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Master's Thesis:

Inflation Inequality In Austria: Who Are The Households At The Top?

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Abstract

I compute household-specific inflation rates for Austria in the period between 2016 and 2019. Data is provided by Statistics Austria's Consumer Expenditure Survey 2014/15 ("Konsumerhebung") and contains household expenditures reaching to the COICOP-3-digit level. I find a negative plutocratic bias, meaning that common types of measurement tend to understate CPI inflation. In the period covered, the distribution of inflation is characterised by large dispersion, meaning that the standard CPI inflation is not very representative for a large part of Austrian households. There is a clear negative relationship between income and inflation that is mainly driven by ownership status. Households living in rent are significantly more affected by inflation. I further find a urban-rural divide in the sense that households from larger cities are more likely to exhibit higher individual inflation rates than their counterparts from small municipalities. This effect remains significant even after controlling for ownership status. All in all, the results are strong arguments to pay bigger attention to the issue of inflation inequality when it comes to wage setting or taxing, as there are potentially large distributional effects being unrecognised.

Keywords: Inflation, group-specific inflation, micro-data, distribution

JEL Codes: E31, C43, C81

Contents

1 Introduction

Economics' efforts to encompass both principles of social and natural sciences have ever been accompanied by the search for generally accepted indicators. One of the main indicators the discipline has to offer is the inflation rate. Whether we are aware of it in our everyday life or not, this single number has large implications on economic processes both on the macro and the micro level. The consumer price index (CPI) is the tool needed to compute the inflation rate. It is described by Pollak (1980) as a powerful index that is not only affecting individuals' perceptions of price developments, but is also influencing wage-setting, social benefits and economic policy in general. Despite the broad general acceptance of CPI inflation, the question has to be asked, how representative a single number, that is more or less regularly published by statistical agencies, can be for a (probably increasingly) heterogeneous set of household in the economy. Since prices do not change similarly over different groups of consumption goods, the degree by which a household is affected by inflation depends on the shares of its expenditures spent on the different consumption groups. Spending relatively more on goods that exhibited larger price increases will increase a household's individual inflation rate. On the other hand, a household spending relatively more on goods that are characterised by relatively lower price increases will make this household less affected by inflation. The questions to be asked are at first, if there indeed is disparity in household-level inflation and how large that disparity is. Furthermore, it is of interest who the households are that are either at the top or the bottom of the distribution of inflation and if there are certain characteristics that can be associated with higher or lower inflation rates. Is, for example, a young household living in rent likely to be affected more by inflation than an older couple owning a house? Are there differences between single households or larger families? These and many more characteristics could potentially result in different consumption patterns for different types of households. Identifying these can help giving politics an idea about the needs of different household groups and how their individual purchasing power is affected by inflation.

In the following master's thesis, I analyse inflation inequality for households in Austria over the period from 2016 to 2019 using the Consumer Expenditure Survey 2014/15 ("Konsumerhebung"), provided by Statistics Austria. Using the so-called "democratic weighting scheme" I compute household-specific inflation rates and compare different groups of households. Firstly, I find that there is a negative plutocratic bias, meaning that mean inflation is understated by common types of measurement (see section 2). Secondly, although mean and median inflation are relatively close, there is a large disparity between the bottom and the top of the distribution of inflation. Results further suggest that there is persistence in the households' relative positions in the inflation distribution over the years covered. Thirdly, the relationship between income and inflation is negative. However, the sign of income changes when controlling for ownership status, which seems to be the main driver of household specific inflation. Accordingly, households living in rent exhibit significantly higher inflation than households owning their main residence. Last but not least, I find a urban-rural divide, meaning that households living in big cities exhibit higher inflation rates than households whose main residence is in a small municipality. This divide remains significant even after controlling for ownership status. The fact that there is large disparity in household-level inflation and that there are differences across certain groups is of great relevance when it comes to wage setting, taxing, etc., as there are potentially large distributional implications that are easily overseen when applying the standard measure CPI inflation. With results showing that this measure tends to be not very representative for a large share of Austrian households, there is definite need for discussion about alternative or additional ways of measuring how price increases affect different groups of households.

Regarding the structure of this thesis, I will first provide an overview about the most relevant and recent contributions on the issue, before discussing data and methods used. Afterwards, I will show results for the bivariate relationship between income and inflation, as well as a multivariate analysis where the influence of a large set of characteristics on household-level inflation is examined. Furthermore, I will provide a short conclusion in the end.

2 Literature Review

Contributions to the issue of inflation inequality reach back to the 1950's, with Prais (1959) beginning to question the so-called "plutocratic weighting scheme" that is still being used by many official statistical agencies when it comes to CPI calculation. In this method, consumption categories are weighted according to absolute expenditure volume. Prais argues, that this weighting method is giving greater weight to luxury expenditures. Along with Nicholson (1975), he suggests a democratic weighting scheme, giving every household equal weight instead of weighting by total expenditure. The difference between these two types of weighting shall later be explained in greater detail.

Studying U.S. households in the early 1970's, Michael (1979) provides one of the first major studies on this issue, first asking for the dispersion between households when it comes to changes in the CPI, before analysing the influence of specific characteristics on a household's inflation rate, as well as the question if there is persistence in a household's relative position in the distribution of individual CPI's. While the latter can be answered with yes, Michael does not find stable differences between different types of households over time, meaning that in the long run, no household group is likely to be excessively affected by higher or lower than average inflation rates. Hobijn and Lagakos (2005) analyse U.S. households in the period between 1987 and 2001 and find that elderly households are affected by higher inflation rates due to relatively higher health care expenditures and that poorer households' inflation rates are driven largely by gasoline prices. Moreover, they do not find persistence in household-specific inflation rates, meaning that a household facing high inflation in one year, does not necessarily face high inflation in the following year. Hamilton (2001) finds black-white differences over the period from 1974 to 1991, as the true cost of living for blacks fell by approximately 15 percent relative to that of whites. This was partly due to a decrease in blacks' expenditure share spent on food. With regard to the United Kingdom in the period from 1976 to 2000, Crawford and Smith (2002) find that the average annual inflation rate was higher for the richest 10 percent of households than for the poorest 10 percent. Moreover, they find that there is more disparity in the distribution of inflation among households in years where inflation

is generally higher.

Turning to Austria, there are three major recent contributions. The first is from Fritzer and Glatzer (2009), who find that lower income households were affected more strongly by inflation in the period of 2000 to 2008 and that these households spent a larger share of their income on housing and food than richer households. Fessler and Fritzer (2013), whose contribution serves as base for this thesis, also find a negative relationship between income and inflation in Austria between 2010 and 2012. Moreover, it is unemployed and blue-collar workers who are likely to exhibit higher than average inflation. Regarding family structure, the authors show, that those households more likely to be affected by higher inflation rates are single households, single parents and couples without children. Furthermore, inflation rates are increasing with population size of the municipality where the household's main residence is located and are generally larger for households living in rent than for owners. The most recent contribution is by Humer and Rapp (2018), who show that a household's consumption behaviour is strongly determined by social and economic characteristics and therefore allows for a group-wise comparison of household-specific inflation rates. The authors find that, between 2000 and 2015, for lower income households inflation increased more strongly than income, resulting in real income losses. They also show that housing is a main factor in determining inflation, with households living in rent exhibiting relatively higher increases in cost of living. Housing structures shall also be a major point of interest in the following analysis.

3 Data and Methods

In the following chapter, I will provide information on data sources used and the steps I took to arrange the data in a suitable way for the analysis. I will further describe the methods used in the econometric part and discuss possible limitations of the approach taken.

The main data source used is the Consumer Expenditure Survey 2014/15 ("Konsumerhebung") from Statistics Austria. Since 1999, it is conducted every five years, over a

one-year period each. Households taking part in the survey are asked to report all their expenditures for a period of two weeks. In additional interviews, Statistics Austria conducts information about household characteristics. These interviews also allow to correct for bigger one-time expenditures like holidays or cars, for instance. Expenditure categories follow the "Classification of Individual Consumption Expenditures by Purpose" (COICOP). Statistics Austria use an adapted COICOP-version, consisting of 13 main categories, however, only 12 of them represent private consumption, which is why the category "not for private consumption" is dropped. These 12 categories correspond to the COICOP-2-digit level. However, for most of the descriptives and computations, data on the COICOP-3-digit level is used, which is the most granular level available in the aggregated version of the Consumer Expenditure Survey. Altogether, it comprises 38 consumption categories (Statistics Austria, 2018a).

Information on prices is not included in the Consumer Expenditure Survey, but Statistics Austria provide CPI data on their website. The version used is the latest revision of the Austrian CPI with 2015 as base year. Consumption categories are also based on the COICOP-classification and can therefore easily be matched with the Consumer Expenditure Survey data.

The number of interest when it comes to household level inflation, is the inflation rate (π), measuring the yearly rate of change in the CPI-indices. It is computed for the period from 2016 to 2019 using the following formula:

$$\pi_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} * 100$$

3.1 Data Wrangling

In the 2014/15 version of the Consumer Expenditure Survey, there are both a household sample and a personal sample. The first consists of 7,162 households and the latter comprises 16,532 individuals. The wide range of information provided by the Consumer Expenditure Survey makes it possible to analyse household-level inflation taking into account several characteristics. These characteristics allow to control for ownership status,

family structure, occupational status, educational attainment, population in the main residence, as well as income. However, in order to be able to meaningfully assign these characteristics to each household in the sample, a few adjustments are necessary. The characteristics and sub-types chosen are very similar to the ones from Fessler and Fritzer (2013).

Ownership Status

One of the main characteristics of interest is ownership status. Data is adjusted in such a way that a household can either own a house or an apartment, live in rent in a public housing facility, a facility of a housing association or a private facility. The remaining subgroups, like official residences, subtenants, etc. are comprised in the group 'other'. The weighted shares in the population are 49.2 percent for owners, 7.09 percent for public housing, 16.9 percent for housing associations, 16.6 percent for renters of private facilities and 10.3 percent for others.

Family Structure

The Consumer Expenditure Survey provides information on household members in a separate "personal file" consisting of 16,532 observations. Since it is known from the data whether a single observation from the personal file is the main earner of the household, a child, a grandparent, an in-law, etc., certain family-types can be constructed from this. The household can then be either a one-person household, a single parent household without any other adults, while the number of children is not relevant, a single parent household where at least one other adult is living, a couple with children or a couple without children. All other types are labelled as 'other'.

