

## A rough check on rental expenditures

Home ownership represents sixty to eighty percent of dwelling units in most countries and often more. When statistical offices estimate total rental expenditures, production of the housing sector or income from dwelling ownership, most of the difficulty involves owner occupied housing. This has been a headache for the ICP because the direct or indirect quantity estimates are inconsistent with the housing expenditures in the national accounts. This note reports an experiment on another way of approaching this issue.

The Groningen Growth and Development Center produces a capital stock series as well as the productivity measures that have been used in the 2011 ICP. The capital stock series is built up using the perpetual inventory method (PIM), which cumulates past investment subtracting each year depreciation of old stock and adding current housing investment. Robert Inklaar has kindly provided their estimates of the housing stock for a 178 ICP of countries. This series is not on their website because the method of obtaining their estimates for all but a handful of non EU-OECD-CIS countries is based on a questionable assumption. Namely, the share of housing construction is a fixed share of total investment for the years prior to available data. Since both construction and housing fluctuate cyclically it is clear that this assumption would be quite unreliable as a basis for estimating housing construction in any particular year.

However normally one bases PIM capital stock estimates on an investment series of 30 years or more so that fluctuations tend to offset each other. If there is no long term upward or downward trend in the ratio of investment in housing construction to total investment then the Inklaar series is a reasonable approximation, albeit very rough. A further warning is that many countries only had twenty years of investment data, a further weakness. The next step is to take the user cost of dwellings times the current value of the dwelling stock to obtain an estimate of the flow of rental services each year. A common formulation of user cost in the context of capturing housing in a CPI is given in (1)

$$u_{it} = P_{it} (r_t + \delta - E [\beta_{it}]) \quad (1) \text{ where,}$$

- $u_{it}$  is the user costs of house  $i$  in period  $t$ ;
- $P_{it}$  is the price of home  $i$  in period  $t$ ;
- $r_t$  is a nominal interest rate often taken as the 30 year mortgage rate;
- $\delta$  is the sum of annual depreciation, maintenance and repair, insurance, and property taxes; and

- $E [\beta_{it}]$  represents the expected annual constant quality home appreciation rate for home  $i$  in period  $t$ , often taken as the Consumer Price Index (CPI) rate for the period:  $CPI_t/CPI_{t-1}$ .

For ICP purposes we drop the  $E [\beta_{it}]$  term which is relevant over time but not at a point in time. Further, dropping the subscript for time we obtain (2),

$$u_i = P_i (r + \delta_i) \quad (2)$$

Those EU-OECD-CIS countries whose rental markets not suitable for applying rental equivalence to owner occupied housing use a method like equation (2). The foregone earnings term,  $r_t$ , is taken as 2.5% in the EU, which is lower than the 3.5% that has been more common in recent years in the United States. The term,  $\delta$ , includes taxes, insurance, depreciation along with maintenance and repairs, which in the ICP are allocated to other expenditure headings and also are needed in estimating rental income and production of the housing sector.

As an approximation user cost as a percent of value of dwellings (rent to dwelling value) was taken as 5% to 6% in our illustration and the average is used in Table 2.<sup>1</sup> Table 1 provides the regional ratios of rental expenditures as a share of GDP from the 2011 ICP. The CIS countries appear to have particularly low rental shares with a wide range of 1.1% in Azerbaijan to 7.3% in Kazakhstan. The estimates for these countries are all based upon user cost implying that their estimates of the value of housing stock is low relative to other countries. In contrast to the CIS, the Caribbean region appears quite high, perhaps because the tourist sector somehow affects the estimation of rental expenditures. Comments on the other regions will be based on the individual country data in Table 2 where the first data column gives the share of rent expenditures from the ICP; column 2 is the user cost estimate based upon the PIM housing stock; and column 3 is the ratio of the rental share in column 1 to the regional average from Table 1.

