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by Age and Year of Move-in  
Application of the Residual Income and  
Tailored Ratio Approach**

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# Housing Affordability in Austria by Age and Year of Move-in – Application of the Residual Income and Tailored Ratio Approach

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## **Abstract**

Housing affordability problems are expected to increase for Austrian households because housing costs have been rising dynamically over the last years. Households who moved more recently are expected to be affected the most. Previous research has identified younger households as also being prone to housing affordability problems because they have relatively lower incomes. There is a strong correlation between the year of move-in and age – young households comprise a large share of households who moved recently. This paper applies the tailored ratio and residual income approach to Austrian households for 2014 to analyze housing affordability by age group and also by year of move-in. To identify whether age (life-cycle) or prevailing market conditions cause affordability problems, affordability measures are compared for age groups at different intervals of move-in. The results suggest that both effects are at work: Young households who moved recently have the highest incidence of affordability problems compared to older households. For other age groups, affordability problems also mostly occur for households who moved recently. The price distortion between below-market rents due to long-term contracts and market rents becomes more pronounced. This adversely affects newcomers and dis-incentivizes mobility of incumbents.

Keywords: housing affordability, ratio approach, residual income approach, life cycle, Austria;

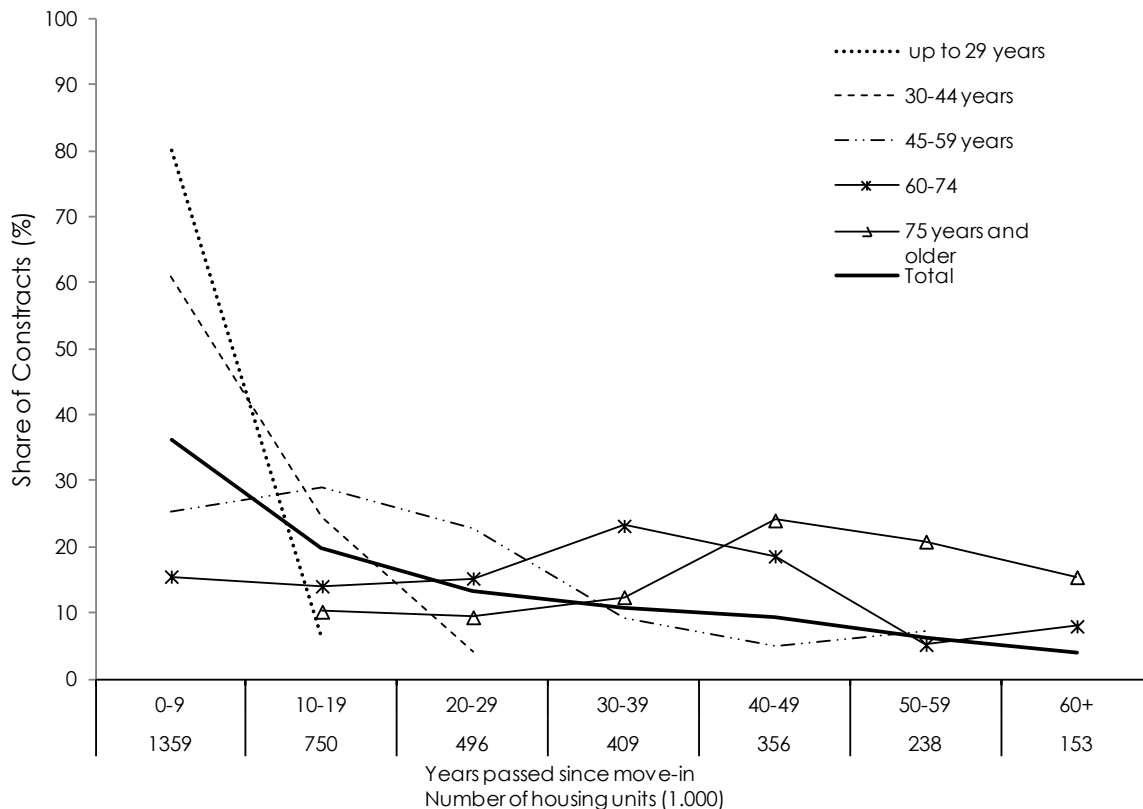
JEL-Codes: R21, R31, I32, J19;

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## 1. Introduction

In Austria, real estate and rent prices have been increasing strongly over the last years suggesting increasing housing affordability problems. *Kunnert – Baumgartner (2012)* show that this dynamic mostly affects new rental contracts whereas rents for existing contracts increased to a lesser degree. Results of another study for Austria indicate that younger households and households who moved into their current dwelling more recently are more likely to suffer from housing affordability problems (*Kunnert, 2016a*); these two variables are strongly correlated (Figure 1) – older households have been living in their current unit for much longer than younger households. However, it is unclear whether the age component or changing market conditions drive the results.

Figure 1: Share of households by 15-year age groups and by time elapsed since move-in



S: Statistik Austria, SILC 2014, own calculations using Stata 14.

A review of the limited literature on housing affordability and demographics shows that age is highly correlated with tenure choices and income over the life-cycle. Therefore age can be expected to be a driver of housing affordability: When results indicate that renters are more affected, age could be an underlying factor and should be made explicit. As *Bramley (2012)* points out in a study of English households, the housing market situation at a particular point in

time seems to play a role and households that have moved more recently have a higher incidence of affordability issues.

As many younger households also have rental contracts that have been concluded more recently or became home-owners more recently, it is difficult to tell the effects of age and market situation apart. This paper implements the residual income approach and the tailored ratio approach as introduced by *Kunnert (2016b)* to show how age and elapsed time since moving into ones dwelling affect housing affordability of Austrian households. It draws on previous work by *Kunnert (2016a)* and extends the analysis by looking at different age groups within groups of similar move-in years. This allows for a better identification of the different effects of age and prevailing market conditions. Conclusions can be drawn whether housing affordability is age-specific or market-induced. The former would imply that younger households would outgrow age-induced affordability problems by moving along the life-cycle with the expectation of higher incomes. The latter implies that lock-in effects distort housing allocation. If both persist, the intergenerational allocation on the housing market could be distorted due to a change in market conditions. Housing policy makers should be interested in understanding the underlying factors that drive housing affordability to be in a better position to design appropriate and targeted housing policies.

## 2. Review of the Literature

In general, one would expect that age or the life-cycle are significant determinants of housing affordability. Nevertheless, demographic components are often neglected in the housing affordability literature. This is surprising because there is a vast strand of literature relating consumption patterns to life-cycle spending including housing (without looking at affordability though) – economic theory suggests that demand for housing and income varies with age.

Whereas the literature on housing affordability commonly differentiates between household types, age is most often ignored.<sup>1</sup> This may be explained by the fact that age is a personal and not a household characteristic and therefore not taken into account, or simply by data constraints. There are a handful of empirical studies, though, that explicitly consider age: *Kutty (2005)* models the likelihood of housing affordability problems for the US housing market. She finds that older homeowners are less likely to suffer from affordability problems because they are more often outright owners. She is less conclusive for renters: The results indicate that

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<sup>1</sup> In the review of the relevant literature only studies are considered that at least remotely follow a similar definition of housing affordability as is used in this paper, i.e. analyzing the trade-off between housing consumption versus non-housing goods under a tight budget. Other studies, following different aspects of housing affordability, are not explicitly considered. One example would be purchase affordability as discussed by *Bourassa (1996)*, who analyzes borrowing constraints for Australian mortgage markets and uses age as one determinant.

