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Topic E. Inclusion of social transfers in kind, housing wealth and imputed rent in the measurement of poverty

Accounting for housing wealth in low income statistics for Canada

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Abstract

National statistical agencies strive to measure household income according to internationally agreed upon standards, such as those outlined in the Canberra Group Handbook on Household Income Statistics (UNECE, 2011). However, due to data limitations or conceptual shortcomings, some sources of income are inconsistently measured. One such area is the Net value of owner-occupied housing services, more commonly called income from imputed rent. Income from imputed rent applies to owner occupiers and represents the implied value of the housing services received less the value of the housing costs incurred, i.e. the imputed market rent less the current expenses of the household in their role as a landlord, such as interest payments, intermediate inputs (property rates, repair and maintenance expenses, insurance costs, etc.), depreciation and taxes (UNECE, 2011). This paper describes the valuation of imputed rent for Canada which is to be undertaken by Statistics Canada for the purpose of creating alternative estimates of distributional statistics such as the low-income rate or inequality in that country. It will review the “state of the art” in estimation as represented in recent studies, and describe challenges towards developing a similar estimate in Canada.

1. Introduction

National statistical agencies strive to measure household income according to internationally agreed upon standards, such as those outlined in the Canberra Group Handbook on Household Income Statistics (UNECE, 2011). However, due to data limitations or conceptual shortcomings, some sources of income are inconsistently measured. One such area is the net value of owner-occupied housing services, more commonly called income from imputed rent.

This paper describes motivations and methods for the valuation of imputed rent. Methods used for deriving imputed rent differ from application to application and, pragmatically, according to the data that is available. Standardisation of methods is therefore greatly desirable, even though differences in source datasets will mean that a certain amount of country variability in methods is unavoidable. The paper also presents estimates for Canada which are undertaken by Statistics Canada for the purpose of creating experimental estimates of the low-income rate in that country, and describes challenges towards developing these estimates¹.

As in other applications, estimates of net imputed rent in Canada skew towards older households who are more likely to be homeowners and have lower money income. Adding net imputed rent to income also reduces low income for older householders relative to younger. Some younger owner-occupiers have negative imputed rent, reflecting a tendency towards owners having high leverage at younger ages.

The paper also investigates the value of rent subsidies using the same methodology. It finds that the subsidised rental market is small in Canada (as a share of the total housing market), and that adding estimates of the value of social housing subsidies leads to only small changes in overall low income. The paper also estimates similar statistics using an alternative method of accounting for housing in low-income statistics: to calculate the rate of low-income after housing costs are deducted. This leads to a somewhat different relative low-income by age profile for Canada, leading to higher relative low income rates for older households.

Imputed rent and other estimates presented in this paper are fairly sensitive to the methods used. Presentation of the results would benefit from a thorough sensitivity analysis, including identification of upper, lower and preferred estimates. Methodologies used in estimation should be clearly described in metadata and made readily available to assist in the interpretation of the results. Estimates including imputed rent or other methods of accounting for housing costs in the income distribution should be

¹ Estimates presented in this paper are provisional, and subject to revision. They are not intended to be referenced as official statistics. International reports regularly report low-income rates as “poverty rates”, while Statistics Canada traditionally describes this as “low income”. This paper uses both terms low income and poverty.

presented separately from the standard estimates (excluding these considerations) for Canada as they are in other countries.

2. Imputed rent – concepts

2.1 Imputed rent applied to owner-occupiers

The 2011 Canberra Handbook on Household Income Statistics provides a standardised, “practical” definition of household income to guide statistical agencies in the creation of income estimates. The definition includes items over which there is little confusion, such as wages and salaries, or the value of cash transfers received by the household from the government. It also includes deductions for taxes paid on that income. This standardised definition of income also includes more conceptually difficult items such as the “Net value of owner-occupied housing services” (or imputed rent) and the value of “Social transfers in kind” (STIK) received. This paper touches directly upon the first of these, and partially upon the second.

Net imputed rent is the estimated value of housing services received by the household, less the shelter costs incurred (gross imputed rent would be the estimated value of housing services without deducting shelter costs – this paper is concerned with estimating net imputed rent). The principle behind imputed rent is that some households, by virtue of being owner-occupiers, receive net benefits from their dwelling that is not received by renters. It can be articulated in a number of different, related ways. For example, imputed rent can be thought of as the income a homeowner would receive if he rented the dwelling from himself, less the costs incurred in acting as the “landlord” such as interest, property taxes, insurance costs, depreciation, and upkeep expenses. It could alternatively be thought of as the return an investor would receive if he invested his home equity in the market at a “safe” rate of return (UNECE, 2011).

Imputed rent would be received by homeowners with and without mortgages. It can be positive or negative; the latter would occur when operating costs exceed the market value of the rent which may be more common for newer, younger homeowners who are more highly leveraged. These homeowners would, all else equal, be “better off” in the short run to be renting (Törmälehto and Sauli, 2013). Indeed, adding imputed rent to income offers a way to reflect the increasing burden of mortgage interest in homeowners, as interest charges can be deducted from income only after imputed rent is added (Frick et al 2008). As noted in Törmälehto and Sauli (2010) the impact of this on the low income rate would be limited, because mortgage holding households are generally not at the lower end of the income distribution. However, there could be some situations in which a household takes on a mortgage it can no longer service following a job disruption or other change in circumstances.