Occupation

In order to assign characteristics based on the occupational status, some pre-work is required. Again, occupational status takes into account only the status of the household's main earner. At first, the sample is divided into five main categories: employed, unem-

ployed, not employed, in education and retired. The 'not employed' category comprises homemakers, incapacitated people and people on parental leave. Students and people in civilian service and military service are summarised under 'in education'. The group of employed people can then be further split up into different types of occupations. These types can either be blue-collar workers, white-collar workers, self-employed, civil servants, farmers or 'others'.

Education

Educational attainment is also referring to the household's main earner and comprises four categories: maximum primary school, lower secondary, upper secondary and tertiary. Categories "Lehre" and "Fach- oder Handelsschule" are subsumed under 'lower secondary', while 'tertiary' comprises not only university degrees, but every degree attained after having completed the "Matura".

Population

Population refers on the one hand to the population density (low, medium and high density) and on the other hand to the population size of the municipality where the household's main residence is located. The latter is divided into municipalities with less than 2,500 inhabitants, less than 10,000 inhabitants, less than 100,000 inhabitants, over 100,000 inhabitants and Vienna.

Income

Income in the Consumer Expenditure Survey is measured as net monthly household income in Euros and is based on administrative data. Moreover, a statistical model is being used for unavailable income components, taking into account the distribution of household income in EU-SILC (European Union Statistics on Income and Living Conditions) (Statistics Austria, 2017).

Furthermore, for most descriptives and computations, the equivalised household income is used, based on the EU-scale (modified OECD-scale) in order to adjust for household

size and members. The Consumer Expenditure Survey also provides an income measure taking into account imputed rent, which is used by Humer and Rapp (2018). Results are partly shown for both income measures, but generally do not differ largely. I will later explain how imputed rents are dealt with when it comes to household expenditures (see section 5).

3.2 Method

The way the CPI and the inflation rate are usually computed by statistical agencies is referred to as "plutocratic". Depending on aggregate spending, weights are assigned to the different consumption categories. The more that was spent on a certain category in absolute numbers, the larger the relevance of a price change in this category is when computing the overall CPI. However, this also means that, when it comes to the category-weights, the spending patterns of households that spend more money on consumption is of greater influence than consumption patterns of households that are less well off financially. The so-called "aggregate CPI" can therefore not be seen as a representative measure of inflation for all households, as it is likely to be biased towards higher income households (Fritzer & Glatzer, 2009).

A common way to compute household-specific inflation rates is the "democratic weighting scheme" that is applied, for example, by Fessler and Fritzer (2013), Humer and Rapp (2018) and Fritzer and Glatzer (2009). In this scheme, every household (h) is given equal weight when computing either mean or median inflation over all households. Therefore, unlike in the plutocratic scheme, it does not matter how much a household consumed in absolute terms. The weights (w) are based on each individual household's relative spending on the different consumption categories (i). As mentioned before, the COICOP-3-digit classification in the aggregated version of the Consumer Expenditure Survey consists of 38 categories. A category's weight is thereby simply the share of a household's consumption expenditure spent on that category.

$$\sum_{i=1}^{38} w_i = 1$$

In a further step, the weights are multiplied with the inflation rate of the consumption categories. Summing up over all categories gives a household's individual inflation rate for a specific year (t).

$$\pi_{h,t} = \sum_{i=1}^{38} w_{h,i,t-1} \left(\frac{p_{i,t}}{p_{i,t-1}} - 1 \right)$$

Using both plutocratic and democratic measures, the "plutocratic bias" can be computed, which is simply the difference between the two. Fritzer and Glatzer (2009) find an annual average plutocratic bias of -0.12 percentage points in Austria between 2000 and 2008. This means that the average inflation rate exhibited by households in Austria is on average understated when applying the plutocratic weighting scheme. They also argue, that the plutocratic bias is a good measure for heterogeneity of inflation among households. On the other hand, Hobijn and Lagakos (2005) find a positive bias of 0.1 percentage points for the United States between 1987 and 2001. Crawford and Smith (2002) do not find any significant difference between the two measures for the United Kingdom between 1976 and 2000.

As shown in Table 1, for Austria between 2016 and 2019, I find a negative plutocratic bias. While in 2016, plutocratic inflation was slightly higher than the democratic measure, the difference is negative throughout the following years. On average, there is a plutocratic bias of -0.035 percentage points, meaning that inflation was understated when applying the plutocratic weighting scheme. The plutocratic bias is even smaller (-0.01), when consumption weights applied in the plutocratic weighting scheme are based on equivalised household expenditure. Democratic inflation, however, is not affected by this.

After having computed household specific inflation rates, the relationship between inflation and income, as well as other characteristics can be analysed. For the first purpose, a simple bivariate OLS model is used where yearly average inflation is regressed on the cumulative distribution function (CDF) of equivalised household income, as proposed by Fessler and Fritzer (2013). Furthermore, the authors suggest using kernel regression as

Table 1: The Plutocratic Bias

Period	Plutocratic Inflation	Democratic Inflation	**Plutocratic Bias**
2016	0.374	0.367	0.008
2017	1.664	1.682	−0.017
2018	1.667	1.770	−0.104
2019	1.010	1.036	−0.026
Average	**1.179**	**1.214**	**−0.035**

Source: *Consumer Expenditure Survey 2014/15*

non-parametric estimation technique. This allows to analyse the income inflation relationship based on information of 7,162 local regressions.

The relationship between inflation and the above-mentioned types of household characteristics is analysed in a series of multivariate linear regression specifications. Grouping data points into bins allows to visually inspect the income inflation relationship after filtering various household characteristics.

As a robustness-check for the multivariate case, quantile regression is used, which is also done by Fessler and Fritzer (2013). The authors argue, that this allows to control for possible outliers of household-specific inflation. This technique is based on Koenker and Bassett Jr. (1978) and differs from common OLS in the sense that instead of the conditional mean, one can also be interested in the conditional median or any conditional quantile. The regression line is thereby not drawn through the estimated mean, but rather the quantile of interest. I estimate quantile regressions at the 20th percentile, the median and the 80th percentile. Fessler and Fritzer (2013, p. 23) further argue, that "all these estimations and resulting parameter estimates are purely descriptive and that no causal interpretation is in order". Moreover, differences in mean and median inflation are shown for chosen subgroups, such as people under 35 years of age living in urban areas, compared to their counterparts in rural areas.

3.3 Limitations

It is important to note that with the approach presented above, a few limitations come along. One of the main drawbacks when using the Consumer Expenditure Survey is that household characteristics and expenditure shares are kept constant over the whole period, as this information is not adjusted until the next version of the Consumer Expenditure Survey. Changes in consumption patterns that might result from price changes of certain goods are therefore not taken into account. Hobijn and Lagakos (2005) argue, that this "substitution bias" might be especially high in the second year when expenditure weights decrease for goods that have gotten relatively more expensive. Furthermore, changes in income could also result in changes in the consumption patterns, as Fessler and Fritzer (2013) point out. They also state, that Statistics Austria might not be able to fully account for one-time consumption of certain goods that are not consumed regularly. Households might not report these expenditures correctly for various reasons. However, potential biases should most likely offset each other over the whole sample, the authors state.

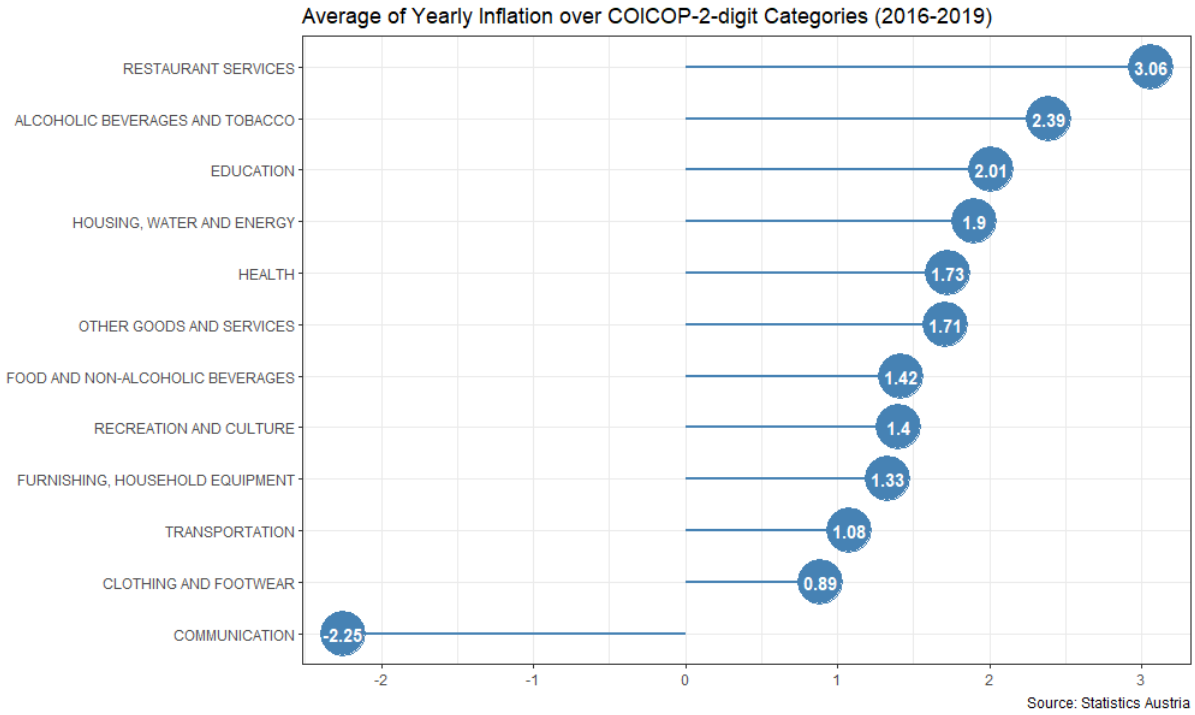
Humer and Rapp (2018) argue, that equivalising household expenditure might be problematic, since economies of scale could differ largely between different goods categories. As mentioned before, equivalising expenditure only affects the plutocratic weights, since the democratic weights for each household do not change when scaling down expenditure. This would only be the case when assigning different economies of scale to each consumption category.

Concerning my approach specifically, I use average yearly inflation over the period 2016 to 2019 as main measure of inflation, which also leaves potential room for bias if inflation was particularly high or low in certain years. Especially for 2016, dispersion was larger than in the other three years covered. Nevertheless, when comparing yearly rates with the average rate, the latter seems to be sufficiently representative for the time frame of interest.

4 Inflation In Austria

In this chapter, I show what inflation in Austria looked like in the four-year period covered and provide the first results concerning the distribution of household-level inflation. Figure 1 shows yearly average inflation between 2016 and 2019 for the 12 main consumption categories (COICOP-2-digit level). These categories remain, after aggregating up from single products like Swiss cheese to product categories, again weighting price developments of the single products.