Also, in this paper demographic aspects and the affectedness by affordability problems are considered. *Smith et al. (1984)* suggest that affordability could also work in the opposite direction: They show for the post-war period that more affordable housing positively influenced the formation of new (smaller) households.

elderly renters are more likely to have affordability issues than their younger counterparts, but that dis-saving among the elderly might distort the results.

*Bramley* (2012) studies the underlying factors of housing affordability in relation to demographics by using various affordability measures, including self-perceived housing affordability for England. He finds that both older and younger home-owners with mortgages have a lower probability of suffering from housing affordability issues – he explains these counterintuitive results for younger households with positive selection into home-ownership through higher initial wealth or better income prospects compared to their peers. For renters, he finds that older households have fewer affordability problems but households younger than 30 years do not appear to be different than the average. In general, households who have moved more recently are found to be more affected by a lack of housing affordability.

At a more descriptive level, *Quigley – Raphael* (2004) look at affordability at the US housing market and notice that younger households with below-average incomes are more often renters than owners; low-income owners are usually older (retired) households who are outright owners without housing affordability problems. They discuss these results in light of the changing age and income distribution due to younger lower-income immigration expecting some pressure on rental markets. Similarly, *Haffner – Boumeester* (2010) study the affordability of home-owning versus renting in the Netherlands. Besides a polarization of the income distribution between owners and renters, they observe that increasing affordability problems in the rental sector can partly be explained by a growing disparity in the household and age composition of renters and owners. Households headed by a person aged 23 or below or by persons aged 65 years or older are found to be over-represented in the rental sector; this is also the case for singles and older retired couples.

*Kunnert – Baumgartner* (2012) show that the dynamic rent price increase in Austria over the last few years mostly affects new rental contracts whereas rents for existing contracts increased to a lesser degree. Rent control in Austria and the rent adjustment mechanisms in existing contracts play a major role: In generalized terms, publicly subsidized and municipal rents are strictly controlled and there is no means-test once a household occupies such a dwelling; other rental contracts are subject to rent control laws that depend on the year of construction of the respective building; the remaining share of free-market rents are adjusted based on the consumer price index (CPI) – which increased much less than the rental share of the CPI over the last years. This indicates that younger households, or more generally, households whose rental contract was concluded more recently are affected more strongly by affordability issues than other groups.

Previous studies on the Austrian economy showed a mixed picture of housing costs for different age groups. On the one hand, housing consumption as share of total consumption seems to be highest for older and younger households (*Kunnert et al.*, 2012). On the other hand, older households seem to pay the lowest rents per square meter and benefit from below-market rents due to the long durations of their rental contracts (*Kunnert*, 2016a). *Kunnert* (2016a) finds that part of this seemingly contradicting evidence can be explained if one considers the following factors: tenure (all households vs. only renters), the definition of housing costs and (strong) preferences of households towards housing consumption in

general. She finds that mostly young households are affected by housing affordability issues, and also households who moved more recently.

In summary, the literature does suggest a connection between age and housing affordability, but market conditions also appear to play a role. This paper builds on the study by *Kunnert* (2016a) and extends it by interacting age and year of move-in.

### 3. Theoretical Foundation

This paper uses two different measures to evaluate housing affordability: the residual income approach and the tailored ratio approach as introduced in *Kunnert* (2016b), which sets upper income and quality limits to the well-known ratio approach. . The microeconomic foundations of these approaches are explained in more detail in *Kunnert* (2016a, 2016b) and can be briefly summarized as follows:

The concept of housing affordability in this paper is understood as the trade-off between housing  $H$  and other goods  $Z$ , subject to a budget constraint. In theory, households can choose freely among combinations of housing  $H$  and other goods  $Z$  to maximize their utility.

However, for households in the lower income segment choices for housing and other goods might be limited. They might not be able to afford housing and other necessities at the same time. Additionally, the exchange of housing  $H$  and other goods  $Z$  is not frictionless as the housing market is characterized by a number of imperfections. These include price discrimination, different price ratios between housing and non-housing goods for different households, indivisibility of housing and transaction costs. Additionally, non-income constraints may hamper an optimal allocation of resources in the market (*Hancock*, 1993).

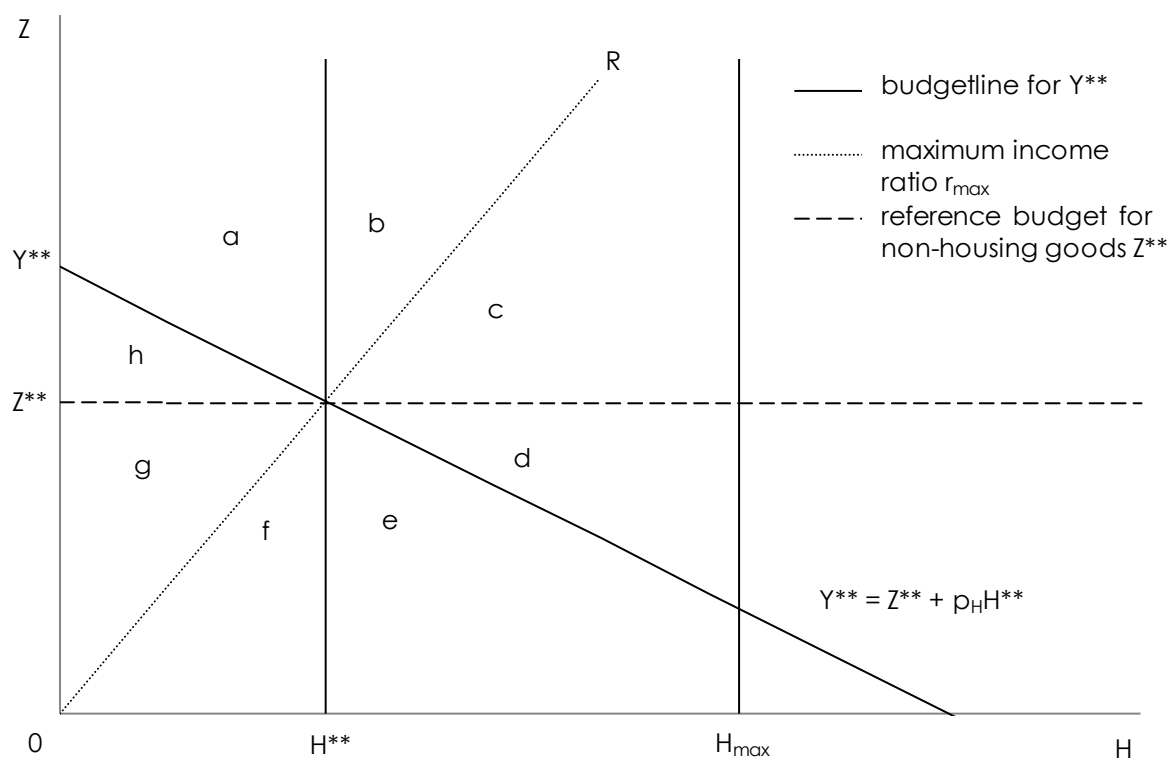
These market frictions create difficulties in adjusting actual housing costs. The residual income approach recognizes that the cost of a minimally adequate basket of other goods is more stable than that for housing, which may vary considerably across regions. It therefore compares residual income, which is derived by deducting actual housing costs from household income, to a reference value for expenditures for other necessary goods. Households for which the residual income is insufficient to cover their housing and non-housing needs are classified as being affected by housing affordability challenges (*Stone*, 2006; *Burke*, 2004; *Kutty*, 2005) (inequality condition (1)):