Imputed rent may seem confusing or problematic because it does not reflect a real market transaction - indeed the “income” received from imputed rent is not fungible - yet it can be important to consider in many circumstances. For example, well-being measures based upon only “money” income could be criticised as misrepresenting the situation of the elderly. Since the money income of elderly persons is lower, they typically appear worse off than other family types. However, many elderly own their own homes which makes them “better off” than younger families who have to carry mortgages or pay rent. Including imputed rent in household income is an attempt to place these family types on a more comparable footing (Short and O’Hara, 2008). Likewise, younger homeowners who face very high house prices, such as is the case in many Canadian markets, may be “worse off” than their money income

implies, because of higher interest charges on their homes. This situation could be expected to worsen as housing prices and interest charges rise, and they presently are in Canada. On the other hand, evidence suggests that the price of rental accommodation is also rising in Canada, which could be reflected in increases in imputed rent estimates for homeowners. While this would result in the expected relative improvement of living standards for homeowners, some may find it confusing that homeowners should become better off when rents rise.

Imputed rent could also be seen as important for inter-regional, or international comparisons. For example, homeownership rates differ from country to country, and between urban and rural households, so comparisons of money income might misrepresent differences in well-being (UNECE 2011, Balcasar et al, 2014). The inclusion of imputed rents should improve comparability of household economic well-being over time, across countries, and between housing tenures, age groups and other population subgroups. Theoretically, net imputed rents could also be included in a comprehensive income tax base in order to obtain fully neutral taxation of owner-occupation (Balcasar et al, 2014, Poterba and Sinai, 2008; Figari et al, 2017). A full consideration of the tax implications of homeownership would include consideration for the deductibility of interest costs or property taxes (Short and O'Hara, 2008).

2.2 Imputed rent in National Accounts

Imputed rent has long been a feature of GDP calculations. In national accounts, owner-occupants are treated similarly to a business. Expenses associated with owner-occupied housing are deducted from the value of the housing services, leaving a profit-like remainder of income. The imputation ensures that GDP will not change if a house is rented by a landlord or is lived in by its owner. (Bureau of Economic Analysis, 2015). The importance of imputed rents in National Accounts is such that more than half of the total housing consumption is imputed rent in many countries in Europe (Balcasar et al, 2014).

2.3 Imputed rent applied to renters

Renters do not receive income from imputed rent. The exception is renters who pay rent at below market value, such as households in social housing units. For these households, net imputed rent is an estimate of the value of the benefit accruing to the household due to not paying full market rent. As with imputed rent, the addition of housing subsidies to income may reduce measured inequality and low income by shifting some low-income families up in the income distribution (Short and O'Hara, 2008). The definition of imputed rent used in EU-SILC takes into account both the returns to home ownership, as well as the in-kind transfers accruing to those who live in social housing at rents below market rates (Eurostat, 2017). Compared to imputed rent for homeowners, the inclusion of the value of housing subsidies in income is met with less confusion by users, as defining a cash value for this social transfer in kind is more intuitive. In Canada, a new National Housing Strategy² may include increased investment in social housing, an investment which ideally would be reflected in the poverty rates.

To estimate the value of the housing subsidy, one calculates the difference between estimated market rent and rent paid, although again this method can yield negative values which should be set to zero or a small positive number (Short and O'Hara, 2008).

² <https://www.placetocallhome.ca/>

2.4 International practices

In 2001, the first edition of the Canberra Group Handbook included imputed rent in the conceptual definition of income but not in the operational one, mainly due to methodological concerns and the lack of harmonised and comparable data. However, in 2011, in the 2nd edition of the Handbook, the operational definition of income was broadened to include the net value of owner-occupied housing services in the recommended income definition to be used for international comparisons. Likewise, the Handbook recommends that data for imputed rent be reported separately so that analysis can be conducted with and without this variable (UNECE 2011, p14).

In the EU-SILC guidelines, both gross and net imputed rent are included as variables, but do not form part of the main measure of disposable income used to calculate at-risk-of-poverty rates—primarily due to concerns regarding data quality and comparability (UNECE 2017, p.52.). Törmälehto and Sauli, 2013, describe a number of issues with the contributed data, including gross and net values being equal, large year to year variations, data missing for certain years, and other issues. Lack of complete metadata is raised as a key concern to using the imputed rent information from EU-SILC. Euromod, a multicountry tax and benefit model represents another multi-country database that incorporates estimates of imputed rent though in a consistent manner across countries (Fricke et al 2010; Figari et al, 2017).

An OECD study of international practices determined that all but 3 out of 27 countries (Canada, Republic of Korea, and United States) calculated imputed rent regularly as part of their income programs, but often publish them as “secondary or alternative” measures of income or inequality. Countries also followed a variety of different practices in computing imputed rent (Sustova, 2016).

3. Imputed rent - methods

There are three estimation methods commonly in use in valuing imputed rent. The two main approaches are the rental equivalence (market rent) approach and the user cost (return to capital) approach. The third approach is the self-assessment method. (Refer to Fricke et al, 2010, Törmälehto and Sauli (2013), Balcasar et al, 2014, or other references listed in this paper and for additional discussion of alternate methods.)