The countries are grouped by region so let us begin with Africa. First, the 20 of the 50 African countries have large differences between the expenditure shares in columns (1) and (2). The source of the difference appears to be roughly shared between the two estimates. Where the differences are not large, there is really no basis for saying which of the two estimates is closer to TRUTH. So far the user cost estimates in column 2 are generally plausible but do not appear to add much to our knowledge. Simply looking at the 2011 ICP shares, it is clear that those countries where the share is less than 1% (**CAF**, **DZA**,

---

<sup>1</sup> In Aten (2018) the range across the 50 U.S. states and DC was 3 to 7% for the rent to value ratio in 2015 (excluding maintenance and repairs).

GHA, GNQ, MDG, NGA, and **TZA**, where bold is egregious) look to be too low. On the high share side are BDI, **COM**, DJI, and RWA. For Myanmar the PIM is unbelievably low as is their investment series. However for the remaining countries in Asia/Pacific the differences between the estimates are not small but usually either estimate would be acceptable. The only suspect ICP shares are Brunei, China and Macao on the low side and KHM, MDV, NPL, and VNM on the high side.

Looking at the 2011 CIS shares (column (1) where countries applied user costs to their nationally estimated housing stocks (supposedly PIM based) it appears that the two versions of user cost are fairly similar. There are one or two anomalies for the EU/OECD, but happily the two sets of estimates are relatively close. For Central and South America the 2011 shares appear somewhat low for Costa Rica, Paraguay, and Venezuela. Western Asia displays differences between the gulf countries and others, with the only really questionable share being that of Qatar.

In conclusion I would describe this exploration into alternative data sources as a well- intentioned effort that in the end was not successful in the sense that most of the questionable expenditure estimates could be seen by closely examining the 2011 shares. But I would argue that if countries could provide national estimates of housing capital, the approach is easy to implement. But if countries could provide good housing stocks estimates, their estimates of housing expenditures are probably quite good too. Back to the drawing board.

**Table 1. Rental Share of GDP 2011 ICP**

<b>Regions</b>	<b>Rent/GDP</b>
<b>Africa</b>	0.055
<b>Asia/Pacific</b>	0.068
<b>Caribbean</b>	0.130
<b>CIS</b>	0.032
<b>Eurostat-OECD</b>	0.086
<b>Latin America</b>	0.062
<b>Western Asia</b>	0.062

**Table 2. Housing Expenditure Share of GDP 2011 and Using .055 User Cost on PIM Housing Stock**

Country Name	Country Code	Rents/GDP 2011	PIM Estimate	2011 Share/Reg
Angola	AGO	0.015	0.015	0.265
Burundi	BDI	0.130	0.037	2.362
Benin	BEN	0.052	0.050	0.942
Burkina Faso	BFA	0.037	0.035	0.680
Botswana	BWA	0.032	0.036	0.577
Central African Republic	CAF	0.008	0.195	0.139
Côte d'Ivoire	CIV	0.046	0.058	0.828
Cameroon	CMR	0.044	0.038	0.805
Congo, Dem. Rep.	COD	0.040	0.166	0.722
Congo, Rep.	COG	0.015	0.034	0.279
Comoros	COM	0.243	0.084	4.417
Cape Verde	CPV	0.080	0.056	1.448
Djibouti	DJI	0.126	0.051	2.282
Algeria	DZA	0.008	0.045	0.154
Egypt, Arab Rep. (AFR)	EGY	0.070	0.019	1.273
Ethiopia	ETH	0.067	0.034	1.219
Gabon	GAB	0.036	0.022	0.646
Ghana	GHA	0.010	0.052	0.182
Guinea	GIN	0.030	0.046	0.552
Gambia, The	GMB	0.021	0.079	0.377
Guinea-Bissau	GNB	0.024	0.095	0.439
Equatorial Guinea	GNQ	0.010	0.010	0.178
Kenya	KEN	0.036	0.032	0.651
Liberia	LBR	0.162	0.039	2.942
Lesotho	LSO	0.081	0.085	1.468
Morocco	MAR	0.056	0.069	1.025
Madagascar	MDG	0.009	0.032	0.167
Mali	MLI	0.044	0.051	0.802
Mozambique	MOZ	0.039	0.005	0.709
Mauritania	MRT	0.034	0.046	0.617
Mauritius	MUS	0.054	0.054	0.975
Malawi	MWI	0.068	0.033	1.231
Namibia	NAM	0.089	0.022	1.623
Niger	NER	0.039	0.156	0.716
Nigeria	NGA	0.010	0.017	0.178
Rwanda	RWA	0.093	0.030	1.684
Sudan (AFR)	SDN	0.068	0.037	1.234
Senegal	SEN	0.085	0.052	1.536