$$(1) Z^{**} < Y - p_H H$$

In Figure 2, the reference expenditures for other goods is represented as  $Z^{**}$  on the vertical axis. The horizontal axis represents the quantity of housing services  $H$  to be interpreted as a vector of different housing characteristics (*Thalmann*, 2003). Households who are below  $Z^{**}$  (whose residual income does not cover the reference consumption basket of non-housing goods) in areas d, e, f and g have an affordability problem. While households in sector h do cover their basic non-housing needs, their housing consumption might be below a minimally adequate housing quality level  $H^{**}$ . However, price discrimination and personal preferences

make it difficult to identify households with actual housing affordability issues in this sector (Hancock, 1993; Thalmann, 1999; Thalmann, 2003). As in Kunnert (2016b) no minimum housing quality standard was set, because the level of housing quality is consistently high.<sup>2,3</sup>

Figure2: Housing affordability by the residual income and ratio approach with upper income and quality limits.



S: Own illustration as in Kunnert (2016b), originally adapted from Lerman – Reeder (1987) and Hancock (1993).

In addition to the residual income approach, the tailored ratio approach as discussed in Kunnert (2016b) is applied. It is a variation of the classical ratio approach in the sense that it introduces an upper income limit at the 25<sup>th</sup> income percentile and an upper quality limit to account for over-consumption of housing. Additionally, instead of setting a single benchmark to measure housing affordability, the affectedness at various levels of housing expenditure to income ratios is shown. In general, households in areas e and f are affected, who do not

<sup>2</sup> In fact, a lack of lower quality housing might be considered as one source of affordability problems: Not only is higher quality associated with higher construction costs, the lack of lower quality units also limits the possibility to cut down on housing quality and hence costs for low-income households if they prefer to do so. In fact, households tend to overcrowd as a solution to their budget constraints. Nevertheless, applying the over-crowding standard of Viennese public housing with no more than 2 persons per room (excluding pure kitchens), less than 4% of households are overcrowded and less than 2% of households are overcrowded and are in the first income quartile.

<sup>3</sup> For other countries, it might be necessary to adapt a minimally adequate housing quality. Thalmann (2003) and for the ratio approach Thalmann (1999) and Lerman – Reeder (1987) are good sources.



over-consume. The ratio restriction for a particular consumption bundle  $B(Z', H')$  is shown in inequality condition (2), the income limit for income  $Y$  in inequality condition (3).

$$(2) Z' < [(100-r_{max})/r_{max}] * p_H H' \text{ for } H < H_{max}, \text{ and}$$

$$(3) Y < Y^{**}$$

It is important to note that the areas in Figure 2 are not totally congruent to each other when the residual income or ratio approach is applied. However, introducing the income and quality constraints for both measures increases the comparability.

#### 4. Methods, Definition of Housing Costs and Data

Affordability measures are calculated for Austrian households for the year 2014 by age groups (in 10-year intervals) and by year of move-in (in 8 groups). To account for different household compositions, equivalised values (EU-scale) are used throughout the analysis.

For the tailored ratio approach, the mean and median as well as the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentile of the housing cost burden (housing costs as % of income) are calculated as suggested in *Kunnert* (2016b). Additionally, the cumulative distribution of households affected by a lack of housing affordability using income and quality limits for a range of maximum income shares (0% to 100%) is shown. The income limit is set at the 25<sup>th</sup> percentile of the equivalised household income distribution. The upper quality limit is defined as having at most one extra room available compared to the Eurostat bedroom standard (counting pure kitchens above 4 square meters as room), which accounts for household composition, sex and age.<sup>4</sup>

Residual incomes are computed by deducting equivalised housing costs from equivalised household incomes. The residual incomes are then compared to the 2014 reference budget for non-housing goods provided by ASB Schuldnerberatungen (2014: 800 Euro). These reference budgets not only cover the bare necessities, but also allow for social and political inclusion. The potentially affordable cost burden is calculated in a reversed manner: The reference budget for non-housing goods is deducted from income. Whatever is left is the amount that a household could afford for housing in absolute terms; relating it to income yields the potentially affordable cost burden.

Housing costs are measured as user costs – depending on tenure and whether market rents are paid or not, housing costs include actual rents, imputed rents, utilities, energy costs and value-added-taxes. Applying the concept of this broader measure of housing costs instead of actual expenditures has three main advantages<sup>5</sup>: 1) Maximum comparability between tenures is ensured despite some intrinsic differences. This is particularly advantageous with smaller sample sizes – if expenditures were used, different tenures would have to be analyzed

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<sup>4</sup> The same limits are also set for the residual income approach mostly avoiding over-consumption. Results will be shown with and without the constraints. In a high-quality country and given that most households under-crowd, it seemed appropriate to use a less stringent crowding standard than the Viennese criterion for municipal housing.

<sup>5</sup> For a more detailed discussion, also see *Kunnert* (2016a, 2016b).

separately. Nevertheless, with the limited sample size available in this analysis, standard errors become large and it is hard to tell distributions of different indicators apart. Therefore, results should be interpreted as tendencies and trends. 2) Maximum comparability of different kinds of subsidies is ensured. The receipt of a monetary (housing allowances) or in-kind (below-market rents) subsidy is treated similarly. This also avoids a quality bias based on price (*Thalmann, 1999 and 2003*). 3) The concept is based on a longer-term view of affordability as suggested by *Haffner – Heylen (2011)* and *Gabriel (2005)*, which might be particularly useful when looking at demographic aspects.

Income is measured as net disposable household income. It includes housing allowances and imputed rents. For owners, the income adjustment amounts to 60% of their imputed rents (not including utilities or energy) minus interest paid on mortgages to account for their costs as landlords (e.g. depreciation). For renters who pay below-market rents, the full amount of the imputed rent is added to their income. This implies that below-market renters move up the income distribution. It should be noted that this does not affect the results of the residual income approach. The affectedness of the classical ratio approach changes depending on whether subsidies are taken into account; however, the tailored ratio approach implemented in this paper is robust against different housing cost and income definitions because it calculates the entire distribution instead of relying on a single benchmark.

This paper uses detailed housing cost and income data from the Austrian Survey of Income and Living Conditions (SILC) for 2014 covering 5,909 private households representing a total of 3.76 million households. Among many other variables on housing conditions and housing quality, the year of move-in is also available – it refers to the year when the first household member moved in (or was born there). The age of the household is the age of the household reference person, who is identified by the highest contribution to household income.

## **5. Results for Austria 2014**

Table 1 and Table 2 provide the results for the residual income approach, the number of households in the sample and in the population, and the average household and dwelling size by age and move-in categories. On average, households with a reference person below 30 or above 60 years are relatively smaller than households headed by a person between 30 and 59 years old. Dwelling size reflects average household size (middle-aged households are the largest and occupy the largest dwellings), but younger households have smaller dwellings than the elderly. Differences by year of move-in are not as pronounced. However, households who moved in after 2000 occupy relatively smaller dwellings. The real-estate and rent price increases suggest that housing got more expensive compared to other goods and is therefore consumed less *c.p.*<sup>6</sup>

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<sup>6</sup> The microcensus, which comprises a much larger sample, indicates that the average dwelling size of all units did not decrease during the last decade. The upward trend of dwelling sizes seems to have halted, though.