3.1 The rental equivalence approach

The objective of the rental equivalence approach is to estimate, using a statistical process, the market rent that would apply to the dwelling, were it to be rented out. The difference between this rent and the actual costs incurred by the household would be the imputed rent or, in the case of subsidised renters, the estimate of the value of the subsidy. The statistical processes used to estimate the market value of rent include the stratification approach, the hedonic regression approach and the Heckman approach.

In each approach, the market value is arrived at by predicting rents of owner-occupied dwellings based upon the characteristics of dwellings occupied by renters. Before moving to describing the estimation for the rental equivalence approach, it is important to note common issues.

In cases where the non-subsidised rental market is “thin” it might be impossible to obtain reliable estimates of the market rent for owner-occupied dwellings (Törmälehto and Sauli (2013)). Eurostat guidelines suggest that the rental market should be larger than 10% of dwellings for the rental equivalence approach to be used. This would rule out these approaches for many European countries (in

Romania for example, only about one percent of households pay market rates). But thin rental markets are also present in some areas within countries – in Canada for example, there are large rural areas where the rental markets would be considered “thin” by this metric. There are also large areas in Canada where subsidised housing is the norm, such as in the northern territory of Nunavut or on Indigenous reserves. The rental market for higher-priced homes may also be “thin”. This, plus difficulty describing relevant aspects of quality in the estimation could lead to bias in the estimates of imputed rent for some dwellings (Brown and LaFrance, 2010). Short et al. (2007) found that the rental equivalence approach did not perform well for the U.S. where rental housing is generally of lower quality than owner-occupied homes.

The data requirements are higher for the rental equivalence approach, and a solution must be found when certain components are missing. For example, in the Canadian microdata used in this study there is no estimate of the interest paid as part of the mortgage, only the gross mortgage payment. A method is needed to approximate the interest portion of the mortgage.

Likewise, once the rental equivalence is determined for homeowners, it is necessary to deduct from this the cost of ownership. Costs of ownership could include property taxes, condominium fees, cost of maintenance and upkeep, some insurance costs and potentially other costs incurred by homeowners but not renters. What is included in the cost of ownership can vary from study to study, and data on these costs can vary from survey to survey. In the absence of certain items, they may be estimated or ignored, though if the latter is chosen, this may imply an overestimation of imputed rent. In some studies, utility costs are also deducted from homeowners imputed rent as a cost of ownership however, this would only make sense if the utility cost were always included in the rents for the renters from which the imputed rent is deduced..

3.1.1 Stratification

In the stratification approach, the microdata data is grouped into cells based upon observed characteristics such as dwelling characteristics and region, and average values of market rent are computed for each cell (for renters). These average values are then assigned to homeowners as estimates of gross imputed rent. Shortcomings of the approach may relate to having a low number of observations in some cells, leading to poor estimation of market rent.

3.1.2 Hedonic Regression

The hedonic regression approach uses similar data inputs as the stratification approach, but the data is used in a regression model. The regression model expresses market rent (of renters) as a non-linear function of dwelling characteristics, and regression coefficients from the model are, in turn, used to predict gross imputed rent for homeowners:

$$\ln(\text{market rent}) = f(\text{dwelling characteristics})$$

The advantage of this approach over the stratification approach is that use of the parametric model reduces the importance of sparse cells.

3.1.3 Selection methods

Renters are different from homeowners, and this process of selection into renting may lead to biased estimates in the hedonic regression, if not controlled for. The typical method for controlling for selection in the imputed rent literature is through use of a Heckman two-stage model. In this model, a first stage models selection into renting based upon observed characteristics of the dwelling, and personal characteristics of the inhabitants. The results of this model are used to generate a probability of selection into renting based upon the characteristics of the renter. This parameter is then added to the hedonic regression to help control for bias in selection. The Heckman model may lead to different estimates of imputed rent, and may be used as a sensitivity check on the hedonic model, where the hedonic model is used.

3.2 The User cost approach

In the user cost approach, net imputed rent is derived through applying a rate of return to home equity. Thus, imputed rent is understood as the rate of return that would have been obtained by owners if the home equity had been invested in a safe investment (Törmälehto and Sauli, 2013; Balcasar et al, 2014). The user cost approach could in this way be used to estimate net imputed rent for owner-occupiers, but not for the net value of social housing benefits. A straight forward approach to estimating imputed income for home owners with the user-cost approach is suggested by Törmälehto and Sauli (2013) as:

$$\text{User cost} = r(\text{market value of dwelling}) - i(\text{outstanding mortgage})$$

The variable r represents an assumed rate of return from a “safe investment” and i represents the interest rate paid on the mortgage. If i and r were equal, the formula reduces to the equity held in the home, multiplied by a rate of return³.

