How strong is the wealth channel of monetary policy transmission? A microeconometric evaluation for Austria

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We study the magnitude and the sources of wealth effects on consumer spending in Austria by using household-level data from the Austrian Household Finance and Consumption Survey (HFCS) 2010 and 2014. Microdata allow us to investigate whether such effects exist, and if so, whether they are heterogeneous across household groups. We find evidence for a limited but statistically significant positive (long-run) relationship between wealth and consumption in Austria: a EUR 1 increase in gross/net wealth increases mean consumption by 1 cent. We also find that this effect is driven by financial assets for which the marginal propensity to consume is estimated to be around 5 cent. Furthermore, the consumption function is concave in wealth, i.e. the marginal propensity to consume out of wealth is lower for households with more wealth. However, given that in Austria wealth is concentrated in the upper tail of the wealth distribution, the decreasing marginal propensity to consume out of wealth is counterbalanced in the aggregate. Additionally, the marginal propensity to consume out of wealth increases across the consumption distribution. Regarding the various hypotheses discussed in the literature concerning the nature of the correlation between wealth and consumption, for Austria we can find support for the precautionary savings channel only.

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Asset prices play an important role in the transmission of monetary policy to the real economy ("wealth channel"). They can contribute to changes in consumption through the interest rate effects on households' wealth (and, analogously, to changes in investment through the effect on companies' assets). In many industrialized countries, including the U.S.A. and euro area countries, increasing annual returns on equity and decreasing aggregate saving rates were observed during the second half of the 1990s (see OECD, 2004). However, the fear that constant or declining stock prices could depress consumption and cause a slowdown in the economy did not come true. According to Paiella (2009), one possible explanation was that the effect of falling stock prices had been offset by rising house prices. Another explanation was that most fluctuations in asset values are temporary and have no effect on consumer spending (only permanent changes in wealth do). In Austria, the development of financial wealth, housing prices and private consumption seems to suggest a positive correlation between the three factors since the beginning of the available time series in 2001 (see chart 1).

In the paper at hand, we study the magnitude and the sources of wealth effects on consumer spending in Austria by using household-level data from the Austrian Household Finance and Consumptions Survey (HFCS), which allow us to investigate whether such effects – if they exist – were heterogeneous across household groups in the period under review. To the best of our knowl-

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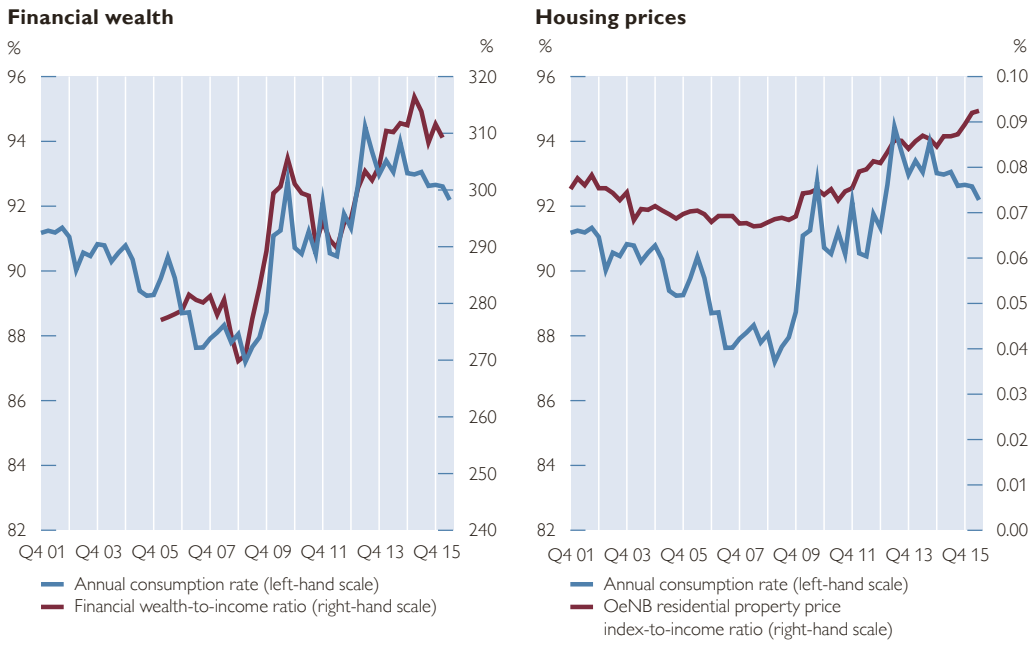
Chart 1

Wealth and consumption in Austria



Source: OeNB, Statistics Austria.

edge, the only paper estimating wealth effects on consumption in Austria is the one by Fenz and Fessler (2008), which uses aggregate data. Thus, we add to the literature by using microdata for the investigation of wealth effects in Austria. Additionally, we combine several approaches in the literature in order to attempt an identification of a causal link using an instrumental-variable approach not only for the overall wealth effect but also for the effects in specific subpopulations.

