land.

- *K5*. Because *K4* refers to the price of a newly constructed dwelling, this price must be adjusted downward so that it approximates the price of a dwelling of average age. To do this, it is necessary to make an assumption about how the price of a dwelling declines as it ages. The simplest assumption, and the one recommended here, is to assume that the price of a dwelling declines by the same amount each year, reaching zero in the last year of its life. With this assumption, the price of a dwelling of average age (*P average*) will equal the new price (*P new*) times the ratio of the remaining years that the dwelling of average age (*A*) will continue to exist to the expected service life (*L*).

Intuitively, one would expect that if the stock of dwellings is constant because the number of new dwellings constructed each year equals the number of old dwellings demolished each year, the average age will be half of the average service life—that is, (*P average*) will be

half of (P_{new}). Normally, however, stocks of dwellings are not constant. When stocks are growing or falling, the average age of the dwellings in a stock (A) can be written as

$$A = \frac{\sum_i^L i(1+r)^{L-i}}{\sum_i^L (1+r)^{L-i}}, \quad (9.1)$$

where L is the average service life of dwellings; r is the annual rate of growth in the stock of dwellings; and i is the age of dwellings constructed in a given year and takes the values of 1, 2, 3, . . . , L .

Note that when a stock of dwellings is stable (i.e., when $r = 0$), the numerator is the sum of the first L digits—that is, $L(L + 1)/2$ —and the denominator is L , so that A in (9.1) reduces to $(L + 1)/2$. This is the midpoint of the digits from 1 to L and confirms the intuitive result just mentioned.

If the stock is growing, the average age will be less than the midpoint because the number of younger dwellings will exceed the number of older dwellings (and vice versa if the stock is declining).

When the percentage of new dwellings is growing, the average price will also rise (and vice versa if the percentage of older dwellings is rising).

When the stock of dwellings is thought to be growing, the value of A should be calculated with r set at the rate used to calculate K_2 , and L set at the estimated average service life of dwellings. The value of the stock of dwellings (K_6) is then obtained as (number of dwellings in the stock (K_3)) \times (price of a newly constructed dwelling (K_4)) \times $(1 - A/L)$.

Worksheet 3 (table 9.9) gives the values of the adjustment factor, $(1 - A/L)$, for values of L commonly assumed for dwellings and rates of annual growth in the housing stock from -1 percent to $+3$ percent.

Table 9.9 Values of $(1 - A/L)$: Worksheet 3, ICP 2011

Life (L)	Annual growth rate of the stock of r				
	-1%	0%	1%	2%	3%
60	0.4417	0.4918	0.5411	0.5884	0.6322
70	0.4347	0.4929	0.5504	0.6048	0.6541
80	0.4275	0.4938	0.5594	0.6205	0.6746

Source: ICP, <http://icp.worldbank.org/>.

- K_6 . The value at current market prices of the stock of owner-occupied dwellings is equal to the estimated number of owner-occupied dwellings in middle of the current year (K_3) times the net value of the average dwelling for the current year (K_5).
- K_7 . In order to calculate the consumption of fixed capital, the estimated value of the stock of dwellings must exclude the value of the land on which the dwellings are situated because no consumption of fixed capital is calculated with respect to land. However, in calculating the net operating surplus, it is necessary to include the value of both the land and the dwellings because the owner's total investment covers both. For this reason, two estimates of the stock of dwellings are required: one with and one without the value of the land.

Estimates of the average ratio of the value of land to the average value of dwellings (excluding land) can be obtained from sources such as realtors (estate agents) or the official records of land values. Some economies may be able to use ratios estimated by neighboring economies that have similar population densities and housing structures.

In the United States, land values represent about one-third of the value of the building itself. Ratios are higher in Western Europe where the amount of land available for constructing dwellings is more limited, but they are likely to be lower than one-third in less densely populated economies. In some economies, land cannot be owned, and plots are granted to families to construct their dwellings. In such cases, the land value is zero because it cannot be traded and so has no commercial value to the owner of the dwelling.

- K_8 . The value at current market prices of land is obtained by multiplying the value at current market prices of the stock of owner-occupied dwellings (K_6) by the ratio of the value of land to the average net value of dwellings in the current year (K_7).

Calculating the Consumption of Fixed Capital

Economies that estimate stocks of dwellings using PIM will already have estimates of consumption of fixed capital. In economies that do

not do so, some other method must be used, and two alternative methods are described in this section.

Straight-Line Depreciation with a Bell-Shaped Mortality Function

When PIM is used, the commonest way of calculating consumption of fixed capital is to assume straight-line depreciation—that is, an equal fall in the value of the asset for each year of its service life—and to assume that retirements of assets are distributed around the average service life according to a bell-shaped mortality function. This method of calculating the consumption of fixed capital can be described as a straight-line depreciation with a bell-shaped mortality function.