Difficulties in applying the user cost approach include being able to settle upon the current market value of the dwelling, as well as an appropriate rate of return (Balcasar et al, 2014). Garner and Verbrugge (2009) note a divergence between actual rents and user costs for the United States and conclude that the rental equivalence approach should be used in official statistics where possible. And as noted above, the Eurostat guidelines indicate that the user cost method should be used only in cases where the rental market is less than 10%. However, Törmälehto and Sauli (2017), have suggested that the user cost method should be reconsidered due to its “better transparency, relative simplicity and lower production and respondent burden (p. 156)”, and that “the quality of data about the current market prices of dwellings may be better than that of data about competitive market rents, even if market price values were derived from survey respondents (P 156)”.

3.3 The self-assessment approach

The self-assessment method involves asking owner-occupiers to estimate the potential market rent for their dwelling. Strengths and weaknesses of this approach are outlined in Balcasar et al (2014) who concludes with concerns about using owner-assessments of rental value, as owner-occupiers may overestimate the true rental value of their property given their affinity to their property or

³ Törmälehto and Sauli (2013) exclude depreciation and upkeep expenses, as these are excluded in the EU-SILC. Capital gains or losses are excluded from housing wealth as these sources are also excluded from income. This paper also excludes depreciation, upkeep and capital gains in the estimates.

neighbourhood. This approach is not pursued further in this paper, as there is no self-assessment information available for Canada.

4. Other practices

The importance of incorporating housing costs and benefits to homeownership is widely recognised, however, as suggested above, there is no standard way to deal with this problem. While calculating imputed rent is one such method, another includes examining the income distribution net of housing costs. In this approach, housing costs, such as rent and mortgage interest, are deducted from post-tax income to yield an estimate of income after housing costs (IAHC). Because lower income families tend to spend more (proportionately) on housing costs, estimates of low-IAHC tend to be higher than estimates that do not take housing costs into consideration. This approach may be seen as better than the imputed rent approach, as it may be easier to explain to users. The UK's Department for Work and Pensions annual article, *Households Below Average Income*, reports distributional measures of income after housing costs, finding that estimates of low-IAHC are higher and have similar trends (ONS, 2018).

5. Canadian practice, and provisional estimates for Canada

Canada does not presently include the value of imputed rent in its official income statistics. However, there are examples of researchers using imputed rent methods in the study of consumption and income. In each of these cases, imputed rent is found to be an important source of consumption and income for children and the elderly. Measurement approaches are also seen to be important. There is one exception where imputed rent is partially included in official income statistics and that is in Canada's market Basket Measure of Low income, which is also described in a subsection below.

5.1 Imputed rent in consumption poverty

Economic well-being can be measured using income or consumption, and the benefits of using one or the other are well discussed in the literature. In Canada, trends in poverty and inequality are usually monitored using income data, due to the availability of high quality and consistent time series data. When measuring consumption poverty and inequality it is very common to incorporate measures of imputed rent, due the mismatch between housing expenditures and housing consumption. For example, Crossley and Curtis (2006) impute housing consumption based upon a regression method and find that estimates of poverty incorporating imputed rent exhibit "significantly less poverty and inequality" than measures that incorporate only observed housing expenditures, or omit housing expenditures altogether.

Norris and Pendakur (2013) examine consumption poverty in Canada using both the standard hedonic regression method, and with a Heckman correction to allow for quality differences between rental and owned housing. With the correction for selection, imputed rent for owners was much higher than it was without selection – on average, imputed rent was estimated to be 30% higher for owners when selection was taken into account than when it was not taken into account.

5.2 Canadian estimates of imputed rent in income

Brown and Dar-Brodeur (2015), updating Brown and Lafrance (2010), use data from multiple sources to examine trends in imputed rent from owner-occupied housing in Canada from 1969-to-2011. They report an overall increase in the proportion of household income derived from home ownership, even

within younger age groups who had declining home equity shares. They also find that this income disproportionately increases the income of retirement age households. For a sense of the levels of income involved in this imputation, they estimate \$10,585 in mean imputed rent among homeowners for 2006 (\$12,458 in 2016 dollars).

In a recent major policy announcement, the Government of Canada announced that it will, for the first time ever, be tracking an “official poverty line” for Canada. The official poverty line is to be based upon Canada’s Market Basket Measure of low income (Employment and Social Development Canada, 2018). The Market Basket Measure is an absolute poverty measure with a threshold based upon the costs of food, shelter, clothing transportation and other items for 50 regions of Canada. The measure of resources is income after federal, provincial, and payroll taxes, child care and medical expenses are removed and a value for “Mortgage Free Advantage” is added in. Mortgage Free Advantage is essentially a value for imputed rent for mortgage free homeowners which is developed using a stratification method. Thus, the imputation currently excludes imputed rents for owners with mortgages and for recipients of social housing benefits. The Market Basket Measure is currently undergoing a comprehensive review by Statistics Canada⁴.

5.3. The development of imputed rent estimates for Canada

The remainder of this paper describes the construction of provisional imputed rent estimates for Canada. The objective here is to prepare estimates using a variety of approaches to examine how the underlying assumptions of the approaches lead to different estimates. It also describes challenges to producing these estimates. The paper employs fairly simple approaches – that is, it uses the data that is available and avoids, wherever possible, making large assumptions about missing data. The results should be seen as preliminary, and should not be referenced as official statistics for Canada.