Country Name	Country Code	Rents/GDP 2011	PIM Estimate	2011 Share/Reg
Sierra Leone	SLE	0.025	0.022	0.461
São Tomé and Príncipe	STP	0.062	0.049	1.120
Swaziland	SWZ	0.096	0.043	1.739
Seychelles	SYC	0.069	0.075	1.246
Chad	TCD	0.048	0.011	0.877
Togo	TGO	0.033	0.089	0.591
Tunisia	TUN	0.081	0.050	1.472
Tanzania	TZA	0.002	0.072	0.036
Uganda	UGA	0.072	0.038	1.311
South Africa	ZAF	0.064	0.043	1.159
Zambia	ZMB	0.033	0.096	0.593
Zimbabwe	ZWE	0.034	0.046	0.620
Bangladesh	BGD	0.067	0.062	0.988
Brunei Darussalam	BRN	0.022	0.053	0.319
Bhutan	BTN	0.062	0.074	0.917
China	CHN	0.034	0.043	0.498
Fiji	FJI	0.150	0.009	2.201
Hong Kong SAR, China	HKG	0.107	0.107	1.575
Indonesia	IDN	0.071	0.026	1.044
India	IND	0.052	0.025	0.762
Cambodia	KHM	0.085	0.027	1.244
Lao PDR	LAO	0.032	0.039	0.472
Sri Lanka	LKA	0.065	0.045	0.956
Macao SAR, China	MAC	0.028	0.025	0.414
Maldives	MDV	0.118	0.037	1.735
Myanmar	MMR	0.050	0.001	0.733
Mongolia	MNG	0.075	0.039	1.097
Malaysia	MYS	0.044	0.029	0.650
Nepal	NPL	0.084	0.070	1.229
Pakistan	PAK	0.067	0.025	0.978
Philippines	PHL	0.063	0.042	0.925
Singapore	SGP	0.067	0.062	0.985
Thailand	THA	0.039	0.041	0.570
Taiwan, China	TWN	0.089	0.027	1.304
Vietnam	VNM	0.090	0.036	1.323
Armenia	ARM	0.029	0.032	0.338
Azerbaijan	AZE	0.011	0.012	0.126
Belarus	BLR	0.016	0.020	0.187
Kazakhstan	KAZ	0.073	0.089	0.849

Country Name	Country Code	Rents/GDP 2011	PIM Estimate	2011 Share/Reg
Kyrgyzstan	KGZ	0.016	0.007	0.183
Moldova	MDA	0.052	0.030	0.603
Tajikistan	TJK	0.017	0.665	0.201
Ukraine	UKR	0.042	0.186	0.484
Albania	ALB	0.065	0.055	0.756
Australia	AUS	0.098	0.130	1.137
Austria	AUT	0.077	0.107	0.901
Belgium	BEL	0.085	0.108	0.991
Bulgaria	BGR	0.068	0.067	0.792
Bosnia and Herzegovina	BIH	0.060	0.068	0.697
Canada	CAN	0.108	0.087	1.257
Switzerland	CHE	0.120	0.120	1.394
Chile	CHL	0.058	0.068	0.680
Cyprus	CYP	0.091	0.070	1.054
Czech Republic	CZE	0.086	0.114	0.998
Germany	DEU	0.096	0.095	1.114
Denmark	DNK	0.099	0.098	1.152
Spain	ESP	0.088	0.077	1.029
Estonia	EST	0.079	0.092	0.914
Finland	FIN	0.108	0.076	1.258
France	FRA	0.106	0.138	1.237
United Kingdom	GBR	0.130	0.072	1.513
Greece	GRC	0.137	0.126	1.588
Croatia	HRV	0.070	0.091	0.818
Hungary	HUN	0.071	0.045	0.829
Ireland	IRL	0.086	0.186	0.995
Iceland	ISL	0.094	0.065	1.095
Israel	ISR	0.109	0.086	1.264
Italy	ITA	0.096	0.089	1.117
Japan	JPN	0.125	0.111	1.453
Korea, Rep.	KOR	0.058	0.073	0.678
Lithuania	LTU	0.043	0.045	0.496
Luxembourg	LUX	0.074	0.063	0.857
Latvia	LVA	0.088	0.066	1.024
Mexico	MEX	0.110	0.188	1.280
Macedonia, FYR	MKD	0.091	0.052	1.061
Malta	MLT	0.059	0.137	0.683
Montenegro	MNE	0.073	0.051	0.852
Netherlands	NLD	0.075	0.069	0.874