*Table 1: Housing affordability by the residual income approach without and with an upper income and quality limit by age groups in Austria 2014*

| Age   | Up to 29 years | 30 to 39 years | 40 to 49 years | 50 to 59 years | 60 to 69 years | 70 to 79 years | 80 and above | Total     |
|---|----------------|----------------|----------------|----------------|----------------|----------------|--------------|-----------|
| Number of households (sample)   | 578            | 865            | 1,217          | 1,212          | 906            | 782            | 349          | 5,909     |
| Number of households (population)   | 427,490        | 562,390        | 753,229        | 777,584        | 523,625        | 483,725        | 233,748      | 3,761,790 |
| Average household size (persons)  | 2.16           | 2.71           | 2.82           | 2.29           | 1.80           | 1.56           | 1.50         | 2.23      |
| Average housing unit size (m <sup>2</sup> )                                   | 80             | 97             | 108            | 108            | 98             | 95             | 92           | 99        |
| <i>Number and share of households not able to afford housing according to</i> |                |                |                |                |                |                |              |           |
| Residual income approach  | 125,852        | 84,532         | 92,705         | 98,168         | 78,013         | 68,364         | 26,430       | 574,065   |
| Share of households (%)   | 29             | 15             | 12             | 13             | 15             | 14             | 11           | 15        |
| Residual income approach with limits  | 107,351        | 63,692         | 80,747         | 65,129         | 51,062         | 37,262         | 15,760       | 421,002   |
| Share of households (%)   | 25             | 11             | 11             | 8              | 10             | 8              | 7            | 11        |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

*Table 2: Housing affordability by the residual income approach without and with an upper income and quality limit by year of move-in in Austria 2014*

| Year of move-in   | 1960 or earlier | 1961-1970 | 1971-1980 | 1981-1990 | 1991-2000 | 2001-2005 | 2006-2010 | 2011 or later | Total     |
|---|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|-----------|
| Number of households (sample)   | 420             | 493       | 676       | 753       | 975       | 656       | 1,009     | 927           | 5,909     |
| Number of households (population)   | 272,485         | 315,402   | 391,591   | 474,766   | 611,919   | 417,450   | 642,569   | 635,607       | 3,761,790 |
| Average household size (persons)  | 2.06            | 2.10      | 2.03      | 2.21      | 2.45      | 2.49      | 2.34      | 2.03          | 2.23      |
| Average housing unit size (m <sup>2</sup> )                                   | 114             | 110       | 112       | 112       | 107       | 96        | 87        | 77            | 99        |
| <i>Number and share of households not able to afford housing according to</i> |                 |           |           |           |           |           |           |               |           |
| Residual income approach  | 28,601          | 23,965    | 35,652    | 41,665    | 74,815    | 56,160    | 110,139   | 203,069       | 574,065   |
| Share of households (%)   | 10              | 8         | 9         | 9         | 12        | 13        | 17        | 32            | 15        |
| Residual income approach with limits  | 11,728          | 9,148     | 17,682    | 21,105    | 52,434    | 46,650    | 92,566    | 169,689       | 421,002   |
| Share of households (%)   | 4               | 3         | 5         | 4         | 9         | 11        | 14        | 27            | 11        |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

The residual income approach suggests that the differences with and without upper income and quality limits are rather small – this is because the approach by design targets lower-income households that tend not to over-consume housing (Table 1 and Table 2). Overall, 15% of Austrian households are classified as having an affordability problem when no income and quality limit is set; applying the stricter criterion suggests that 11% of households are affected by a lack of affordability. This additional criterion mostly excludes elderly households, who tend to over-consume housing when household size declines.

The results by age in Table 1 suggest that younger households are approximately twice as prone to housing affordability problems as the average household (29%). When considering the year of move-in, the results show that an even larger share of those households who moved into their current dwelling in 2011 or later is affected by affordability issues (32%) (Table 2). There is also a stark difference to those households who moved between 2006 and 2010, even though a relatively high share of these households also experience housing affordability problems (17%).

Table 3 and Table 4 provide descriptive statistics for income, housing costs and cost burden by age and by year of move-in. These statistics are provided to set the tailored ratio approach into perspective (Kunnert, 2016b). In addition, the potentially affordable cost

burden is provided to improve the interpretability of the cost burden. Incomes are highest for the age groups at main working age (40 to 59 years). Incomes are lowest for the youngest and eldest age groups. Because the average time spent at their current housing unit is highly correlated with age, the same inversed-U-shaped income curve is also found by year of move-in (Table 4): Households who moved in earlier tend to be older and their incomes tend to be lower than that of households at main working-age; households who moved into their current dwelling more recently are disproportionately younger, which explains the lower incomes.

*Table 3: Descriptive statistics for income, housing costs, cost burden and potentially affordable cost burden by 10-year age groups in Austria 2014*

| Age groups (10-years)              | Mean  | 10th percentile | 25th percentile | Median | 75th percentile | 90th percentile |
|------------------------------------|-------|-----------------|-----------------|--------|-----------------|-----------------|
| Monthly amounts (€)                |       |                 |                 |        |                 |                 |
| <i>Up to 29 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 1,855 | 759             | 1,116           | 1,753  | 2,337           | 2,874           |
| Housing costs                      | 446   | 252             | 319             | 411    | 527             | 678             |
| Cost burden                        | 131   | 12              | 17              | 26     | 39              | 65              |
| Potentially affordable cost burden | -101  | -5              | 28              | 54     | 66              | 72              |
| <i>30 to 39 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 2,191 | 1,029           | 1,411           | 1,887  | 2,550           | 3,396           |
| Housing costs                      | 446   | 253             | 314             | 403    | 527             | 680             |
| Cost burden                        | 165   | 11              | 15              | 21     | 29              | 42              |
| Potentially affordable cost burden | -179  | 22              | 43              | 58     | 69              | 76              |
| <i>40 to 49 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 2,298 | 1,119           | 1,530           | 2,065  | 2,717           | 3,547           |
| Housing costs                      | 427   | 246             | 309             | 384    | 496             | 670             |
| Cost burden                        | 24    | 10              | 14              | 18     | 27              | 39              |
| Potentially affordable cost burden | 53    | 29              | 48              | 61     | 71              | 77              |
| <i>50 to 59 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 2,609 | 1,119           | 1,660           | 2,321  | 3,101           | 4,209           |
| Housing costs                      | 461   | 263             | 321             | 421    | 555             | 706             |
| Cost burden                        | 24    | 10              | 13              | 18     | 27              | 41              |
| Potentially affordable cost burden | 57    | 29              | 52              | 66     | 74              | 81              |
| <i>60 to 69 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 2,348 | 1,072           | 1,520           | 2,024  | 2,783           | 3,839           |
| Housing costs                      | 489   | 284             | 348             | 461    | 579             | 727             |
| Cost burden                        | 44    | 11              | 16              | 22     | 31              | 43              |
| Potentially affordable cost burden | 27    | 25              | 47              | 60     | 71              | 79              |
| <i>70 to 79 years</i>              |       |                 |                 |        |                 |                 |
| Income                             | 2,193 | 1,135           | 1,467           | 1,938  | 2,512           | 3,324           |
| Housing costs                      | 499   | 283             | 363             | 475    | 597             | 753             |
| Cost burden                        | 29    | 13              | 17              | 24     | 32              | 43              |
| Potentially affordable cost burden | 52    | 30              | 45              | 59     | 68              | 76              |
| <i>80 and above</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,027 | 1,149           | 1,488           | 1,884  | 2,363           | 3,035           |
| Housing costs                      | 483   | 258             | 349             | 452    | 564             | 715             |
| Cost burden                        | 29    | 13              | 18              | 24     | 32              | 43              |
| Potentially affordable cost burden | 46    | 30              | 46              | 58     | 66              | 74              |
| <i>Total</i>                       |       |                 |                 |        |                 |                 |
| Income                             | 2,272 | 1,053           | 1,462           | 2,015  | 2,698           | 3,628           |
| Housing costs                      | 460   | 259             | 325             | 421    | 547             | 701             |
| Cost burden                        | 61    | 11              | 15              | 21     | 30              | 43              |
| Potentially affordable cost burden | -2    | 24              | 45              | 60     | 70              | 78              |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