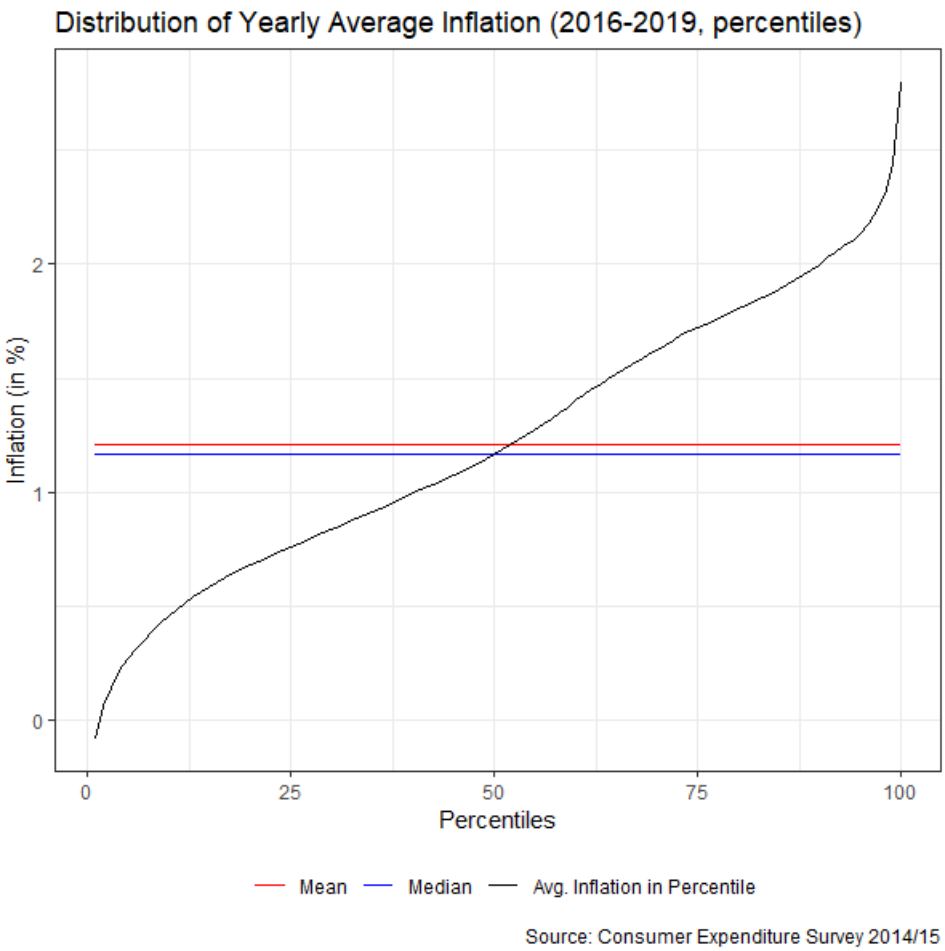
Figure 1:



What immediately catches the eye is the development in the "communication" category, where prices have declined in the yearly average. Furthermore, clothing and footwear, as well as transportation have seen only modest price increases in the period covered. On the upper end, one can exhibit large average inflation for restaurant services (3.06 percent) and alcoholic beverages and tobacco (2.39 percent). Housing, water and energy were characterised by an average inflation of 1.9 percent. As I will show later, housing expenditures are of great relevance to household inflation in general, since in

many cases, a big share of total household expenditure is spent on this category, giving it a large weight.

Figure 2:



Computing household-level inflation using the democratic weighting scheme introduced above makes it possible to show the distribution of inflation over all households. Figure 2 shows average inflation for the years 2016 to 2019 by percentile. Figure 11 in the appendix shows the same when using the Cumulative Distribution Function of inflation. The mean of yearly average inflation is 1.21 and the median 1.17, meaning that 52 percent of all households exhibited inflation rates below the mean. The distribution is skewed positively, but only slightly, since mean and median are relatively close together. The latter holds for all four years covered (see Table 2), with a maximum difference of 0.07 percentage points between mean and median. However, there seems to be large dispersion between the bottom and the top, with even negative yearly average inflation for

the lowest percentile (-0.08 percent). On the other end of the distribution, the average within the 100th percentile is 2.80 percent.

The 90.10-point ratio for yearly average inflation is 4.37, meaning that inflation at the 90th percentile was 4.37 times higher than at the 10th percentile. The 80.20-point ratio lies at 2.64, also indicating that dispersion of yearly average inflation is relatively high. This also means that official CPI inflation is not very representative for a large part of Austrian households. As Fessler and Fritzer (2013) point out, these results are only indicators that household inflation is indeed heterogeneous, but at this point, one cannot conclude who the households are that exhibit higher or lower inflation rates.

Table 2: Dispersion Measures

	Mean	Median	P10	P20	P80	P90	P90.10	P80.20
2016	0.37	0.42	−0.91	−0.5	1.29	1.6	-	-
2017	1.68	1.66	0.82	1.1	2.31	2.54	3.08	2.11
2018	1.77	1.84	0.86	1.27	2.35	2.59	3.00	1.85
2019	1.04	1.01	0.22	0.46	1.67	1.88	8.67	3.61
Average	**1.21**	**1.17**	**0.46**	**0.68**	**1.8**	**2.00**	**4.37**	**2.64**

Source: *Consumer Expenditure Survey 2014/15*

Before answering this question, however, it is important to find out if it is always the same households that exhibit high inflation, or if their position in the distribution is likely to change from year to year. In Figure 3, I use a graphical approach in keeping the 2016 inflation-deciles constant over the whole time period and check if the deciles' relative position changes in the other years. Except for 2018, where the pattern is rather unclear, all of the ten deciles of 2016 remained in the same position in the following years. Following Michael (1979), it is also possible to look at simple correlation of household-specific inflation for all years. Correlation between 2016 and 2017 is 0.75, as shown in Table 3 below. There is also strong correlation for all years, with a value of 0.83 between 2016 and 2019. However, in line with Figure 3, the results for 2018 do not fit well into this picture, as correlation for 2018 with the other years is very weak throughout. Nevertheless, it seems to be an outlier, as results for 2019 again show a strong correlation.

Unfortunately, there is a possibility that these results are partly influenced by the fact that consumption patterns are kept constant over the four-year period covered. This is one of the drawbacks of the Consumer Expenditure Survey, as explained before (see section 3.3). However, it seems reasonable to assume at this point, that consumption patterns on the household level are not likely to change drastically from year to year. Overall, these results hint that the distribution of inflation was relatively persistent in the time period covered. However, this stands in contrast to Hobijn and Lagakos (2005) who find that households facing above-average inflation in one year are not likely to do so in another year.

Figure 3:

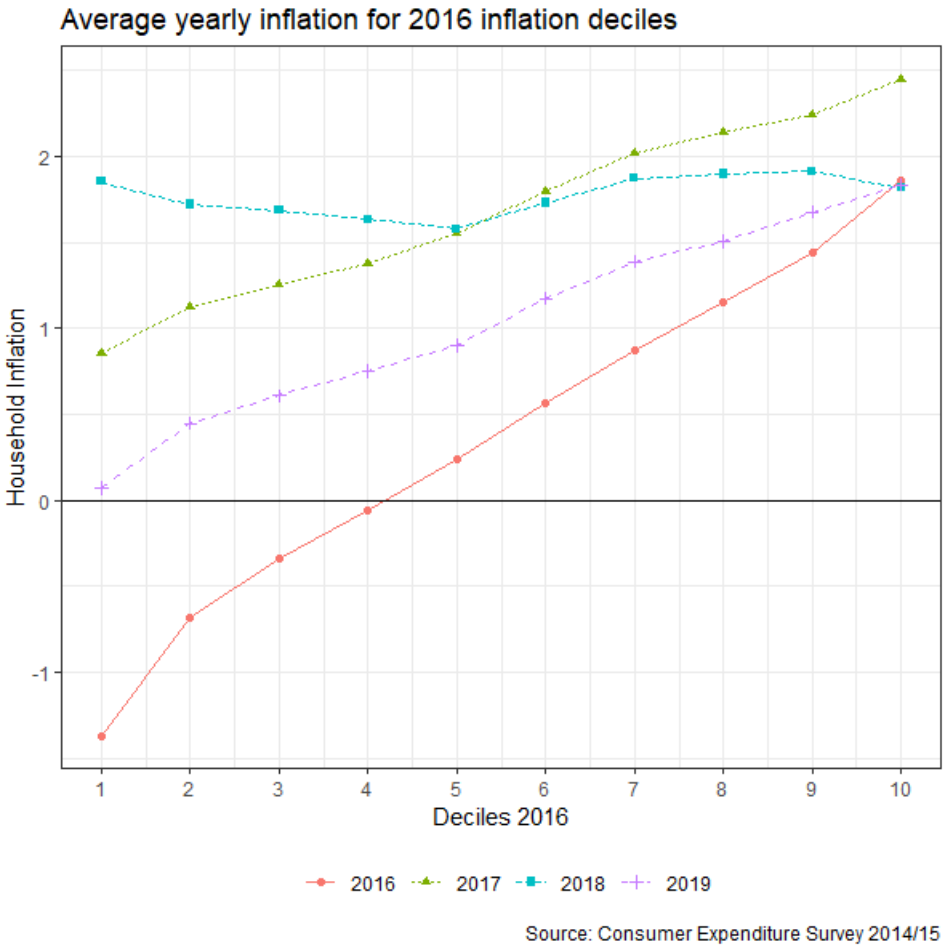


Table 3: Correlation Table

	2016	2017	2018	2019
2016	1	0.749	0.017	0.828
2017	0.749	1	0.251	0.745
2018	0.017	0.251	1	0.325
2019	0.828	0.745	0.325	1

Source: Consumer Expenditure Survey 2014/15

5 The Income Inflation Relationship

Having shown that for many households, official CPI inflation is not a very representative measure, I am now interested in who the households are that are typically facing higher or lower than average inflation. A good start to do so is by examining the relationship between inflation and income. Are there significant differences in household level inflation over different income groups? The income measure chosen is the equivalised household income without considering imputed rent. Figure 4 shows that the distributions look very similar for the two different measures.

Mean income is 2,073 Euros for equivalised income and 2,201 for equivalised income with imputed rent. The median is at 1,862 and 1,988, respectively. Taking into account imputed rent in the income measure will mainly increase income of the upper deciles, since these households are generally more likely to be owners of real estate. However, results do not differ largely when switching between the two measures, which is why I choose not taking into account imputed rent, as the results obtained by this are the more conservative ones.