5.3.1 Data and hedonic regression results

Estimates of income and imputed rent are generated using data from the Canadian Income Survey (CIS) for 2016⁵. The CIS is an annual survey covering Canadian provinces, but excluding Canadian Territories, Indigenous reserves, military bases, and persons in non-private dwellings, and covers about 97% of the population of Canada. It has a response rate of about 80%. Data on income for this survey comes from income tax records, which are combined with data from other survey and administrative sources to yield estimates of household income after federal and provincial taxes. Income sources include income from market and government transfer sources, and federal and provincial taxes are deducted. In 2016 the survey obtained responses from 28,005 households and 65,782 individuals.

The CIS collects most information useful for the calculation of imputed rent. The dataset contains an estimate of monthly rent paid, excluding utilities, for renters who pay market or subsidised rates for their dwelling. A log linear regression is used to estimate predicted market rent for households paying market rent based upon their dwelling characteristics:

$$\ln(\text{market rent}) = f(\text{dwelling size, dwelling type, dwelling condition, region of Canada})$$

⁴ <https://www.statcan.gc.ca/eng/consultation/mbm>

⁵ <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5200>

There were 6,890 households paying market rent in the sample in 2016. This represented 29.4% of households. The dwelling size is indicated by a quadratic in the number of bedrooms. Nine different categories of dwelling type are available with low-rise apartment (43.8%), high-rise apartment (20.3%) and single detached (15.6%) being the most common. Dwelling condition can take on the values of “major repairs are needed”, “minor repairs are needed”, or “only regular maintenance is needed”. Market rent is measured in monthly terms, and is net of utility costs. When utility costs are included in rent, their values are estimated and removed from rent by Statistics Canada.

Table 1 displays descriptive statistics of households by age of household head (households are classified by the age of the highest income earner) tenure type for Canada for 2016. Altogether, 29.4% of households were market renters, 3.7% were renters in subsidised dwellings, 38.3 were owners with a mortgage, and 28.6% were owners without a mortgage⁶. Market renters were concentrated among the younger age groups, where 52.9% rented market units. Owners with mortgage were more highly concentrated in the 35-49 age group, and owners without mortgage were more concentrated in the 50-64 and especially the 65+ age groups.

Table 1, Distribution of households by tenure type and age of household head, Canada, 2016

tenure type	age of household head				
	less than 35	35-49	50-64	65+	all
renters	52.9	27.5	20.7	22.9	29.4
subsidised renters	2.7	3.5	4.1	4.1	3.7
owners with mortgage	38.4	56.8	39.9	15.4	38.3
owners without mortgage	6.0	12.3	35.3	57.6	28.6

Source: Statistics Canada, Canadian Income Survey, 2016

Imputed rent for homeowners and households living in subsidised dwellings is estimated using the results of the regression. Regression estimates for the above model are displayed in a technical appendix table available from the authors. As expected, the rent estimates were higher in larger cities, such as Toronto and Vancouver, and lower in rural areas, and rent increased with the size of the dwelling. Interestingly, rent was higher in high rise apartments than detached dwellings. This feature is also found in the raw descriptive data, and is also reported in Brown and Lafrance (2010) who used Census data for Canada. Brown and Lafrance suggest that rents for high-rise apartment buildings will be higher than for detached homes because they are more centrally-located in cities than rentable single detached homes.

Predicted values from the regression reflect gross imputed rent. To estimate net imputed rent for subsidised renters, actual rent paid is subtracted, while for owners, interest payments on mortgages, property taxes paid and condominium fees are subtracted. As mentioned before, this is an incomplete listing of costs of homeownership. For example, house insurance costs could also be included as a cost of home ownership. It is left to future research to determine how this might be done.

⁶ Identifying households that are in subsidised housing is accomplished through a question asked on the survey. Future research could examine alternative, administrative sources of social housing information.

The value of interest paid on mortgages (for homeowners with a mortgage) must be estimated in the CIS, however, a value for total monthly mortgage payment is present⁷. A model to predict average equity shares by age, dwelling type and region is estimated from a second Canadian data source for the same year. The coefficients from this model are then used to predict equity share in the Canadian Income Survey. Predicted equity shares are multiplied by the monthly mortgage payment to yield an estimate of the interest portion of the mortgage payment. A description of this imputation is found in the technical appendix.

5.3.2 Results – rental equivalence approach

Table 2 presents estimates for (annual) imputed rent generated from the rental equivalence approach for Canada in 2016. On average, Imputed rent was estimated to generate \$10,319 for owners without mortgage while the median was \$10,036. This mean estimate is somewhat smaller than the estimate produced by Brown and Dar-Brodeur for Canada for 2006, which was \$12,458 in 2016 dollars.

Imputed rent estimates for owners with mortgages averaged \$3,984, the lower estimate reflecting the additional costs of mortgage interest for these owners. Estimates also indicate that some owners are highly leveraged, yielding net imputed rents. The 10th percentile of the imputed rent distribution for owners with mortgages was \$-2,832.

Imputed rent estimates for subsidised renters averaged \$5,962 in 2016. By design, market renters receive no imputed rent.