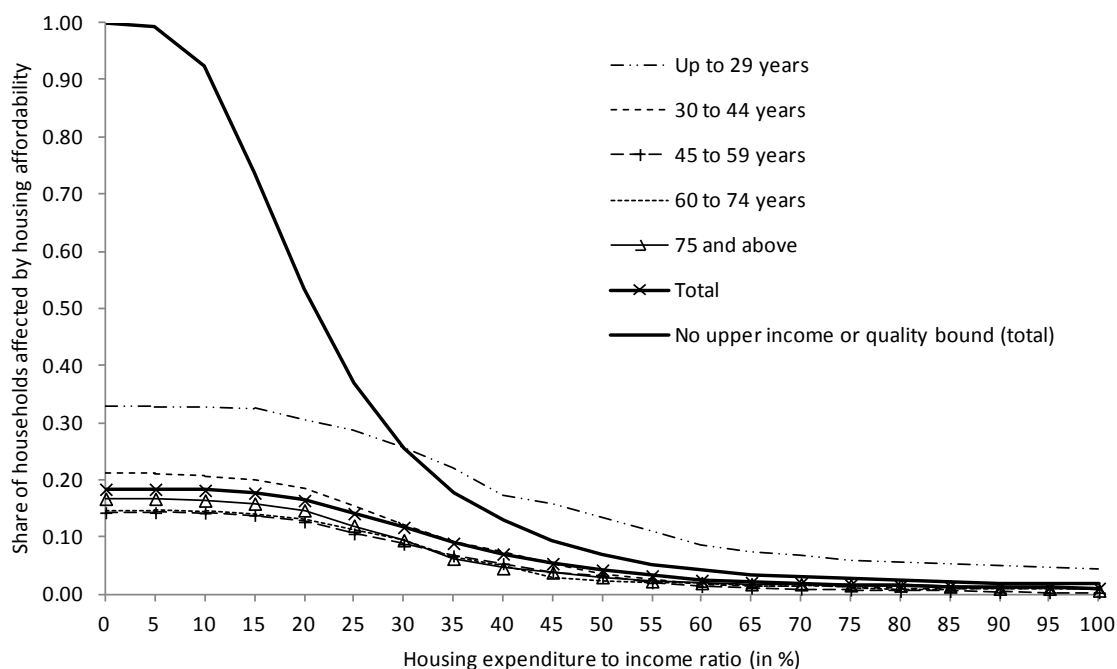
Table 4: Descriptive statistics for income, housing costs, cost burden and potentially affordable cost burden by year of move-in in Austria 2014

| Year of move-in                    | Mean  | 10th percentile | 25th percentile | Median | 75th percentile | 90th percentile |
|------------------------------------|-------|-----------------|-----------------|--------|-----------------|-----------------|
| Monthly amounts (€)                |       |                 |                 |        |                 |                 |
| <i>1960 or earlier</i>             |       |                 |                 |        |                 |                 |
| Income                             | 2,292 | 1,179           | 1,550           | 2,004  | 2,708           | 3,754           |
| Housing costs                      | 434   | 230             | 304             | 399    | 531             | 694             |
| Cost burden                        | 22    | 9               | 13              | 19     | 29              | 37              |
| Potentially affordable cost burden | 58    | 32              | 48              | 60     | 70              | 79              |
| <i>1961 to 1970</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,243 | 1,282           | 1,673           | 2,062  | 2,601           | 3,219           |
| Housing costs                      | 428   | 242             | 307             | 403    | 521             | 650             |
| Cost burden                        | 24    | 10              | 14              | 19     | 27              | 37              |
| Potentially affordable cost burden | 54    | 38              | 52              | 61     | 69              | 75              |
| <i>1971 to 1980</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,365 | 1,263           | 1,646           | 2,134  | 2,808           | 3,778           |
| Housing costs                      | 472   | 263             | 331             | 449    | 561             | 701             |
| Cost burden                        | 24    | 11              | 14              | 20     | 29              | 41              |
| Potentially affordable cost burden | 58    | 37              | 51              | 63     | 72              | 79              |
| <i>1981 to 1990</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,624 | 1,325           | 1,767           | 2,408  | 3,153           | 4,165           |
| Housing costs                      | 468   | 266             | 330             | 440    | 556             | 719             |
| Cost burden                        | 23    | 9               | 13              | 18     | 26              | 39              |
| Potentially affordable cost burden | 60    | 40              | 55              | 67     | 75              | 81              |
| <i>1991 to 2000</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,440 | 1,102           | 1,606           | 2,153  | 2,866           | 3,783           |
| Housing costs                      | 454   | 258             | 323             | 408    | 546             | 710             |
| Cost burden                        | 27    | 10              | 14              | 19     | 28              | 41              |
| Potentially affordable cost burden | 53    | 27              | 50              | 63     | 72              | 79              |
| <i>2001 to 2005</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,268 | 1,070           | 1,438           | 1,971  | 2,726           | 3,664           |
| Housing costs                      | 445   | 247             | 312             | 403    | 533             | 703             |
| Cost burden                        | 25    | 11              | 15              | 20     | 28              | 41              |
| Potentially affordable cost burden | 52    | 25              | 44              | 59     | 71              | 78              |
| <i>2006 to 2010</i>                |       |                 |                 |        |                 |                 |
| Income                             | 2,197 | 993             | 1,370           | 1,901  | 2,496           | 3,427           |
| Housing costs                      | 460   | 269             | 327             | 414    | 547             | 688             |
| Cost burden                        | 28    | 13              | 16              | 22     | 31              | 42              |
| Potentially affordable cost burden | 49    | 19              | 42              | 58     | 68              | 77              |
| <i>2011 and later</i>              |       |                 |                 |        |                 |                 |
| Income                             | 1,877 | 694             | 1,079           | 1,643  | 2,296           | 3,041           |
| Housing costs                      | 491   | 276             | 352             | 444    | 573             | 725             |
| Cost burden                        | 237   | 14              | 19              | 27     | 41              | 69              |
| Potentially affordable cost burden | -281  | -15             | 26              | 51     | 65              | 74              |
| <i>Total</i>                       |       |                 |                 |        |                 |                 |
| Income                             | 2,272 | 1,053           | 1,462           | 2,015  | 2,698           | 3,628           |
| Housing costs                      | 460   | 259             | 325             | 421    | 547             | 701             |
| Cost burden                        | 61    | 11              | 15              | 21     | 30              | 43              |
| Potentially affordable cost burden | -2    | 24              | 45              | 60     | 70              | 78              |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

Housing costs do not vary as much as incomes. There is no clear age trend, the use of imputed rents increases housing costs particularly for below-market renters compared to actual expenditures (Kunnert, 2016a). There is, however, a clear trend by year of move-in: Households who have moved in after 2011 have significantly higher housing costs. This fact can be explained by dynamic rent increases and not by a surge of quality.