Geometric Depreciation with No Mortality Function

This method can be approximated by a simpler procedure in which the annual consumption of fixed capital is calculated as a constant fraction of the value of the stock of dwellings at current market prices. This method of calculating consumption of fixed capital is described as a geometric depreciation with no mortality function.

Although it is only an approximation of straight-line depreciation with a bell-shaped mortality function, geometric depreciation with no mortality function offers the important advantage of not requiring economies to have a long time series of gross fixed capital formation in order to calculate the mortality function.

For economies that have used the method described in worksheet 2 to estimate the stock of owner-occupied dwellings, geometric depreciation with no mortality function is the only

feasible method. Consumption of fixed capital (CFC) is obtained by multiplying the midyear value of the net capital stock by the depreciation rate. The depreciation rate used for geometric depreciation is usually written as D/L , where D is the declining balance rate and L is the average service life of the assets. D is usually assumed to lie between 1 and 3, and it has been found that for dwellings in Europe and North America a value of 1.6 produces estimates of consumption of fixed capital that are similar to those obtained using straight-line depreciation with a bell-shaped mortality function. In the absence of information to the contrary, it is recommended here that D be set at 1.6. Thus, for example, if the midyear net value of the stock of a particular type of owner-occupied dwelling is 4,000 local currency units, and if the average service life for that type of dwelling is 70 years, the CFC is obtained as follows: $4,000 \times (1.6/70) = 91$.

Worksheet 4 (table 9.10) is used to calculate the CFC. As explained earlier about the stock of owner-occupied dwellings, the calculations are made separately for each type of dwelling for which separate information is available. In calculating the consumption of fixed capital, the capital stock must exclude the value of the land underlying dwellings.

More explanation of the items shown in table 9.10 follows:

- *CFC1*. The current market value of the stock of owner-occupied dwellings is taken from K6 in table 9.8. K6 is the value of the dwelling stock, excluding the value of the underlying land.
- *CFC2*. The average service life is the number of years that dwellings of this type are expected to remain in use from the year of

Table 9.10 Estimating Consumption of Fixed Capital of Owner-Occupied Dwellings: Worksheet 4, ICP 2011

Worksheet 4. Estimating consumption of fixed capital of owner-occupied dwellings			
Item no.	Description of item	Associated formula	Value
CFC1	Midyear current market value of the stock of owner-occupied dwellings, excluding land	K6	
CFC2	Estimated service life of owner-occupied dwellings (in years)	NONE	
CFC3	Depreciation rate of owner-occupied dwellings	$1.6/CFC2$	
CFC4	Consumption of fixed capital formation of owner-occupied dwellings in current market prices	$CFC1 \times CFC3$	

Source: ICP, <http://icp.worldbank.org/>.

construction until the dwelling is demolished. The estimate of the average service life is important because it effectively determines the depreciation rate. Estimates of the service life of dwellings vary widely. European economies have generally used a service life of between 50 and 90 years. In the absence of any reliable information, an average service life of 70 years can be used.

Population censuses usually collect information on the age of dwellings, and this information can be used to estimate life expectancies.

- *CFC3*. A declining balance rate of 1.6 should be used so that the depreciation rate is $1.6/(CFC2)$. As noted earlier, a value of 1.6 has been found to be a plausible pattern of CFC for dwellings in Europe and North America. With a declining balance rate of 1.6 and an average service life of 70 years, the depreciation rate will be $1.6/70 = 0.023$, so that the CFC can be calculated as 0.023 times the current market value of the stock of owner-occupied dwellings.

Choosing the Real Rate of Return Used to Estimate the Net Operating Surplus

Economists assume that people acquire capital assets because the net operating surplus they expect to earn is at least as high as the interest they could earn by investing in a financial asset. It has been suggested that the interest rate on a relatively safe long-term bond is the appropriate nominal rate to use. An example might be the rate of return on a 10-year government bond. An alternative approach is to assume that home

owners aim to recover the interest they have to pay on any housing loans they may have taken out. In this case, the rate of housing loans could be used as the nominal rate of return.

Whatever rate is used as the nominal rate, it has to be reduced to a real rate by subtracting the overall rate of inflation (the reason for this is explained in box 9.1). The overall rate of inflation could be measured either by the GDP deflator or by the all-items consumer price index.

In economies in which financial markets are not well developed, neither of these alternatives may be feasible for estimating the nominal rate of return. In these circumstances, it is recommended that a standard real rate of 2.5 percent be used. This means that the real net operating surplus will be calculated as 0.025 times the current market value of the stock of owner-occupied dwellings.

NOTE

1. The ICP Classification follows the order of GDP: aggregate–category–group–class–basic heading.

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