Imputed rents can be excluded from the income measure, but not from household expenditures. Statistics Austria (2018b) is computing imputed rents in the Consumer Expenditure Survey due to "international recommendations". It is argued, that this is enabling a better comparison of housing costs between owners of real estate and renters. However, investments and other costs associated with construction and modification are not part of a household's consumption expenditures. In total, imputed rents are assigned

Figure 4:

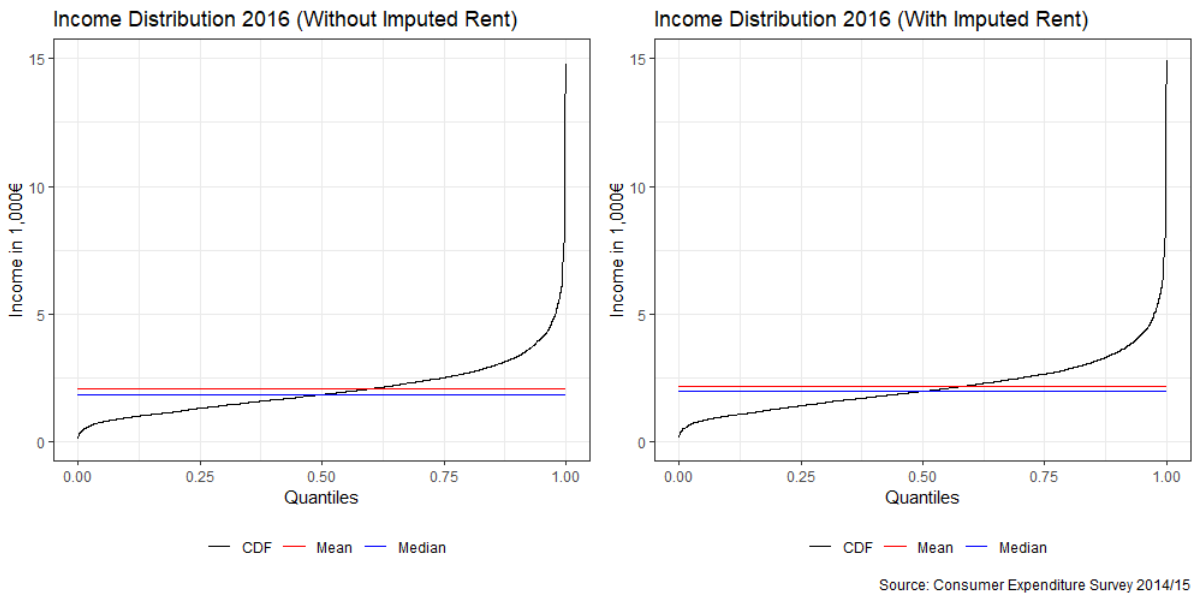
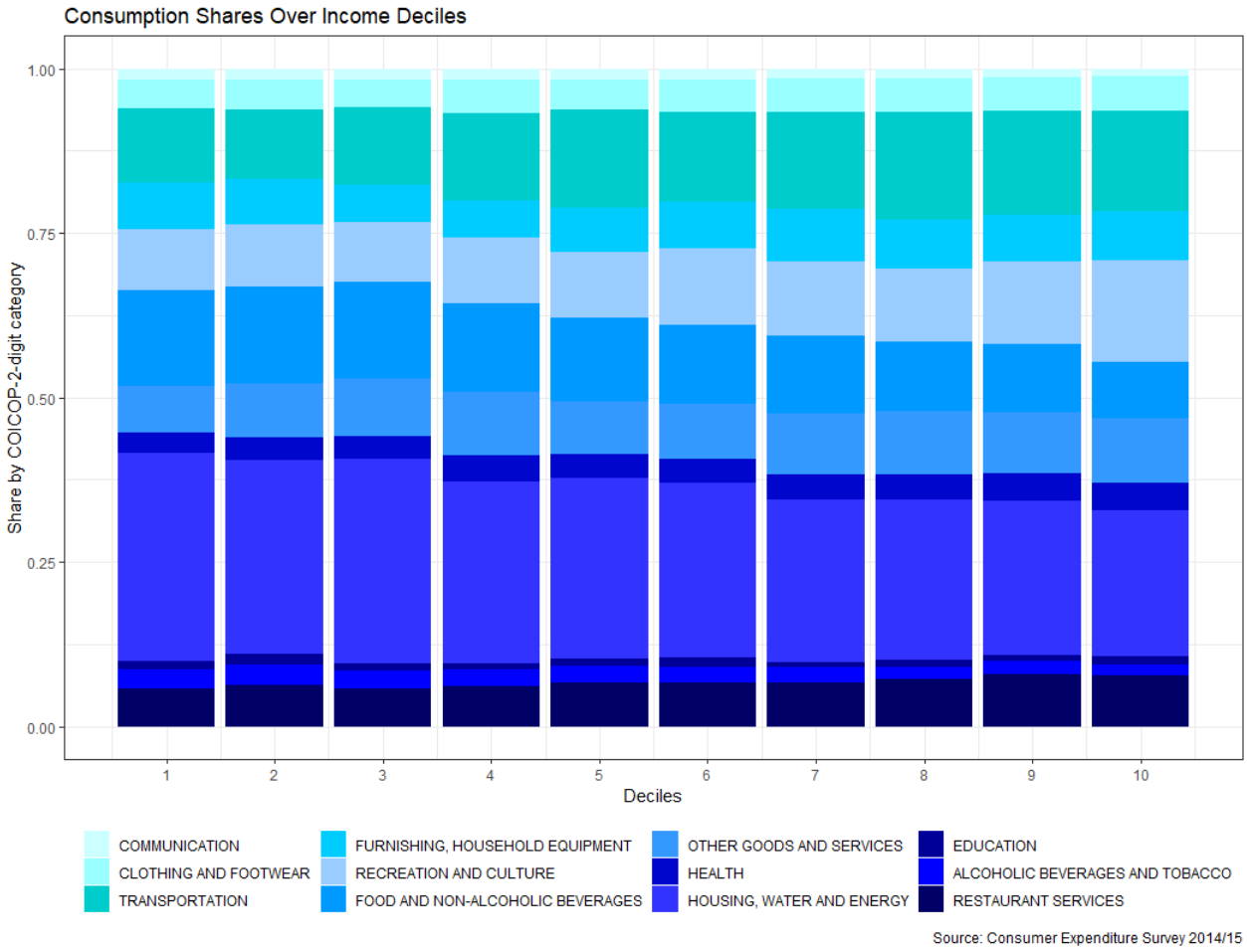


Figure 5:



to 57.2 percent of all households in the Consumer Expenditure Survey 2014/15, making up 9.2 percent of total household expenditure. It has to be clear that, without assigning imputed rents to household expenditures, differences between owners and renters in the "housing, water and energy" category would most likely be far more pronounced, since imputed rents make up 52.5 percent of the category for owners of a house, 50.6 percent for owners of an appartment and 52.7 percent for 'others'.

Figure 5 visualises the consumption shares of each income decile for the 12 main categories. The categories are ordered from top to bottom according to their average price increases in the four-year period. Lower-income deciles spend a larger share of their income on the five categories where price increases have been the highest than upper income deciles do. By far the largest fraction is spent on housing, water and energy. However, this share is diminishing when moving up the income deciles. On the other hand, households from higher income deciles spend relatively more on categories like transportation or recreation and culture. These categories are among those with the lowest average inflation rates between 2016 and 2019. The larger the share a household spends on these lower-inflation categories, the more weight is assigned to these categories in the computation of the household's individual inflation rate. Comparing this over income deciles indicates that households from lower income deciles could be likely to exhibit higher individual inflation rates, as they tend to spend a larger fraction of their income on goods that have become relatively more expensive in the period covered.

Estimating the income inflation relationship is first done via OLS. The first specification regresses yearly average inflation on the cumulative distribution function (CDF) of equivalised household income, while column (2) uses the log of equivalised household income. Standard errors are shown in parentheses. The results show a highly significant negative relationship between income and inflation in both cases. The R^2 and adjusted R^2 are low, with the chosen controls only explaining slightly above one percent of the variation in the dependent variable. Further controls are added in the multivariate case. The separate estimations for each year show that the income inflation relationship was always negative and significant in the four-year period covered with coefficients between -0.11 and -0.48.

Table 4: Bivariate OLS Regression

	Dependent variable:	
	Average Yearly Inflation	
	(1)	(2)
Income (CDF)	-0.244^{***}	
	(0.024)	
log Income		-0.135^{***}
		(0.014)
Constant	1.336^{***}	2.226^{***}
	(0.014)	(0.104)
Observations	7,162	7,162
R^2	0.014	0.013
Adjusted R^2	0.014	0.013
Residual Std. Error (df = 7160)	13.740	13.744
F Statistic (df = 1; 7160)	100.101^{***}	95.144^{***}
Note:		*p<0.1; **p<0.05; ***p<0.01
Source:	*Consumer Expenditure Survey 2014/15*	

Following Fessler and Fritzer (2013), I also estimate the non-parametric relationship between income and inflation by applying kernel regression. Figure 6 depicts both the linear regression line obtained by OLS and the non-linear regression line from 7,162 local regressions using the second-order gaussian kernel. The relationship is also a negative one across most parts of the distribution. However, it is stronger at the lower end, especially between the 2nd and the 4th decile. When moving up to the upper end of the distribution, the relationship even becomes slightly positive.

Table 5: OLS by Year

	Coefficient	Standard Error
2016	−0.11	0.04
2017	−0.13	0.027
2018	−0.48	0.03
2019	−0.26	0.027
Source:	*Consumer Expenditure Survey 2014/15*	

Figure 6:

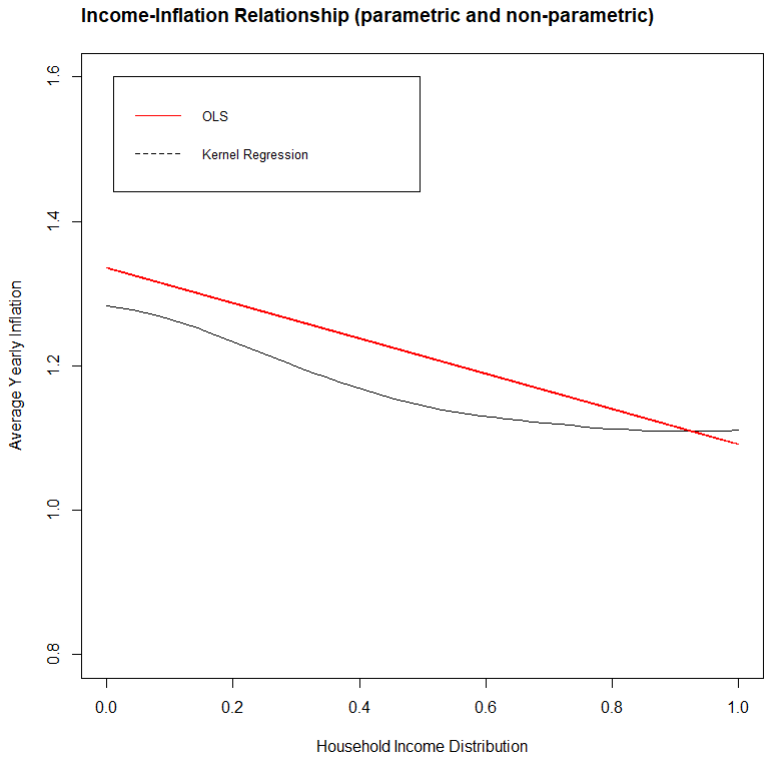


Figure 7 compares the median inflation within each income decile and the overall median inflation. Except for 2016, where one can observe large jumps between the deciles, the patterns are relatively stable over the years. Median inflation for the lowest two income deciles was 130 percent of the overall median of yearly average inflation, while the 9th and 10th decile exhibited a median inflation that was only 89 percent and 92 percent of the overall median, respectively.