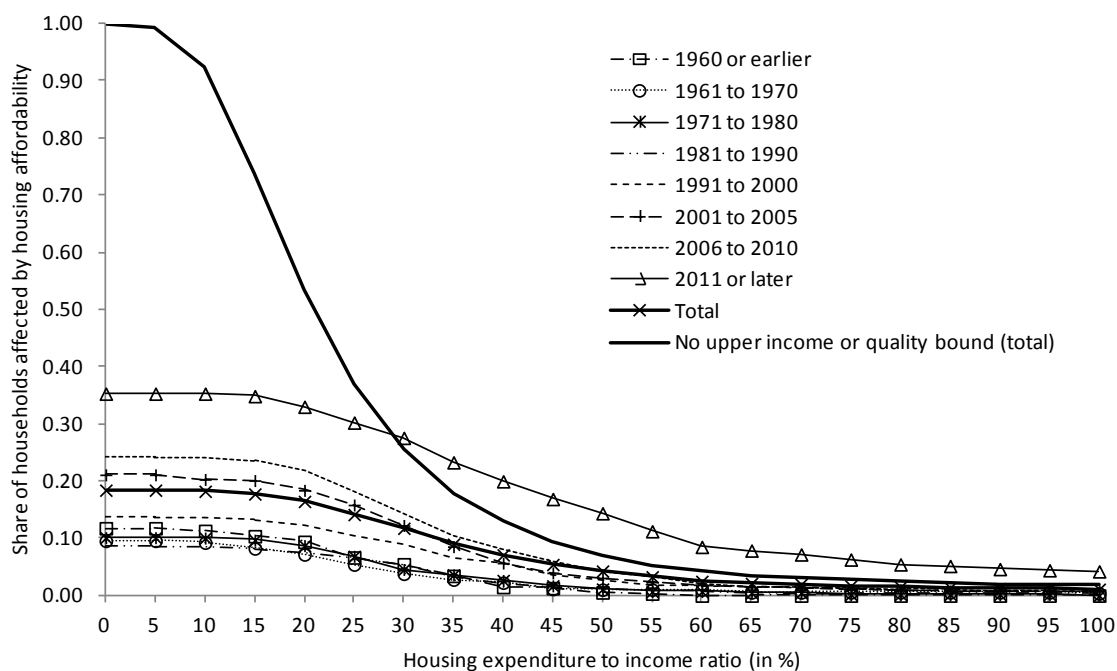
Figure 3: Cumulative distribution of households by 15-year age groups over various expenditure shares of income with maximum income and quality limits



S:

Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

Figure 4: Cumulative distribution of households by year of move-in over various expenditure shares of income with maximum income and quality limits



S:

Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

Comparing housing costs and incomes implies that the youngest and oldest households and households who moved in most recently have the highest cost burdens at the median<sup>7</sup>. Overall, at the 10<sup>th</sup> percentile, households could afford to spend 24% of income for housing while not sacrificing the consumption of other necessities. These results do not yet account for upper income or quality limits.

Figure 3 and Figure 4 show the cumulative distribution of households affected by affordability problems at various maximum expenditure shares under the constraint of upper income and quality limits. At any maximum ratio, households below 30 years of age are significantly more affected than any other age group. As already indicated, despite the high cost burden of elderly households, they are not identified as having an affordability problem if they over-consume housing (under-crowding). Households who moved into their current dwelling in 2011 or later are much more affected than any other group. In general, households who moved after the year 2000 show above-average affordability problems at any ratio. More than 10% of households that are either below 29 years or have moved since 2011 have cost burdens above 55% of their income.

To identify whether the underlying cause of affordability problems is age or the prevailing market conditions or both, it is worthwhile to look at different age groups with similar years of move-in. For sample size constraints, households were divided into groups of below 30 years, 30 to 59 years (working-age) and 60 years and older. Years of move-in were grouped into three categories: before 1990, 1991 to 2005, and 2006 or later.

It should be noted in Table 5 that the number of observations for households below 30 years who moved before 2006 is very small and therefore should be interpreted with care. It is also noteworthy that households who moved more recently have relatively smaller dwelling sizes and live in smaller households.

*Table 5: Housing affordability by the residual income approach without and with an upper income and quality limit by age group and year of move-in in Austria 2014*

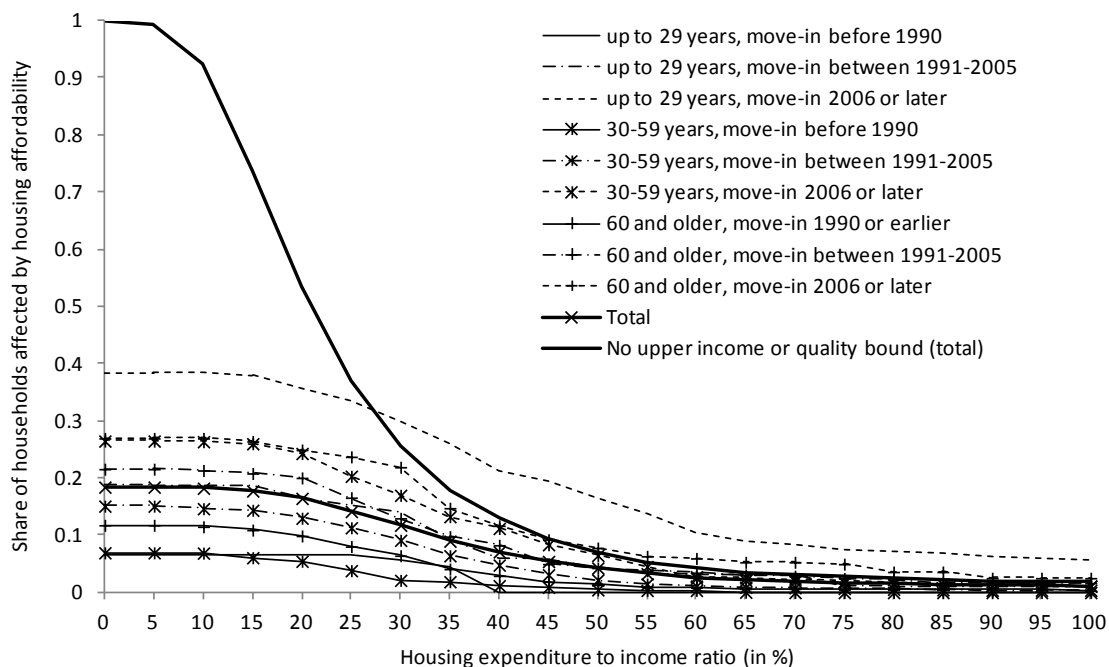
| Age<br>Year of move-in  | Up to 29 years  |           |               | 30 to 59 years  |           |               | 60 and above    |           |               | Total     |
|---|-----------------|-----------|---------------|-----------------|-----------|---------------|-----------------|-----------|---------------|-----------|
|   | 1990 or earlier | 1991-2005 | 2006 or later | 1990 or earlier | 1991-2005 | 2006 or later | 1990 or earlier | 1991-2005 | 2006 or later |           |
| Number of households (sample)   | 55              | 59        | 464           | 856             | 1,209     | 1,229         | 1,431           | 363       | 243           | 5,909     |
| Number of households (pop.)   | 45,516          | 44,925    | 337,049       | 546,600         | 756,040   | 790,562       | 862,128         | 228,405   | 150,565       | 3,761,790 |
| Average household size (persons)  | 3.68            | 2.96      | 1.85          | 2.71            | 2.67      | 2.45          | 1.65            | 1.71      | 1.57          | 2.23      |
| Average housing unit size (m <sup>2</sup> )                                   | 136             | 102       | 70            | 126             | 106       | 88            | 101             | 90        | 76            | 99        |
| <i>Number and share of households not able to afford housing according to</i> |                 |           |               |                 |           |               |                 |           |               |           |
| Residual income approach  | 1,295           | 7,565     | 116,992       | 35,756          | 83,715    | 155,934       | 92,832          | 39,694    | 40,281        | 574,065   |
| Share of households (%)   | 3               | 17        | 35            | 7               | 11        | 20            | 11              | 17        | 27            | 15        |
| Residual income approach with limits  | 1,295           | 6,250     | 99,807        | 11,769          | 65,024    | 132,774       | 46,599          | 27,810    | 29,674        | 421,002   |
| Share of households (%)   | 3               | 14        | 30            | 2               | 9         | 17            | 5               | 12        | 20            | 11        |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

