INTERNATIONAL COMPARISON PROGRAM

SECOND MEETING OF THE TECHNICAL ADVISORY GROUP

Note on Quality Adjustment of Physical Measures of Housing

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Background

Because of the paucity or inconsistency of housing data for many of the countries in the 2005 and 2011 ICP rounds, the Global and Regional Offices had often to adopt less than desirable techniques to compare dwelling volumes. One method was to ask countries the share of households that had electricity, tap water and an inside toilet. The arithmetic average of these shares was taken as a measure of quality that when multiplied by the physical volume of housing, provides an estimate of the volume of *quality adjusted housing*. The preferred physical volume measure was area in square meters or next best, number of rooms, but many countries provided only the number of housing units in rural and urban areas, regardless of size. This was true even though some of these countries could provide average rents for the ICP stratified characteristics of dwellings by type, size and amenities.[2]

The three amenities have also been requested for 2017 so that the 2011 methods can be replicated. A very important use of these estimates in 2011 was to link the regional estimates of quality adjusted volumes as described in Konijn (2017), which may also be necessary in 2017. Another use of these crude quality adjusted quantities can be used to link in individual countries that for reasons like late availability of data, require special treatment. The ADB has taken the initiative under Kaushal Joshi in improving on the methods used in 2011 for their countries and this work is taken up in section A. In section B, Inyoung Song and I have extended Kaushal's proposal to a larger number of ICP 2011 countries and shown the impact of this change in method would have had on the 2011 results.

Section A. Research at the Asian Development Bank

Joshi was struck by the fact that the ICP housing quality measure for many ADB countries of widely varying incomes were not very different. For example comparing Singapore (1.0) to Viet Nam, Sri Lanka, Fiji and the Philippines he found the latter group were all above (8), representing a reduction in volumes but less than one might expect. This led the ADB to look into international sources that provided more detail on measures of sanitation and for electricity supply, international and other sources. The ADB work at this stage is ongoing but it is a major step towards improving housing comparisons in the Asian-Pacific region. One of the mandates for the Housing Task Force was to improve on the approach of Asia-

[2] In fact over 100 countries provided rental estimates in 2011, though many were not used because they were not consistent with the total rental expenditures of the country resulting in improbable indirect volume estimates.

Pacific that assumed PPP for housing was the same as other basic headings of consumption. The work that the ADB has been carrying out is certainly a step in that direction.

When the ADB introduced alternative assessments of water supply and sanitation from the Joint Monitoring Program of UNICEF and WHO monitoring of sanitation around the world referred to here as JMP, there was considerably more spread across the Asia-Pacific countries. Electricity measures examined by the ADB were not considered satisfactory and that research remains ongoing. The ADB work led us to see if some similar embellishments of the housing quality measure might be useful in other regions. With each new round of the ICP there is concern that improvements in methods will reduce comparability across benchmarks. At a minimum it is valuable to know what effect changes in method would have made in the latest benchmark. In this spirit the next section compares the housing quality measure as applied in the 2011 ICP with plausible alternatives. It should be noted that for this exercise we are only using 108 countries representing the group that was used to link quality adjusted housing volumes in the different regions for 2011. The other 2011 ICP countries are excluded because they did not collect data to make direct volume comparisons (for example, CIS), or had questionable or no responses with respect to some of the questions related to housing amenities, or were not used in the linking of regions, e.g. the Caribbean.

Section B. Alternative Measures of Housing Quality

Inyoung and I have modified the ADB approach to develop an alternative set of estimates for the ICP regions for 2011 that will allow the TAG to judge the probable effects of this modification of the ICP approach. To keep the comparison as simple as possible we have retained the arithmetic average of amenities so that if we are using a combined index of sanitation, it is given a weight of 2/3 and electricity 1/3. That is, the sanitation index takes the same weight as did water and toilet availability in the 2011 quality measure. We have looked at two principal sources for sanitation, the Environmental Protection Index (for 2014) and JMP for 2011. These two sources and others available need to be further examined before judging which is preferable. For now we have carried out computations for just these two indexes of sanitation.

The ICP has used as its electricity indicator the share of households living in a dwelling with access to a source of electricity. The availability of electricity has been supplemented by a quality index based on the Global Competitiveness Survey (GCS) that ranks countries based on a survey of business respondents in about 170 countries. The survey is administered by local research institutes and includes questions related to establishing firms, the legal system, mechanisms for resolving disputes, as well as questions

about infrastructure as it relates to business operations. Among the infrastructure questions are two that ask about the basic electricity and telephone capacity and the quality of electricity distribution. For ICP purposes the concerns of business respondents will only partially overlap those of urban and even less rural households. This said, we have used the GCS electricity responses for 2011 for those ICP countries for which they are available.