Table 2, Estimates of imputed rent using the rental equivalence approach, Canada, 2016

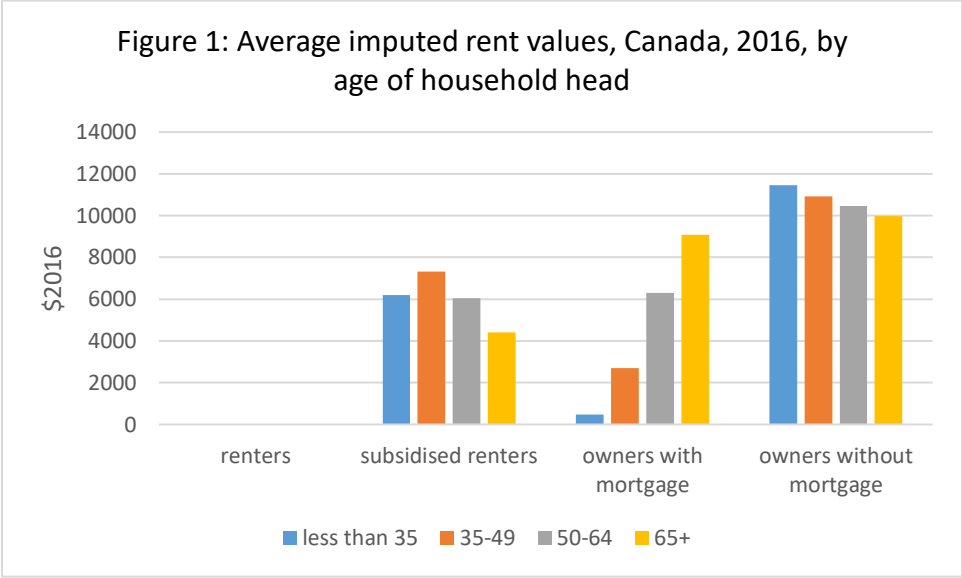
tenure type	mean (\$2016)	median (\$2016)
renters	0	0
subsidised renters	5962	5134
owners without mortgage	3984	4444
owners with mortgage	10319	10036
all	4699	4082

Source: Calculations using the Canadian Income Survey, 2016

Figure 1 shows the distribution of average imputed rent values by tenure type and age of the household. Average imputed rents among owners without a mortgage differed marginally by age of household, with younger homeowners living in dwellings with higher imputed rent. There was a stronger association between imputed rent and age of household for owners with a mortgage, reflecting the process of owners having larger mortgages when they first purchase their homes, working towards smaller mortgages as they get older. The value of rent subsidies also varied by age of household, with older household receiving, on average, less income from subsidies than younger, possibly associated with the

⁷ This estimate excludes property taxes when they are paid as part of the mortgage.

availability of government social security transfers for these groups, which may in some cases reduce the value of the rent subsidy.



Source: Calculations using the Canadian Income Survey, 2016

Table 3 contains estimates of after-tax (annual) income before and after the addition of imputed rent, by age group and tenure type, incorporating the rental equivalence approach. Including imputed rent in income generates a mean income estimate that is 6.3% higher on average, 13.3% higher for owners with a mortgage, and 13.6% higher for households aged 65 and over. The largest percentage difference is for households in subsidised dwellings where the inclusion of an estimate of the subsidy value yields an income estimate that is 24.7% higher.

Table 3, Household income estimates, Canada 2016, various income definitions

	income after-tax	income after-tax and imputed rent, rental equivalence approach	income after-tax and imputed rent, heckman correction approach
age of household head		mean (\$2016)	
less than 35	69104	70148	70079
35-49	87179	90304	90882
50-64	83922	90379	91288
65+	53614	60933	61931
tenure			
renters	51320	51320	51320
subsidised renters	24119	30081	29904
owners with mortgage	95362	99346	100224
owners without mortgage	77515	87834	88947
all	74705	79404	80053

Source: Calculations using the Canadian Income Survey, 2016

Table 4 contains estimates of low-income rates computed with and without imputed rent. In this table and other tables on low income the data is not presented for households by age of household head; rather, data is presented for persons by age. The baseline (without imputed rent) estimate for Canada in 2016 was 13.0%. Low-income rates were slightly higher for those aged 65+ (14.2%), and significantly higher for persons in (market) rental accommodation (24.6%), and subsidised housing (72.3%).

The second and third columns of table 4 present results after incorporating imputed rent. Imputed rent changes the median income, therefore it also changes the low-income threshold. To isolate the part of the change due only to the addition of imputed rent income, the second column recalculates the low-income rates as though the threshold did not change from the baseline example. Incorporating imputed rent produces estimates of low income that are (not surprisingly) lower. More importantly, the age and tenure profiles of the low income rates are changed. In the baseline case, older persons were 9.2 percent more likely to be in low income than average (14.2/13.0 - 1), but when including imputed rent, older persons were 27% less likely to be in low income (7.3/10.0 - 1), holding the thresholds constant. Likewise, persons living in subsidised dwellings, owners with mortgage and owners without mortgage were all substantially less likely, in a relative sense, to be found in low income when the measure includes imputed rent.

In the third column, low income rates are re-calculated to the threshold resulting from the post-imputed rent distribution. In this comparison, one can see that the incorporation of imputed rents reclassifies some renters as low income who would not have been considered low income under the baseline case. Overall, 3.5 million Canadians (10.5%) were in low income with or without imputed rent. Adding income from imputed rent “lifts” 886,000 (2.5%) Canadians out of low income, while 383,000 (1.1%) slide into low income due to the increase in median income caused by adding imputed rent.