Table 6 provides an overview of mean and median inflation for income deciles of both the standard income measure (equivalised household income) and equivalised household income taking into account imputed rent. In the standard measure, there is no steady decrease in mean inflation when moving up the deciles, but it is definitely lower for the upper income deciles. While mean inflation in the first decile lies at 1.35 percent, it is over 0.2 percentage points lower in the 9th and 10th decile. Median inflation is characterised by larger dispersion, with 1.52 percent mean inflation in the bottom two deciles and 1.04 and 1.08 percent for the 9th and 10th decile, respectively. Using the measure with imputed

Figure 7:

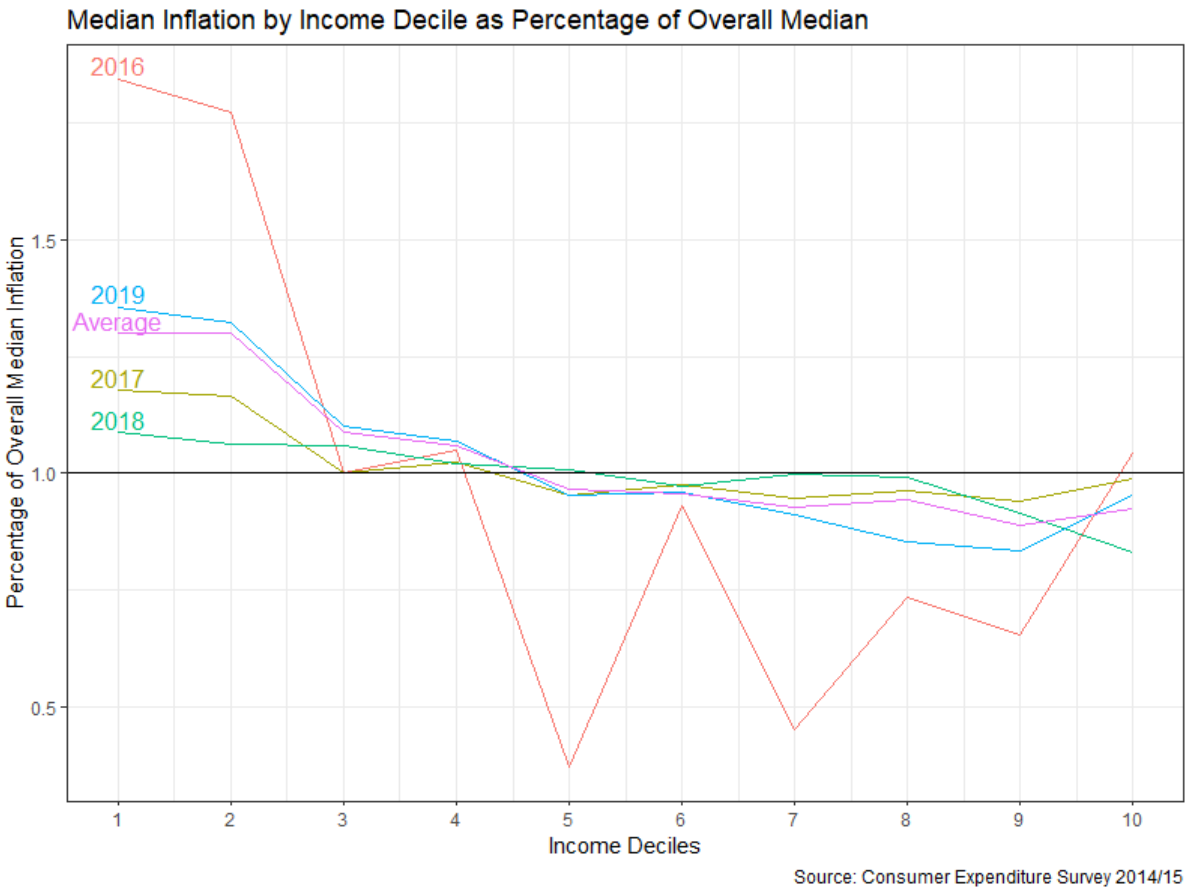


Table 6: Mean and Median Inflation per Income Decile

	Income (Standard Measure)		*Income (Imputed Rent)*	
Decile	Mean	Median	Mean	Median
1	1.35	1.52	1.55	1.72
2	1.36	1.52	1.36	1.54
3	1.23	1.27	1.28	1.32
4	1.24	1.24	1.21	1.22
5	1.17	1.13	1.17	1.14
6	1.19	1.12	1.14	1.07
7	1.17	1.08	1.14	1.04
8	1.18	1.10	1.11	1.02
9	1.10	1.04	1.05	1.00
10	1.14	1.08	1.12	1.06

Source: Consumer Expenditure Survey 2014/15

rent shows a steady decrease of average inflation with income, except for the 10th decile where it rises again. Furthermore, the dispersion between the lowest and highest values is far more pronounced when using the second income measure. Overall, the picture that emerges from the first few results clearly shows that lower income households seem to be affected more strongly by yearly average inflation in the period between 2016 and 2019.

6 Inflation and Household Characteristics

Having examined the relationship between income and inflation, it is clear also from the literature that a sufficient analysis of the determinants of household-specific and group-specific inflation needs to take into account other characteristics as well. This is done by a large multivariate regression, controlling for different sets of characteristics. I will further provide binned scatter plots concerning the income inflation relationship. Luckily, the Consumer Expenditure Survey provides a large variety of variables that allow controlling for household structure, occupational status, housing situation, etc.. The second part of the chapter is denoted to differences in ownership status over different household characteristics, such as income, occupation, age or population of the municipality where the household's main residence is located.

Table 7 shows results for five different specifications of a multivariate linear regression. The dependent variable, as in the bivariate case, is average yearly inflation of a household and standard errors are shown in parentheses. The first striking result is the coefficient for income: In contrast to the bivariate case, its sign is no longer negative in all specifications, except for column (4). This is the one specification that does not control for ownership status. Looking at exactly this group of controls strongly suggests that ownership status could be the main driver of household-specific inflation. Compared to the base group, which is made up of households that own the house or apartment they live in, renters in public housing facilities face inflation that is 0.796 basis points higher. Results are highly significant at the one percent level over all specifications and

Table 7: Multivariate Regressions

	Dependent variable: Average yearly inflation				
	(1)	(2)	(3)	(4)	(5)
Age	0.004**	0.005***	0.005***	−0.006**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age^2	−0.0001***	−0.0001***	−0.0001***	−0.00003	−0.0001***
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Ownership (base=owner of house or appartment)					
Renter (public)	0.796***	0.850***	0.847***		0.796***
	(0.021)	(0.019)	(0.019)		(0.021)
Renter (association)	0.849***	0.884***	0.883***		0.851***
	(0.014)	(0.014)	(0.014)		(0.014)
Renter (private)	0.916***	0.948***	0.951***		0.915***
	(0.015)	(0.015)	(0.014)		(0.015)
Other Housing	0.102***	0.098***	0.092***		0.101***
	(0.017)	(0.017)	(0.017)		(0.017)
Family structure (base=single)					
Couple w/ children	−0.017	−0.019	−0.018	−0.178***	−0.011
	(0.013)	(0.013)	(0.013)	(0.017)	(0.013)
Couple w/o children	0.010	0.008	0.009	−0.056***	0.012
	(0.012)	(0.012)	(0.012)	(0.016)	(0.012)
Single parent (only adult)	−0.022	−0.027	−0.028	−0.043	−0.024
	(0.022)	(0.022)	(0.022)	(0.030)	(0.022)
Single parent (NOT only adult)	−0.055	−0.046	−0.060	−0.234***	−0.044
	(0.061)	(0.061)	(0.061)	(0.080)	(0.061)
Other household-type	−0.006	−0.014	−0.014	−0.169***	−0.004
	(0.025)	(0.025)	(0.025)	(0.032)	(0.025)
Occupation (base=retired)					
Unemployed		0.157***	0.155***	0.196***	0.145***
		(0.026)	(0.026)	(0.035)	(0.026)
Not employed		0.091***	0.088***	0.102***	0.085***
		(0.029)	(0.029)	(0.038)	(0.029)
In education		0.169***	0.189***	0.048	0.146***
		(0.037)	(0.036)	(0.049)	(0.038)
Blue-collar		0.005	−0.003	0.086***	0.011
		(0.021)	(0.021)	(0.027)	(0.021)
White-collar		0.008	0.013	0.008	0.006
		(0.020)	(0.020)	(0.026)	(0.020)
Civil servant		0.033	0.037	−0.044	0.030
		(0.027)	(0.027)	(0.036)	(0.027)
Self-employed		0.004	0.011	−0.043	0.005
		(0.025)	(0.025)	(0.033)	(0.025)
Farmer		−0.031	−0.036	−0.151***	−0.013
		(0.044)	(0.044)	(0.059)	(0.044)
Other		0.015	0.021	0.058	0.016
		(0.030)	(0.030)	(0.040)	(0.030)
Education (base=maximum primary)					
Lower secondary	0.030**	0.041***		−0.008	0.036***
	(0.014)	(0.014)		(0.018)	(0.014)
Upper secondary	0.049***	0.060***		−0.026	0.041**
	(0.018)	(0.018)		(0.024)	(0.018)
Tertiary	0.047**	0.075***		−0.030	0.049***
	(0.018)	(0.019)		(0.025)	(0.019)
Population in residence (base= less than 2,500)					
Less than 10,000	0.045***			0.119***	0.043***
	(0.013)			(0.017)	(0.013)
Less than 100,000	0.067***			0.319***	0.063***
	(0.015)			(0.020)	(0.015)
Over 100,000	0.122***			0.477***	0.112***
	(0.020)			(0.026)	(0.020)
Vienna	0.121***			0.581***	0.107***
	(0.016)			(0.019)	(0.016)
Income (CDF)					
Income	0.058***	0.106***	0.129***	−0.094***	0.102***
	(0.018)	(0.020)	(0.019)	(0.026)	(0.020)
Constant	0.726***	0.678***	0.714***	1.464***	0.653***
	(0.049)	(0.053)	(0.052)	(0.067)	(0.054)
Observations	7,161	7,161	7,161	7,161	7,161
R^2	0.583	0.583	0.582	0.277	0.586
Adjusted R^2	0.582	0.582	0.581	0.274	0.584