The structure of the paper is as follows: Section 1 discusses both the theoretical and empirical international literature on wealth effects. In section 2, the methodology and the data are presented, and in section 3 some descriptive statistics are shown. Section 4 discusses the results and section 5 concludes.

1 Literature review[2]

1.1 Conceptual framework

The theoretical link between wealth and consumption can be described using the life-cycle model of household spending behavior developed by Modigliani and Ando (1960) and Ando and Modigliani (1963). According to this model, households accumulate and deplete their wealth to keep their consumption more or less steady. Only if households experience an unexpected change in wealth (e.g. through unexpected changes in asset prices), will they revise their consumption plan, otherwise they do not. Extensions to the model also make it possible to explain some exceptions to this basic prediction. Such extensions allow for the possibility that households are unable to borrow as much as they would like against higher future incomes, or that

[2] *For more detailed literature reviews see Poterba (2000) and Paiella (2009).*

households may want to keep some assets as a precaution against unpredictable future adverse events or to bequeath to younger generations. With these extensions the model can explain the possibility that consumption may respond to predictable changes in income or wealth, or respond only slowly to permanent changes, or the possibility that household spending may be related to all those variables that help to predict future changes in income or wealth.

Generally, the literature distinguishes the following hypotheses for the nature of the correlation between wealth and consumption (see Paiella, 2009):

1. Direct wealth effect: Rising asset prices increase household wealth, which in turn increases consumption via the budget constraint.
2. Common causality: Asset prices and consumer spending are driven by a common macroeconomic factor that brings innovations to productivity or income growth (e.g. financial market liberalization); even households with no assets would adjust their consumption behavior as their expectations of the future change.
3. Collateral or precautionary savings channel: For borrowing-constrained homeowners, an increase in house prices relaxes credit constraints and may lead to an increase in spending because it allows homeowners to borrow more (in the form of mortgage equity withdrawal) and to smooth consumption over the life cycle; similarly, changes in asset prices may affect households' desire for other forms of precautionary savings: when the price of an asset rises, the stock of savings held in that form increases, and households may choose to reduce the stock of other assets and increase consumption.

Finally, concerning the magnitude of the marginal propensity to consume out of wealth, the basic life-cycle model predicts that it should be the same for all types of assets. However, there are several reasons why this is likely not to be the case in practice. For example, if assets are not liquid (e.g. long-term investment funds) then changes in the value of these assets may lead to slower and less intense reactions in consumption. Also, if households develop "mental accounts" that make them believe that certain directly held assets are more appropriate to use for current expenditure and others (e.g. retirement accounts) for long-term saving the reactions to changes in the valuation of these assets might be different (Thaler, 1990). Other examples for wealth effects being asset-type specific may be that households view the accumulation of some kinds of wealth as an end in itself, or for tax, bequest or other reasons (Paiella, 2009).

It is important to distinguish the marginal propensity to consume (mpc) out of wealth from the elasticity of consumption to wealth. While the mpc measures the amount of an absolute change in wealth that is spent on average consumption, the elasticity measures the percentage change in average consumption in response to a percentage change in wealth. Thus, in contrast to mpc, elasticity crucially depends on the level of wealth that each household has. This should be kept in mind for the rest of the paper.

1.2 Empirical evidence

Most studies find a statistically significant long-run relationship between total wealth and consumption. The point estimates of the effects vary depending on whether aggregate data or

microdata are employed, and there are also large differences across countries that cannot be well explained by theory. Apart from cultural differences, this variation is likely to come from differences in the measurement of wealth and in the sample definition (Paiella, 2009). Many studies on the U.S.A. (see Paiella, 2009), the country on which most of the literature focuses, find that a USD 1 increase in total wealth leads to an increase in (aggregate or average) consumption of 3 to 5 U.S. cents, a point estimate that is consistent with Modigliani (1971). The only available study estimating wealth effects on consumption in Austria (Fenz and Fessler, 2008) finds a marginal propensity to consume out of total wealth of 5 EUR cents in Austria. This result is based on the application of aggregate data.