Table 4, Low-income estimates, Canada 2016, various income definitions

	income after-tax (baseline)	income after-tax and imputed rent, rental equivalence approach, threshold as per income after tax	income after-tax and imputed rent, rental equivalence approach	income after-tax and imputed rent, heckman selection correction
age			%	
less than 35	13.3	11.5	13.2	13.7
35-49	11.2	9.3	10.8	11.1
50-64	13.3	9.8	10.8	11.1
65+	14.2	7.3	9.5	9.6
tenure				
renters	24.6	24.6	27.8	28.3
subsidised renters	72.3	47.0	55.9	58.1
owners with mortgage	5.4	3.7	4.6	4.8
owners without mortgage	9.4	3.5	4.0	4.3
all	13.0	10.0	11.6	12.0

Source: Calculations using the Canadian Income Survey, 2016

5.3.3 Results – Heckman approach

Tables 3 and 4, in their final columns, also contain results from estimation of imputed rent using the heckman 2-stage method. Here, a first stage regression identifying the probability a household is in a market-rent unit is regressed on housing and personal characteristics. A parameter related to this probability of selection is then fed through to the second stage which is, otherwise, the same as hedonic model estimated above (regression results are in the technical appendix). Heckman estimates of imputed rent are slightly larger on average and add slightly more in imputed rent to owners and older households than from the hedonic model only (table 3). They also produce slightly larger low income estimates than the hedonic model. The results, however, are very similar and suggest that selection is not a large empirical issue in this data.

5.3.4 – Results, Unit Cost approach

Table 5 shows results from the unit cost approach. The Canadian Income Survey does not include estimates of homeowner equity. Therefore a different dataset must be used. For this the 2016 edition of

Canada's Survey of Financial Security is employed⁸, which includes a household home equity value for 2016 and household income estimates for 2015. Income estimates for this survey are generated in much the same way as they are for the CIS.

Two sets of results are chosen, one that sets the rate of return at 2% and another at 3%. The setting of the appropriate rate of return is not the focus of this paper. Rather, two rates of return are chosen, one which yields a slightly smaller average imputed rent than the rental equivalence approach and another which yields a slightly larger estimate. Results are shown only for owners.

At a rate of return of 2%, owners with a mortgage received, on average, \$9,173 in imputed rent. This is a lower average imputed rent value than that observed in the rental equivalence estimate (\$10,319). Compared to the rental equivalence approach, the income from imputed rent is distributed much more unequally in the rental equivalence approach. For example, the ratio of the mean to the median in the distribution of imputed rent income of owners without a mortgage in the unit cost approach is 1.4 compared to 1.0 in the rental equivalence approach. This may reflect the presence of thin rental markets for higher priced homes, as described by Brown and Lafrance (2006). A 3% rate of return yields a correspondingly higher imputed rent estimate across the imputed rent distribution.

Table 5, Estimates from unit cost approach, Canada 2016

	average imputed rent	median impute d rent	income, without imputed rent	income, with imputed rent	low income rate, without imputed rent	low income rate, with imputed rent
	(\$2016)		mean (\$2016)		%	
R=2%						
owners with mortgage	3312	1700	91644	94955	5.2	4.3
owners without mortgage	9173	6500	83672	92844	7.2	4.0
R=3%						
owners with mortgage	7885	5148	91644	99529	5.2	3.7
owners without mortgage	13759	9750	83672	97431	7.2	3.5

Source: Calculations using the Canadian Income Survey, 2016

⁸ <http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2620>

Differences from the rental equivalence approach are similar when considering owners with mortgages where average imputed rent is slightly smaller at 2% (\$3,312), larger at 3% (\$7885), and more unequally distributed. Decreases in low-income rates are larger for owners with a mortgage.

5.3.5 – Results, Income less housing costs

As described earlier, an alternate approach which can be used to reflect housing costs in low-income estimation is to examine income after removing housing costs. Results from this approach are shown in Table 6 for Canada in 2016.

On average, housing costs are higher for younger households, owners with a mortgage, and renters. Overall, housing costs represent 15.5% of after-tax income, but this proportion was higher for families with a household head younger than 35 (21%), market renters (26.2%), and subsidised renters (29.8%). The low income rate was 17.7% measured on an after-housing costs basis (compared to 13% on a before housing cost basis), and like the baseline estimates, remained relatively high for younger and older households, market renters and subsidised renters.