In terms of the index there is an issue of scaling; respondents rated countries 1-7 on questions about frequency of interruption or fluctuations in voltage, that were aggregated to obtain an overall measure of electricity quality. The values might range from under 2 to over 6.9 for some OECD countries, a large range.[3] We have transformed the GCS scale in a conservative way so that the adjustment factor will be moderate.[4] The adjustment factor is multiplied times the share of households that countries reported as having electricity in their dwelling and given a weight of one-third in the quality index.

Column (1) of Table 1 labeled *ADJ/2011* is the quality adjustment using the 2011 method. The remaining columns in Table 1 present the quality measures using the 2011 method and four variations using the two sanitation and one electricity quality index based upon the 110 ICP 2011 countries that had collected volume comparison data. The CIS countries are not included because they apply user cost for their dwelling comparisons and are separately linked to the EU-OECD region through 3 EU countries that carry out user cost and rental equivalence comparisons. The Caribbean and Pacific islands are also excluded because of timing along with some outliers leaving a total of 110 countries. In columns (2) and (3), the two measures of sanitation JMP and EPI are combined with the share of households with electricity used in ICP 2011 with two-thirds to sanitation and one-third to electricity. Finally, the adjusted electricity share (GCS) is combined with the two sanitation measures in columns (4) and (5). The percentage decrease in quality between the 2011 index and column (5) is given in column (6).

Western Asia, which had some hard to explain changes in housing volumes between 2005 and 2011, appears to be least affected by the adjustments in the quality measures, the effect being significant, though less than the other non-EU-OECD regions. Our adjustment for electricity has a small impact compared to the difference between the two sanitation measures, perhaps because of our conservative scaling. Column (5) represents the largest effect of adjusting the present quality approach in column (1). In

[3] There was also a measure of electricity and telephone capacity that is highly correlated with the electricity quality question so in the end in our numerical illustration we have only used the electricity quality response.
[4] For GCI values above 6, the adjustment factor is 1.0; 5-6 it is .9; 4-5 it is .8; 3-4 it is .7; and below 3 it is .6.

Table 2 the results have been transformed in to an EU-OECD reference of 100. The potential effects of changing the quality adjustment are significant for all regions in terms of linking housing volumes. Applying the adjustments in column (5) would have reduced the real volume of housing in 2011 relative to the EU-OECD by 38%% in Asia-Pacific, 43% in Africa, 33% in Latin America, and 17% in Western Asia.

Table 1: Comparison of Quality Measures for Housing in 2011

Region	ICP2011	JMP2/3	EPI2/3	Qelecjmp	Qelecepi	%Dif 1-5
	1	2	3	4	5	6
AFR	41.1	41.3	25.6	35.2	18.9	-54.0
AP	72.9	71.2	51.6	63.7	36.8	-49.5
LA	76.7	74.9	56.2	69.1	42.6	-44.4
EU-OECD	96.2	98.4	90.1	96.3	85.5	-11.1
WA	87.0	91.8	72.0	87.2	62.3	-28.4

Table 2: Comparison of Quality Measures for Housing in 2011, OECD=100

Region	ICP2011	JMP2/3	EPI2/3	Qelecjmp	Qelecepi	# Countries
	1	2	3	4	5	6
AFR	43	42	28	37	22	29
AP	76	72	57	66	51	15
LA	80	76	62	72	57	14
EU-OECD	100	100	100	100	100	42
WA	91	93	80	91	77	10

If country response on housing is no better in 2017 than 2011 one issue the TAG should consider is whether to recommend the type of adjustment explored in this note. One question is what should the TAG recommend, if anything, to the regional coordinators, especially if Asia-Pacific plans to make some adjustment? And should the Global Office and Housing Task Force pursue this line of research further? As noted in this numerical illustration simple weighting has been retained so as to keep the analysis with 2011 comparable. However, alternative weighting schema have been discussed previously by the TAG and it is simple to compare 2011 using any weighting scheme with the types of modifications explored here. Is that a useful direction to explore?

Still another way to improve the quality adjusted quantity measure across countries would be to take advantage of all the information that countries provide on physical quantities. For example it is customary in Latin America to have number of rooms in addition to number of dwellings. A number of

countries provide two and in many cases all three physical measures in all regions. It is possible to apply some CPD type analysis to all of the physical quantity data to move from the default number of dwellings to estimated square meters or number of rooms for all countries. Another question for the TAG; is this a useful direction for the Housing Task Force to move?

In the bigger picture, the dwelling services comparisons have been bedeviled by the uncertainty enveloping the underlying expenditures, namely do they embody the rents obtained from surveys in the rental equivalence approach, or the real quantity of housing as embodied in the direct volume comparisons? One reason to pursue the line of research discussed in this note is to make the best direct volume estimates for each country. For those countries supplying rents, it is then possible to compare direct and indirect volumes. If the two measures are within 10 percent of each other as is the usual case for EU countries, or 20 percent for other regions, there is some assurance that we are getting dwelling volumes correct and that the expenditures are acceptable. If the direct and indirect estimates of volumes or PPPs are far apart, resort to Plans B or C may be necessary.[5]

[5] Suggestions welcome.