Note: *p<0.1; **p<0.05; ***p<0.01
Source: *Consumer Expenditure Survey 2014/15*

are even more pronounced for renters in housing associations, as well as renters in private facilities (0.851 and 0.915, respectively). The income coefficient is negative and significant only in column (4), where the ownership status controls are left out. Apparently, ownership status captures a large part of the income effect seen in the bivariate case and even leaves income with a positive effect on average yearly inflation of 0.102 basis points (column (5)) when moving up one decile. The second very interesting result can be found when controlling for population in the household's main residence. Inflation is higher for households living in municipalities with larger population, compared to the base group, which is municipalities of less than 2,500 inhabitants. The coefficients are significant at the one percent level in all specifications and are largest in column (4), where ownership status is not controlled for. Since areas with larger population are usually characterised by a larger renter-share, a part of the effect of ownership status might move into the population coefficients in column (4). Yet, in the full specification, the results in the population group remain significant, hinting that there indeed is an urban-rural divide when it comes to household inflation, even after controlling for ownership status. Living in a city with more than 100,000 inhabitants is associated with yearly average inflation that is 0.112 basis points higher than for households in the base group (less than 2,500). The coefficient for households living in Vienna is only slightly smaller at 0.107. From these results, there can be no conclusion made about the reasons for this urban-rural divide, except that on a broad scale, the consumption structure seems to differ between households from small municipalities and households from larger cities.

Regarding family structure, significant results are only obtained in column (4), where all types of family structure are associated with lower inflation rates than the base group which is made up of single households. Single parent households with only one adult are the only group with no significant coefficient. The fact that significance within the family structure group can only be obtained when not controlling for ownership status suggests, that a part of the effect of the latter is included in the family structure coefficients in column (4). Even though these results are rather weak, they hint that single households and single parent households with one adult might be affected by higher inflation rates.

Results for occupational status differ largely from Fessler and Fritzer (2013) in the sense that except for farmers, all other groups are associated with higher inflation rates than the base group made up of retirees. Households where the main earner is either unemployed, not employed or in education show significantly higher inflation (between 0.085 and 0.145 basis points) than the base group in the full specification in column (5). Leaving out the ownership controls results in a significant positive effect if the household's main earner is a blue-collar worker (0.086 basis points) and a remarkably lower average yearly inflation for farmers (-0.151 basis points). This most likely has to do with the large ownership share of farmers, as shown in Figure 9 in the next section.

In contrast to results from Fessler and Fritzer (2013), higher educational attainment is associated with higher average yearly inflation. This is again true for all specifications, except column (4). There, the results show the exact opposite, but without being significant. Yet, higher educational attainment is usually associated with higher income. The negative income inflation relationship from the bivariate case seems to be largely absorbed by the ownership status controls. Similar to the coefficient of income, a positive effect on inflation remains for rising educational attainment, once ownership status is controlled for. This hints that if housing costs were left out, inflation would eventually be higher for households with higher incomes and higher educational attainment. However, the negative income inflation relationship seems to be driven by expenditures for housing, water and energy, as this is also the category with the largest expenditure share over many income deciles, shown in Figure 5. The same could be true for age, which shows a negative coefficient only in column (4). Older households are more likely to live in their own property and earn higher income. The effect that remains after controlling for these characteristics is one that suggests that the consumption structure of older households is shifting towards categories with larger price increases. Table 9 in the appendix provides results using the income measure that accounts for imputed rent.

Looking at the R^2 and adjusted R^2 in Table 7 shows large differences between column (4) and the other columns. Excluding the ownership status controls from the specification results in an R^2 of 0.277, which is less than half of the R^2 in the other columns. This

Table 8: Relative Importance Metrics

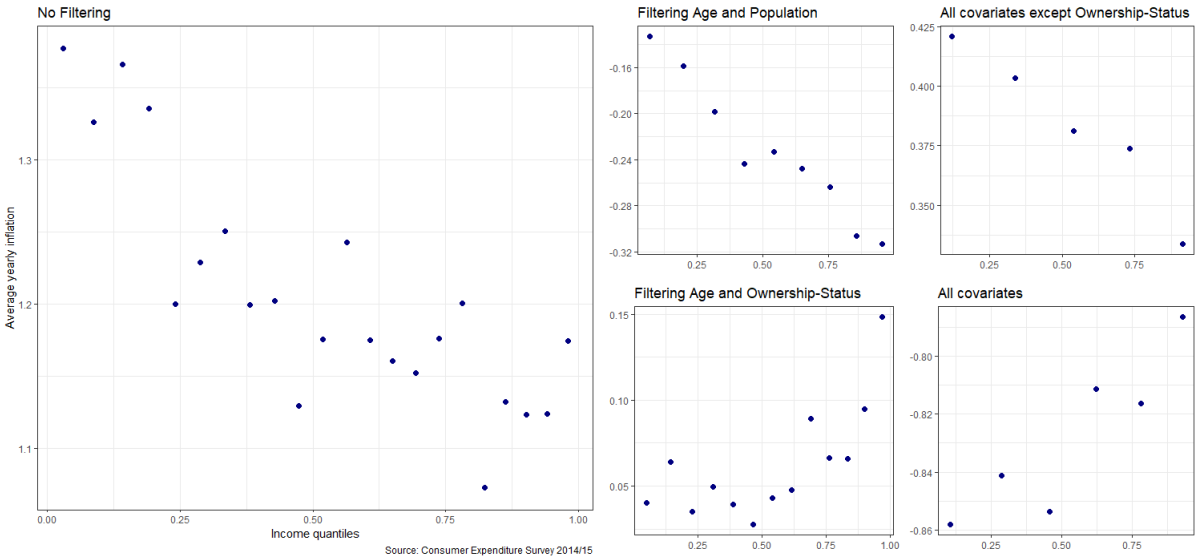
Group	LMG	last	first
Age	7.8%	0.37%	15.4%
Ownership Status	69.9%	96.9%	53.0%
Family Structure	2.1%	0.1%	2.2%
Occupation	4.7%	1.0%	8.7%
Education	0.7%	0.2%	1.3%
Population	13.8%	0.96%	18.1%
Income	0.9%	0.5%	1.3%

Source: Consumer Expenditure Survey 2014/15

means that without the ownership controls, instead of around 58 percent, only around 28 percent of the variation in the dependent variable (average yearly inflation) is explained by the groups of controls. This suggests, that ownership status is the most important contributor to the R^2. However, it might be of interest to further decompose the R^2. Table 8 shows the relative importance metrics of the different groups of controls, referring to the full specification in column (5) of Table 7. There exist different measures when it comes to decomposing the R^2, three of these measures are included in Table 8. The first one, the LMG-measure, is referring to Lindeman, Merenda, and Gold (1980) and is averaging the contribution of each group of variables over different orderings in the specification. The other two columns show the contributions of the different groups when including them either last or first. Contributions are standardized to 100 percent. The picture that emerges confirms that ownership status is by far the most important group of controls when it comes to explaining variation in average yearly inflation with an LMG-measure of 69.9 percent. Population (13.8 percent) and age (7.8 percent) are further important contributors to the overall R^2, while income and educational attainment seem to explain hardly any variation in average yearly inflation. The importance of the ownership status controls can further be shown via binned scatter plots.

Figure 8 shows the income inflation relationship, grouping areas where relatively more data points occur into bins. Without filtering any controls, the relationship portrayed in the left plot is the one from the bivariate OLS. Like in the multivariate case, the relationship remains negative right until ownership-status is controlled for. Filtering all

Figure 8:



covariates from column (5) in Table 7 results in the plot in the bottom right corner, where the relationship is a positive one.

As a robustness check, quantile regression at the median is applied (see Table 10 in the Appendix). The results are largely in line with those from the multivariate OLS. Following Fessler and Fritzer (2013), quantile regressions are also estimated at the 20th and the 80th percentile of the distribution of average yearly inflation. Over all specifications, the main results remain robust showing again a clear renter-owner and urban-rural divide.

6.1 Ownership Status Over Other Characteristics

The main result from the multivariate regressions was the large part that ownership status seems to play in determining a household's individual inflation rate. In the following chapter, I will provide some interesting figures depicting owner- and renter-shares and relate it to other household characteristics. The intention behind this is to show, that even though the income inflation relationship turns from a negative into a positive one, when including the various controls in the regression, this does not mean that high income households examine higher inflation rates. It is simply the effect of income that remains, after controlling for ownership status, occupation, education, etc.. If, for example, farmers