<sup>7</sup> The mean of the cost burden is highly distorted by outliers as some incomes are very close to zero, the same holds true for the mean potentially affordable housing cost burden. The median therefore is the better measure of centrality.

The results for the residual income approach show that, even when accounting for market conditions, younger households are most severely affected by housing affordability problems if they have moved in recent years (35% of them have difficulties meeting their non-housing needs once they paid for housing) (Table 5). Of those households who moved since 2006, households between 30 and 59 years are affected the least; however, even 20% of them are affected, which is higher than the total. Results with quality and income adjustments are very similar. Figure 5 shows the results for the tailored ratio approach. The findings support the results of the residual income approach: For those households who moved most recently, younger households are most affected. Differences or trends for earlier move-in dates are not as clear and hard to interpret due to the small sample.

Figure 5: Cumulative distribution of households by age groups and year of move-in over various expenditure shares of income with maximum income and quality limits



S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

Table 6 suggests that within each age group incomes are lowest for households who moved most recently and highest for households who moved the earliest. A lower mortgage burden and higher imputed rental income (including from below-market rents) could be one reason. For households who moved since 2006, incomes are the lowest for the youngest households and highest for those at working-age. Except for households aged 60 years and above, housing costs per dwelling are higher for households who moved more recently (despite the smaller dwelling sizes). Nevertheless, among households who moved most recently, housing costs are highest for households who are 60 years and older. Again, imputed rents for below-market renters might be one reason to explain the elevated housing costs for older households who moved not as recently.



Among households who moved since 2006, the cost burden is equal for the youngest and oldest households (28% of income). However, the potential cost burden at the 10<sup>th</sup> percentile suggests that younger households are more affected. This result is also supported by the tailored ratio approach when over-consumption of housing is accounted for (Figure 5).

Table 6: Descriptive statistics for income, housing costs, cost burden and potentially affordable cost burden by age group and year of move-in in Austria 2014

| Age group and year of move-in                    | Mean  | 10th percentile | 25th percentile | Median | 75th percentile | 90th percentile |
|--|-------|-----------------|-----------------|--------|-----------------|-----------------|
| Monthly amounts (€)                              |       |                 |                 |        |                 |                 |
| <i>up to 29 years, move-in before 1990</i>       |       |                 |                 |        |                 |                 |
| Income   | 2,479 | 1,613           | 1,962           | 2,403  | 2,764           | 3,658           |
| Housing costs                                    | 340   | 199             | 252             | 318    | 388             | 485             |
| Cost burden                                      | 15    | 7               | 10              | 13     | 16              | 33              |
| Potentially affordable cost burden               | 64    | 50              | 59              | 67     | 71              | 78              |
| <i>up to 29 years, move-in between 1991-2005</i> |       |                 |                 |        |                 |                 |
| Income   | 2,069 | 942             | 1,506           | 1,974  | 2,476           | 3,160           |
| Housing costs                                    | 399   | 233             | 309             | 353    | 445             | 559             |
| Cost burden                                      | 26    | 10              | 13              | 18     | 29              | 47              |
| Potentially affordable cost burden               | 49    | 15              | 47              | 59     | 68              | 75              |
| <i>up to 29 years, move-in 2006 or later</i>     |       |                 |                 |        |                 |                 |
| Income   | 1,742 | 698             | 1,016           | 1,595  | 2,210           | 2,678           |
| Housing costs                                    | 467   | 262             | 344             | 442    | 560             | 692             |
| Cost burden                                      | 161   | 14              | 20              | 28     | 43              | 73              |
| Potentially affordable cost burden               | -143  | -15             | 21              | 50     | 64              | 70              |
| <i>30-59 years, move-in before 1990</i>          |       |                 |                 |        |                 |                 |
| Income   | 2,652 | 1,349           | 1,840           | 2,386  | 3,111           | 4,165           |
| Housing costs                                    | 419   | 238             | 301             | 378    | 500             | 646             |
| Cost burden                                      | 19    | 9               | 11              | 15     | 22              | 34              |
| Potentially affordable cost burden               | 62    | 41              | 57              | 66     | 74              | 81              |
| <i>30-59 years, move-in between 1991-2005</i>    |       |                 |                 |        |                 |                 |
| Income   | 2,417 | 1,144           | 1,583           | 2,134  | 2,890           | 3,793           |
| Housing costs                                    | 435   | 254             | 313             | 396    | 515             | 684             |
| Cost burden                                      | 23    | 10              | 13              | 18     | 26              | 38              |
| Potentially affordable cost burden               | 56    | 30              | 49              | 63     | 72              | 79              |
| <i>30-59 years, move-in 2006 or later</i>        |       |                 |                 |        |                 |                 |
| Income   | 2,169 | 945             | 1,315           | 1,860  | 2,550           | 3,452           |
| Housing costs                                    | 471   | 268             | 332             | 422    | 552             | 709             |
| Cost burden                                      | 128   | 13              | 16              | 22     | 32              | 48              |
| Potentially affordable cost burden               | -117  | 15              | 39              | 57     | 69              | 77              |
| <i>60 and older, move-in 1990 or earlier</i>     |       |                 |                 |        |                 |                 |
| Income   | 2,252 | 1,204           | 1,579           | 2,014  | 2,665           | 3,525           |
| Housing costs                                    | 482   | 273             | 352             | 462    | 575             | 719             |
| Cost burden                                      | 26    | 12              | 16              | 22     | 30              | 41              |
| Potentially affordable cost burden               | 55    | 34              | 49              | 60     | 70              | 77              |
| <i>60 and older, move-in between 1991-2005</i>   |       |                 |                 |        |                 |                 |
| Income   | 2,275 | 1,006           | 1,386           | 1,943  | 2,516           | 3,669           |
| Housing costs                                    | 510   | 274             | 348             | 486    | 630             | 802             |
| Cost burden                                      | 36    | 13              | 18              | 25     | 33              | 45              |
| Potentially affordable cost burden               | 42    | 20              | 42              | 59     | 68              | 78              |
| <i>60 and older, move-in 2006 or later</i>       |       |                 |                 |        |                 |                 |
| Income   | 2,014 | 906             | 1,222           | 1,652  | 2,224           | 3,311           |
| Housing costs                                    | 515   | 300             | 360             | 457    | 595             | 766             |
| Cost burden                                      | 87    | 14              | 19              | 28     | 39              | 57              |
| Potentially affordable cost burden               | -42   | 12              | 35              | 52     | 64              | 76              |
| <i>Total</i>                                     |       |                 |                 |        |                 |                 |
| Income   | 2,272 | 1,053           | 1,462           | 2,015  | 2,698           | 3,628           |
| Housing costs                                    | 460   | 259             | 325             | 421    | 547             | 701             |
| Cost burden                                      | 61    | 11              | 15              | 21     | 30              | 43              |
| Potentially affordable cost burden               | -2    | 24              | 45              | 60     | 70              | 78              |