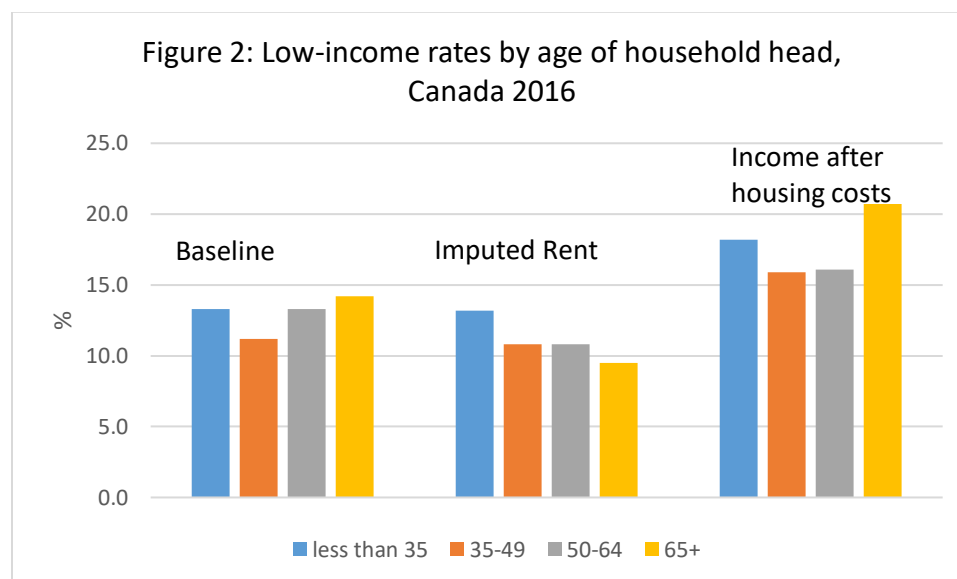
Table 6, Estimates of housing cost, income less housing cost, and low income less housing cost, Canada 2016

	housing costs	income of households without deducting housing costs	income of households with deducting housing costs	low income rate of persons without deducting housing costs	low income rate of persons with deducting housing costs
age group of household head or person		mean (\$2016)		%	
less than 35	14753	69104	54350	13.3	18.2
35-49	14024	87179	73155	11.2	15.9
50-64	9929	83922	73994	13.3	16.1
65+	8329	53614	45285	14.2	20.7
tenure					
renters	13461	51320	37859	24.6	35.4
subsidised renters	7198	24119	16922	72.3	78.9
owners with mortgage	14143	95362	81219	5.4	8.5
owners without mortgage	6853	77515	70662	9.4	10.9
all	11602	74705	63103	13.0	17.7

Source: Calculations using the Canadian Income Survey, 2016

As discussed earlier, imputed rent approaches tend to increase the income of homeowners, as these are the households that will receive this income. These households also tend to be older. The “after-housing

costs” approach decreases the incomes of all tenure types, but, on average, the decrease is larger for owners with mortgages and renters, who are more likely to be younger. On balance, the two approaches have different effects on the distribution of low income by age (figure 2). The imputed rent approach tends to reduce the low income rates of older households relative to younger, while the “after-housing cost approach” does not. Of course, these differences in results are not surprising as conceptually, housing costs and imputed rent do not equate. For example, in this study estimates of imputed rent explicitly excluded utilities, while these are included in housing costs.



Source: Calculations using the Canadian Income Survey, 2016

6. Discussion

Low income (poverty) measurement requires a meaningful and standardised measure of resources available to the household to spend on its consumption. When a household owns its home, it will tend to have lower shelter costs, and therefore have more resources to spend on other necessities. This is the logic for adjusting household income to take account of housing wealth for poverty measurement. In the Canadian context, where many seniors own their homes, the consequences of ignoring housing costs in the measurement of low income would include overestimating poverty among these households.

Owners without mortgages are not the only households who may pay lower than market rents for their homes. Owners with mortgages may pay less than market rates if they have paid off their mortgage sufficiently. The current Canadian context is one of rising house prices and larger mortgages for newer home buyers, and this could lead to some owners paying higher than market rental rates for their homes. A consequence of this is that some households are “house poor”. They pay so much for their housing that they cannot afford the other necessities of life.

Finally, some households live in subsidised housing. While not a great proportion of households in Canada – about 1 in 20 households live in a subsidised dwelling in Canada – these households also pay

less than market rates for their dwellings, and therefore, have more left to pay for other necessities than do comparable households in market rent apartments. Incorporating the value of their housing subsidy to their income could allow for a clearer representation of their poverty relative to other groups, and could allow for more a transparent accounting of the benefit implied by the in-kind subsidy.

Therefore, reflection of housing wealth in income can lead to useful insights on well-being, poverty and inequality of the population. However, estimates of imputed rent are sensitive to assumptions and approaches. Estimates suggest that imputed rents from the user cost approach would be distributed more unequally than it would be under the rental equivalence approach, so the choice of which approach to use should be considered carefully. An alternative approach, examining the distribution of income less housing costs, is equally valid but yields different stylised results for Canada than the imputed rent methods, particularly for seniors.

Standardisation of methods is therefore desirable. However, this may be difficult due to different data inputs being available in different countries. For example, in Canada, the user-cost approach cannot be implemented in the main Canadian dataset used to study income, because an estimate of housing equity is not available. Also in Canada, the interest portion of the monthly mortgage payment (for homeowners) must be estimated using inputs from another data source. Presentation of the results would benefit from a thorough sensitivity analysis, including identification of upper, lower and preferred estimates. Methodologies used in estimation should be clearly described in metadata and made readily available to assist in the interpretation of the results. Estimates including imputed rent or other methods of accounting for housing costs in the income distribution should be presented separately from the standard estimates (excluding these considerations) for Canada as they are in other countries.

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