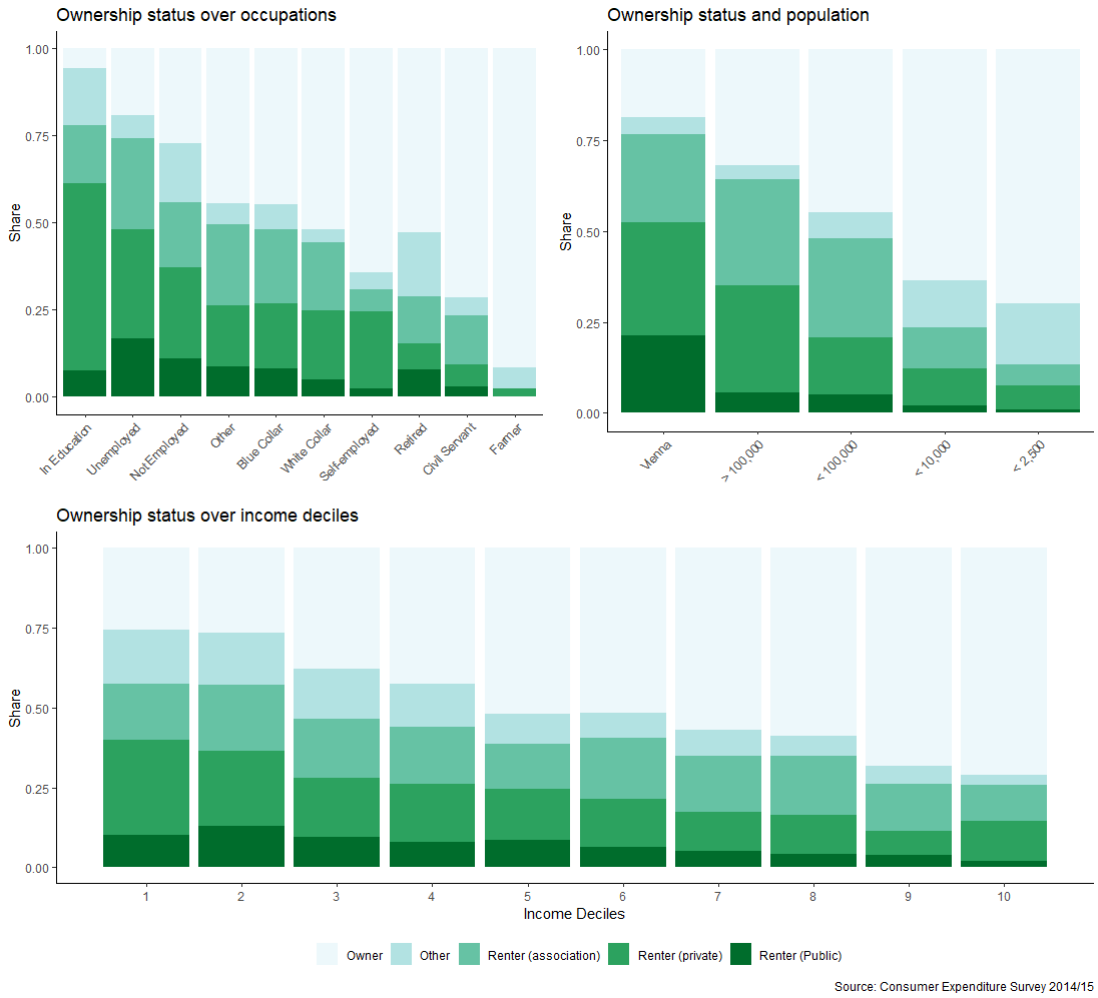
are by far more likely to be owners of their residence, they will tend to be less affected by inflation. However, this does not result in a large negative coefficient for farmers, but is already included in the part where ownership status is controlled for. The same goes for educational status, income deciles, etc..

To make these differences clearer, Figure 9 shows the different states of ownership for various subgroups. The top-left corner confirms the example from above, with farmers clearly having the largest ownership-share (91.6 percent) when comparing occupational groups. Interestingly, with 71.6 percent, civil servants have the second-largest share, even higher than self-employed (64.3 percent). Moving to the other end, households where the main earner is not (fully) included in the labour market, exhibit by far the lowest ownership-share. While 53.8 percent of the households in education are renters in private facilities, the share living in public housing is the largest for unemployed with 16.6 percent. Comparing blue-collar and white-collar workers, the latter show an ownership share that is more than seven percentage points higher. Along with column (4) of Table 7, this is a further hint that blue-collar workers could be, at least, slightly more affected by inflation than white-collar workers.

Moving to the different population groups in the top-right corner, the picture that emerges is in line with the presumptions from above. The share of people living in rent is far larger in bigger cities and is also growing with population. Therefore, households living in large cities are likely to be more strongly affected by inflation than households from small municipalities. However, this is only via the ownership-status channel. As seen in the regression results in Table 7, there still remains an urban-rural divide, even after controlling for ownership-status. At this point, however, no well-founded conclusions can be made about this interesting finding.

Furthermore, the results of the multivariate regression show a positive effect of age on inflation, except when leaving out the controls for ownership status. Figure 10 shows the shares of the different housing types over seven age groups. The ownership share is increasing heavily when moving along the first three age groups, with a maximum of 60.1 percent for the group between 56 and 65 years of age. Afterwards, results are

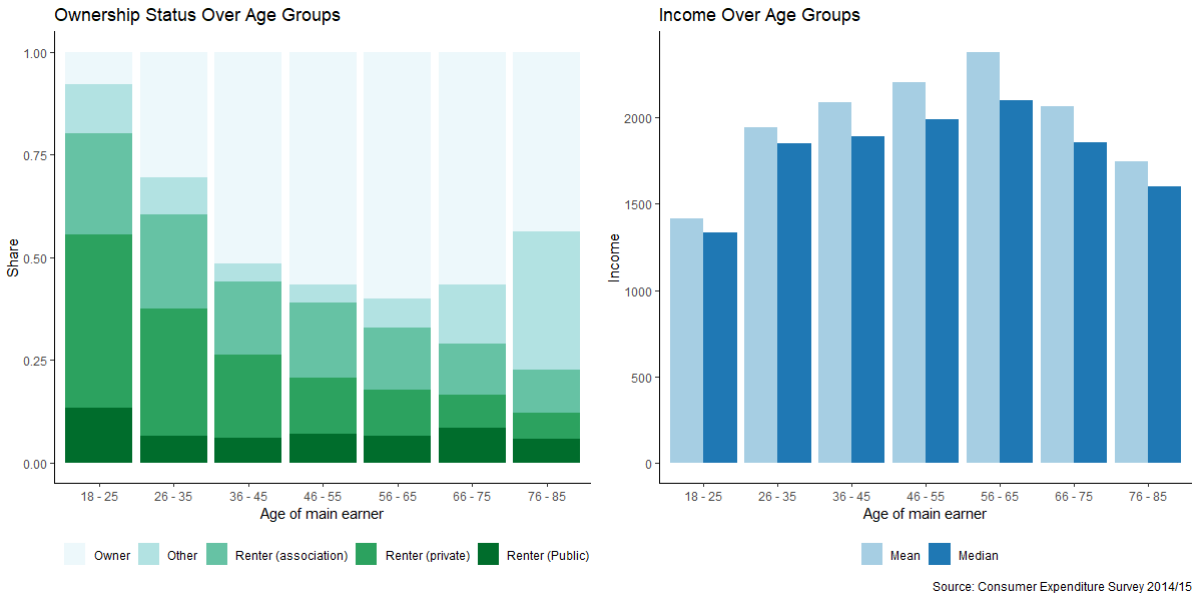
Figure 9:



not that clear anymore. On the one hand, the share of households living in rent is still decreasing, on the other, it is not accompanied with a rise in the ownership share, but a rise in the share of other types of housing. These types include, for example, subleases or rent-free housing. All in all, age is associated with a higher ownership share, which is in turn associated with a lower household-individual inflation rate. This is confirmed by column (4) in the multivariate regression, as well as the binned scatter plot filtering age and population in Figure 8. However, when controlling for ownership status, a positive age-effect remains.

Last but not least, it is of great interest, how ownership status differs over income deciles. As expected, there is a clear increase in the ownership share when moving up the income deciles, from around 26 percent in the bottom two deciles, up to 71 percent

Figure 10:



in the 10th decile. In the fifth decile, the ownership share is around 52 percent. As with occupational status, this clearly suggests that the negative relationship between income and inflation in the bivariate case is driven by ownership status.

To give a further overview, chosen subgroups are listed in Table 10 in the Appendix with their mean and median inflation. At first, young households, where the main earner is under 35 years old, from differently populated areas are compared. Mean inflation for this subgroup is 1.21 percent in municipalities with less than 2,500 inhabitants and 1.73 percent in cities with a population of over 100,000. Furthermore, the difference in mean inflation between the smallest municipalities and Vienna is almost 0.5 percentage points for young households.

Comparing households under 35 years of age with those where the main earner is 35 years or older and dividing into differently populated areas shows large disparities in mean and median inflation between the age groups, as well as between urban and rural areas. For example, the difference in mean inflation between those under 35 living in cities with more than 100,000 inhabitants and older households from municipalities with a population of less than 2,500 is over 0.85 percentage points.

Results from the renter-owner-section show a difference in mean of over one percentage

point between owners of a house and renters of private facilities. The differences in mean between the two owner groups and the renter groups are all significant. The next section of Table 10 compares mean and median inflation for households under 35 years split up by population and ownership status. As expected, there are large differences between renters from big cities and owners from small municipalities. However, sample size gets very small for these subgroups. As these numbers are purely descriptive, one should not start to think about causality when looking at this table.

7 Conclusion

Summing up, there a few major findings gained from this thesis. At first, the plutocratic bias for the four-year period covered is negative on average, meaning that the plutocratic-weighting scheme that is part of the official way of inflation measurement leads to the understatement of mean inflation. I find that there is large dispersion in the distribution of inflation in Austria between 2016 and 2019. The households' relative positions in this distribution are persistent, meaning that over the period covered, it was mostly the same households that exhibited low or high inflation. Concerning the income inflation relationship, both parametric and non-parametric estimations suggest inflation decreases with income. The multivariate analysis reveals that ownership status is the major driver of household-specific inflation. Compared to the base group made up of households owning a house or an apartment, living in rent increases inflation between 0.8 to 0.92 basis points, depending on the type of rent. Moreover, the results imply that there is a clear urban-rural divide, which still remains after controlling for ownership status. Households living in Vienna, or cities with over 100,000 inhabitants, exhibit inflation that is 0.107 or 0.112 basis points higher, respectively.

Ownership status is not only the most powerful control variable, when it comes to coefficient size. Including it in the OLS specification changes the sign of controls like age, educational attainment, as well as certain types of family structures or occupations. It is further shown, that the owner-renter shares can differ largely across different household

groups. Households where the main earner is either a farmer, a civil servant or self-employed have a far greater ownership share than those who are e.g. unemployed, not employed or in education. The ownership share of white-collar workers is around seven percentage points higher than for blue-collar workers, making the latter more likely to be affected by higher inflation. As expected, the ownership share decreases as population increases, being the lowest in Vienna. As mentioned before, this does not fully account for the observed urban-rural divide in the OLS results. Furthermore, the ownership share increases with income and with age groups up to those households where the main earner is between 55 and 65 years old.

The large dispersion of household-level inflation between 2016 and 2019, as well as the fact that groups can be identified, for which inflation is likely to be particularly high or low, is a strong argument to pay greater attention to the distributional implications of inflation inequality. These differences over characteristics like income, ownership status, or occupation should strongly be taken into account when it comes to wage setting, policy making, taxing, etc.. The debate about compensation of the fiscal drag ("cold progression") is an example for the latter point. The implications of wage setting are to be addressed when looking at differences over occupation groups. Unfortunately, the Consumer Expenditure Survey allows only to control for differences between blue-collar workers, white-collar worker, civil servants and self-employed. If there was additional information on the occupation and the branch the main earner is working in, it would be possible to relate differences in inflation to collective bargaining outcomes. However, the results give reason to believe that there could be a fair share of households that have probably exhibited real income losses in the past few years if their household-specific inflation rate increased more than their income.