Country Name	Country Code	Rents/GDP 2011	PIM Estimate	2011 Share/Reg
Norway	NOR	0.065	0.080	0.757
New Zealand	NZL	0.118	0.134	1.376
Poland	POL	0.045	0.020	0.518
Portugal	PRT	0.070	0.052	0.811
Romania	ROU	0.090	0.066	1.043
Russian Federation (EUO)	RUS	0.025	0.018	0.286
Serbia	SRB	0.110	0.090	1.281
Slovakia	SVK	0.055	0.101	0.642
Slovenia	SVN	0.068	0.080	0.788
Sweden	SWE	0.098	0.058	1.142
Turkey	TUR	0.106	0.058	1.232
United States	USA	0.103	0.121	1.203
Bolivia	BOL	0.034	0.229	0.551
Brazil	BRA	0.063	0.072	1.010
Colombia	COL	0.062	0.015	1.002
Costa Rica	CRI	0.021	0.032	0.338
Dominican Republic	DOM	0.088	0.343	1.414
Ecuador	ECU	0.068	0.030	1.104
Guatemala	GTM	0.087	0.064	1.408
Honduras	HND	0.056	0.221	0.901
Haiti	HTI	0.047	0.086	0.752
Nicaragua	NIC	0.072	0.055	1.157
Panama	PAN	0.096	0.038	1.548
Peru	PER	0.045	0.063	0.725
Paraguay	PRY	0.019	0.021	0.304
El Salvador	SLV	0.100	0.040	1.606
Uruguay	URY	0.110	0.020	1.767
Venezuela, RB	VEN	0.022	0.004	0.347
Georgia	GEO	0.044	0.004	
Iran, Islamic Rep.	IRN	0.103	0.027	
Aruba	ABW	0.175	0.033	1.349
Anguilla	AIA	0.106	0.093	0.816
Antigua and Barbuda	ATG	0.115	0.276	0.883
Bahamas, The	BHS	0.165	0.272	1.273
Belize	BLZ	0.173	0.135	1.328
Bermuda	BMU	0.196	0.552	1.507
Barbados	BRB	0.406	1.203	3.122
Cayman Islands	CYM	0.198	0.920	1.520
Dominica	DMA	0.135	0.256	1.036

Country Name	Country Code	Rents/GDP 2011	PIM Estimate	2011 Share/Reg
Grenada	GRD	0.105	0.151	0.808
Jamaica	JAM	0.076	0.088	0.586
St. Kitts and Nevis	KNA	0.137	0.038	1.057
St. Lucia	LCA	0.110	0.115	0.844
Montserrat	MSR	0.094	0.026	0.725
Suriname	SUR	0.022	0.014	0.169
Turks and Caicos Islands	TCA	0.024	0.005	0.182
Trinidad and Tobago	TTO	0.044	0.027	0.336
St. Vincent and the Grenadines	VCT	0.145	0.317	1.115
Virgin Islands, British	VGB	0.053	0.023	0.406
United Arab Emirates	ARE	0.150	0.105	2.427
Bahrain	BHR	0.073	0.069	1.173
Iraq	IRQ	0.087	0.022	1.404
Jordan	JOR	0.106	0.061	1.711
Kuwait	KWT	0.058	0.012	0.931
Oman	OMN	0.051	0.028	0.815
Palestinian Territory	PSE	0.040	0.081	0.652
Qatar	QAT	0.034	0.013	0.550
Saudi Arabia	SAU	0.053	0.034	0.862
Yemen	YEM	0.055	0.047	0.889