S: Statistik Austria, SILC 2014, own calculations using Stata 14. – Housing costs include imputed rents, incomes are net equivalised disposable incomes including imputed rents (minus costs of owners).

## 6. Conclusions

This paper looks at housing affordability of Austrian households in 2014 and applies the residual income approach and the tailored ratio approach with upper income and quality limits. It shows that younger households and households who moved more recently are affected the most by affordability issues. Because most households who moved more recently are also below 30 years, it is unclear whether age or the surrounding housing market environment with significant rent and real-estate price increases is the underlying factor.

The results suggest that both, age and the prevailing market situation, play a role for housing affordability issues in Austria. Young households who only moved recently have the highest incidence of affordability problems. The driving factors are relatively higher housing costs caused by rising rents and lower incomes – at best, young households have just (or not even) entered the labor market. Taking permanent income into account would alleviate some of the affectedness of younger households, but is difficult to measure. Also, *Kunnert (2016a)* and *Klien (2016)* suggest that the market for smaller dwellings is tight in Austria – therefore, increasing the availability of smaller dwellings to accommodate smaller households or supporting shared living units would be beneficial for younger households.

Other age groups are generally less affected. Their housing affordability is predominantly determined by the year of move in. The results show that older households who moved more recently clearly downsize. Affordability does play a role for them, but as *Kutty (2005)* suggests, they might be able to draw on accumulated wealth. More generally, dynamic housing price and rent developments seem to adversely affect newcomers on the market and people moving. In addition, the loss of beneficial below-market rents when moving might cause lock-in effects: Households who would like to downsize or move for other reasons might not be able to afford a more suitable dwelling at market prices. This implies an inefficient allocation of housing units, including public ones. Also, these lock-in effects can have harmful spill-over effects on the economy. As *Badinger – Url (2002)* show, low mobility of Austrian households due to low-cost public housing has negative effects on the labor market.

With an increasing discrepancy between market prices and reduced prices due to the dynamic rent increases for new contracts, potentially harmful lock-in effects and thus misallocation are aggravated. The findings suggest a distribution problem between incumbents and newcomers on the housing market. These issues particularly concern rent regulations and public housing allocation and should be addressed in more detail.

## References

- Badinger, H., Url, T., "Determinants of Regional Unemployment: Some Evidence from Austria", *Regional Studies*, 2002, 36(9), S. 977-988.
- Bourassa, S., "Measuring the Affordability of Home-Ownership", *Urban Studies*, 1996, 33(10), S. 1867-1877.
- Bramley, G. "Affordability, Poverty and Housing Need: Triangulating Measures and Standards", *Journal of Housing and the Built Environment*, 2012, 27(2), S. 133-151.
- Burke, T., *Measuring Housing Affordability*, Australian Housing and Urban Research Institute, Melbourne, 2004.
- Gabriel, M., Jacobs, K., Arthurson, K., Burke, T., Yates, J., *Conceptualising and Measuring the Housing Affordability Problem*, Australian Housing and Urban Research Institute, Research Paper, Sydney, 2005.
- Haffner, M., Boumeester, H., "The Affordability of Housing in the Netherlands: An Increasing Income Gap Between Renting and Owning?", *Housing Studies*, 2010, 25(6), S. 799-820.
- Haffner, M., Heylen, K., "User Costs and Housing Expenses: Towards a more Comprehensive Approach to Affordability", *Housing Studies*, 2011, 26(4), S. 593-614.
- Hancock, K., "Can Pay? Won't Pay? or Economic Principles of Affordability", *Urban Studies*, 1993, 30(1), S. 127-145.
- Klien, M., "Perspektiven einer regional differenzierten Wohnungs- und Verkehrspolitik vor dem Hintergrund des demographischen Wandels in Österreich", Projektbericht des WIFO zum Forschungsprogramm "Österreich 2025" (mimeo), Wien, 2016.
- Kunnert, A., "Leistbarkeit von Wohnen in Österreich: Operationalisierung und demographische Komponenten", WIFO, Wien, 2016a.
- Kunnert, A., "Housing Affordability in Austria – Tailoring the Ratio Approach in a Simple yet Effective Way", WIFO Working Paper 520, WIFO, Wien, 2016b.
- Kunnert, A., Baumgartner, J., "Instrumente und Wirkungen der österreichischen Wohnungspolitik", WIFO, Wien, 2012.
- Kunnert, A., Fritz, O., Pennerstorfer, D., Streicher, G., Aigner, B., Döring, T., "Teilbericht 3: Alterung und regionale Wettbewerbsfähigkeit", in *Demographischer Wandel als Herausforderung für Österreich und seine Regionen*, WIFO, Wien, 2010.
- Kutty, N., "A New Measure of Housing Affordability: Estimates and Analytical Results", *Housing Policy Debate*, 2005, 16(1), S. 113-142.
- Lerman, D., Reeder, W., "The Affordability of Adequate Housing", *AREUEA Journal*, 1987, 15(4), S. 389-404.
- Quigley, J., Raphael, S., "Is Housing Unaffordable? Why isn't it more affordable?", *Journal of Economic Perspectives*, 2004, 18(1), S. 129-152.
- Smith, L., Rosen, K., Markandya, A., Ullmo, P., "The Demand for Housing, Household Headship Rates, and Household Formation: An International Analysis", *Urban Studies*, 1984, 21(4), S. 407-414.
- Stone, M., "What is Housing Affordability: The Case for the Residual Income Approach", *Housing Policy Debate*, 2006, 17(1), S. 151-184.
- Thalmann, P., "Identifying Households which Need Housing Assistance", *Urban Studies*, 1999, 36(11), S. 1933-1947.
- Thalmann, P., "'House poor' or simply 'poor'", *Journal of Housing Economics*, 2003, 12, S. 291-317.