There certainly is room for additional research when it comes to inflation inequality, especially in explaining the urban-rural divide. It is also the task of politics and advocacy groups to make the public aware of this issue. Otherwise many distributional consequences and developments could potentially be overseen.

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A Appendix

Figure 11:

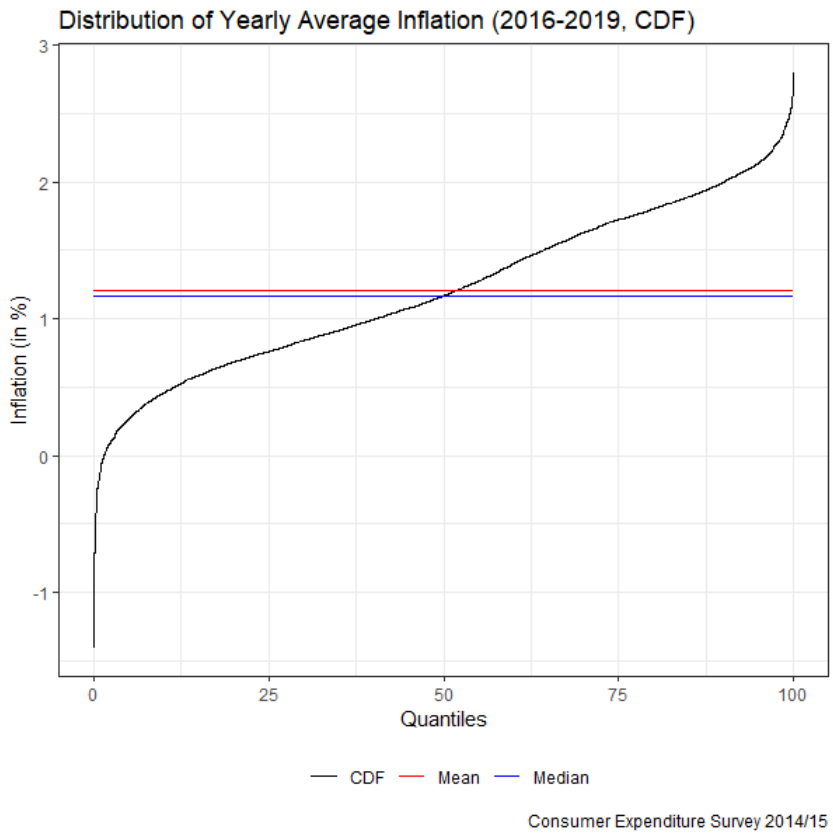

Table 9: Multivariate OLS II:

	Dependent variable:	
	Average yearly inflation	
	(1)	(2)
Age	0.005** (0.002)	0.005*** (0.002)
Age^2	−0.0001*** (0.00002)	−0.0001*** (0.00002)
Ownership (base=owner of house or appartment)		
Renter (public)	0.796*** (0.021)	0.793*** (0.021)
Renter (association)	0.851*** (0.014)	0.850*** (0.015)
Renter (private)	0.915*** (0.015)	0.911*** (0.016)
Other housing	0.101*** (0.017)	0.095*** (0.017)
Family structure (base=single)		
Couple w/ children	−0.011 (0.013)	−0.010 (0.013)
Couple w/o children	0.012 (0.012)	0.017 (0.012)
Single parent (only adult)	−0.024 (0.022)	−0.027 (0.022)
Single parent (NOT only adult)	−0.043 (0.060)	−0.040 (0.060)
Other household-type	−0.004 (0.025)	−0.001 (0.025)
Occupation (base=retired)		
Unemployed	0.145*** (0.026)	0.135*** (0.026)
Not employed	0.085*** (0.029)	0.078*** (0.029)
In education	0.146*** (0.038)	0.135*** (0.038)
Blue-collar	0.011 (0.021)	0.014 (0.021)
White-collar	0.006 (0.020)	0.016 (0.020)
Civil servant	0.030 (0.027)	0.042 (0.027)
Self employed	0.005 (0.025)	0.007 (0.025)
Farmer	−0.013 (0.044)	−0.010 (0.044)
Other	0.016 (0.030)	0.022 (0.030)
Education (base=maximum primary)		
Lower secondary	0.036*** (0.014)	0.042*** (0.014)
Upper secondary	0.041** (0.018)	0.051*** (0.018)
Tertiary	0.049*** (0.019)	0.063*** (0.019)
Population in residence (base= less than 2,500)		
Less than 10,000	0.043*** (0.013)	0.043*** (0.013)
Less than 100,000	0.063*** (0.015)	0.064*** (0.015)
Over 100,000	0.112*** (0.020)	0.113*** (0.020)
Vienna	0.107*** (0.016)	0.109*** (0.016)
Income (CDF)		
Income w/o imputed rent	0.102*** (0.020)	-
Income w imputed rent	-	0.048** (0.020)
Constant	0.653*** (0.054)	0.654*** (0.054)
Observations	7,162	7,162
R^2	0.586	0.585
Adjusted R^2	0.584	0.583
Residual Std. Error (df = 7133)	8.919	8.932
F Statistic (df = 28; 7133)	360.586***	358.770***
Note:		*p<0.1; **p<0.05; ***p<0.01
Source:		*Consumer Expenditure Survey 2014/15*

Table 10: Quantile Regression

	Dependent variable: Average yearly inflation		
	p=0.2	**p=0.5**	**p=0.8**
Age	0.008**	0.004	0.002
	(0.003)	(0.002)	(0.002)
Age^2	−0.0001***	−0.0001**	−0.00004*
	(0.00004)	(0.00003)	(0.00002)
Ownership (base=owner of house or appartment)			
	(0.00004)	(0.00003)	(0.00002)
Renter (public)	0.857***	0.812***	0.761***
	(0.029)	(0.020)	(0.021)
Renter (association)	0.901***	0.881***	0.800***
	(0.023)	(0.016)	(0.016)
Renter (private)	0.980***	0.934***	0.874***
	(0.021)	(0.016)	(0.018)
Other housing	−0.064	0.021	0.295***
	(0.041)	(0.030)	(0.038)
Family structure (base=single)			
Couple w/ children	0.073***	−0.029**	−0.092***
	(0.020)	(0.015)	(0.017)
Couple w/o children	0.065***	0.005	−0.054***
	(0.020)	(0.014)	(0.016)
Single parent (only adult)	0.024	−0.056**	−0.076***
	(0.032)	(0.028)	(0.019)
Single parent (NOT only adult)	0.044	−0.105*	−0.076
	(0.079)	(0.061)	(0.106)
Other household-type	0.013	−0.008	−0.066
	(0.041)	(0.032)	(0.047)
Occupation (base=retired)			
Unemployed	0.094**	0.170***	0.098***
	(0.037)	(0.032)	(0.029)
Not employed	0.168*	0.114***	0.032
	(0.086)	(0.029)	(0.020)
In education	0.082	0.141**	0.120*
	(0.054)	(0.068)	(0.063)
Blue-collar	−0.042	0.025	0.009
	(0.035)	(0.023)	(0.023)
White-collar	−0.008	0.031	−0.027
	(0.034)	(0.021)	(0.022)
Civil servant	0.002	0.052*	−0.018
	(0.042)	(0.028)	(0.030)
Self-employed	−0.029	0.031	0.014
	(0.043)	(0.029)	(0.033)
Farmer	0.011	0.028	0.013
	(0.088)	(0.038)	(0.058)
Other	0.038	0.046	−0.048*
	(0.038)	(0.034)	(0.029)
Education (base=maximum primary)			
Lower secondary	0.053**	0.022	0.012
	(0.024)	(0.017)	(0.020)
Upper secondary	0.057**	0.023	0.002
	(0.029)	(0.022)	(0.022)
Tertiary	0.051*	0.018	0.014
	(0.031)	(0.021)	(0.024)
Population in residence (base= less than 2,500)			
Less than 10,000	0.053**	0.050***	0.012
	(0.023)	(0.015)	(0.016)
Less than 100,000	0.043*	0.059***	0.057***
	(0.022)	(0.017)	(0.020)
Over 100,000	0.136***	0.086***	0.067***
	(0.027)	(0.019)	(0.025)
Vienna	0.079***	0.094***	0.083***
	(0.027)	(0.019)	(0.019)
Income (CDF)			
Income	0.077**	0.074***	0.115***
	(0.031)	(0.022)	(0.025)
Constant	0.234***	0.674***	1.136***
	(0.085)	(0.065)	(0.063)
Observations	7,161	7,161	7,161

Note: *p<0.1; **p<0.05; ***p<0.01
Source: *Consumer Expenditure Survey 2014/15*

Table 11: Mean and Median Inflation over Household-Groups

	Mean	Median	Share
Population Density			
High	1.558	1.647	32.572
Medium	1.177	1.120	27.310
Low	0.959	0.898	40.118
Population in Residence and Age			
under 35 years			
less than 2,500	1.214	1.179	2.675
less than 10k	1.391	1.494	4.096
less than 100k	1.534	1.613	2.927
over 100k	1.727	1.797	2.114
Vienna	1.697	1.735	5.284
35 years and older			
less than 2,500	0.874	0.841	21.597
less than 10k	0.994	0.927	24.290
less than 100k	1.220	1.222	13.602
over 100k	1.407	1.517	5.378
Vienna	1.560	1.636	18.037
Renters and Owners			
Owner (house)	0.808	0.824	38.819
Owner (appartment)	0.936	0.938	10.344
Renter (public housing)	1.679	1.710	7.091
Renter (housing association)	1.733	1.769	16.907
Renter (private)	1.818	1.829	16.557
Population and Ownership Status			
Renters			
less than 2,500	1.671	1.720	1.184
less than 10k	1.806	1.830	2.052
less than 100k	1.762	1.773	2.043
over 100k	1.877	1.845	1.744
Vienna	1.790	1.814	4.386
Owners			
less than 2,500	0.783	0.796	1.142
less than 10k	0.865	0.842	1.603
less than 100k	0.892	0.866	0.564
over 100k	0.823	0.786	0.259
Vienna	0.894	0.860	0.440
Family Status			
Couple w/ child	1.124	1.052	28.135
Couple w/o child	1.158	1.089	25.081
Single	1.312	1.452	37.179
Single parent (NOT only adult)	0.950	0.866	0.597
Single parent (only adult)	1.373	1.523	4.941

Source: Consumer Expenditure Survey 2014/15