Concerning specifically financial wealth effects, the elasticity of consumption to financial asset prices is often found to be larger in Anglo-Saxon countries than in continental Europe, where financial asset holdings are substantially smaller (see e.g. Edison and Sløk, 2001; Ludwig and Sløk, 2004 or Paiella, 2007). Furthermore, the nature of the correlation between financial wealth and consumption in Anglo-Saxon countries points toward a direct wealth effect (section 1.1) while for countries in continental Europe this nature of the correlation is still largely unexplored. Using U.S. time-series data, Dynan and Maki (2001), for example, find that changes in aggregate consumption stem mainly from changes in consumption by households that own stocks. Similarly, Maki and Palumbo (2001) find that those U.S. households whose portfolio gained the most are the same whose savings fell the most during the bust afterward (caused by the 1997 Asian financial crisis). For Italy, Paiella (2007) finds that financial wealth effects are unlikely to be direct. Indeed, although aggregate saving rates fell, stockholders continued to save and invest heavily in stocks, in contrast to U.S. stockholders. He concludes that they might have been influenced by a positive feedback effect (higher recent returns encourage higher investment).

With respect to housing wealth effects, the evidence suggests that while no clear pattern can be observed across countries for the marginal propensity to consume out of housing wealth, the elasticity of consumption to house prices may be similar in Anglo-Saxon countries and continental Europe and larger than the corresponding financial wealth effects (e.g. Case et al., 2005, for the USA and 13 other countries; Paiella, 2007 or Guiso et al., 2006, for Italy and Bover, 2006, for Spain). Furthermore, the nature of the channel through which changes in housing wealth affects consumption in Anglo-Saxon and continental European countries is not very well explored yet; indeed, it is the focus of most recent papers that use microdata. For the U.K., the findings of Attanasio and Weber (1994) and Attanasio et al. (2005) suggesting the common causality hypothesis (see section 1.1) contrast sharply with the ones of Campbell and Cocco (2007), which suggest the collateral channel hypothesis. For the U.S.A., Cooper (2013) also finds evidence supporting the collateral channel hypothesis. For Italy, Guiso et al. (2006) find evidence for a direct housing wealth effect because the effect is positive for homeowners but negative for renters.

Finally, there are several studies finding empirical support for a concave consumption function. For example, Parker (1999), Dynan et al. (2004), Mian et al. (2013) and Arrondel et al.

(2015) find that the marginal propensity to consume out of wealth is lower for households with more resources like wealth or income. An exception is Farinha (2008), who finds support for a consumption function that is concave for lower wealth values and convex for larger wealth values for Portugal.

2 Methodology and data

2.1 Method

We focus on the long-run behavior of households and use cross-sectional data (see section 2.2) to estimate the relationship between consumption and wealth. Differences in wealth across households with the same observed characteristics may reflect unobserved differences in saving behavior, which leads to reverse causality. Therefore, we follow Bover (2006) and estimate linear two-stage instrumental variable equations relating consumption in levels to different measures of household wealth in levels and sociodemographic characteristics using instruments for the wealth measures. In particular, in the first stage, we estimate household wealth as follows:

$$Wealth_i = \delta' X_i + \theta' Z_i + \nu_i \qquad (1)$$

In the second stage, we estimate a linear equation for household consumption:

$$Consumption_i = \beta \widehat{Wealth_i} + \gamma' X_i + \varepsilon_i \qquad (2)$$

The error terms are normally distributed, $\nu_i = N(0,1)$, $\varepsilon_i = N(0,1)$, and are allowed to be correlated. The matrix X_i contains an extensive set of exogenous sociodemographic characteristics in order to control for consumption differences that are due to other factors than wealth. Following Bover (2006), instead of considering explicitly permanent labor income or outstanding debt, we control for those variables in a flexible nonlinear way by including a large number of sociodemographic household characteristics. The matrix Z_i contains a set of exogenous instrumental variables that are uncorrelated with the error ε_i but are correlated with wealth. This set of instruments contains similar variables as used in Bover (2006) (local house prices and inheritance indicators for real estate properties) but also new ones (interviewers' dwelling ratings and inheritance indicators for financial assets). Intuitively, by using this set of instruments we want to control for unobservable or common determinants of wealth and consumption (see Disney et al., 2010). Below we explain in detail which controlling information we use and how we measure the above-mentioned instruments.

Furthermore, in order to see whether wealth effects differ across the distribution of consumption, we also estimate quantile regressions (see Chamberlain, 1994, and Koenker, 2005).

2.2 Data

We use the Austrian data from the first and second waves of the Eurosystem Household Finance and Consumption Survey (HFCS) carried out in 2010–11 and 2014–15, respectively, and pool both waves for the analysis in order to have a larger sample size. The implicit assumption is that by pooling the data there is no structural break in the correlation between consumption and wealth, which seems to hold when looking at chart 1. However, we also include a dummy into the regressions that equals 1 if an observation comes from the first wave and 0 otherwise in order to control for differences between both waves. Because within this framework identification is based on cross-sectional variation in levels, our

estimations will only yield information about the long-run marginal propensity to consume and has no implications for whether an effect occurs in the short run. Thus, the estimations are based on the assumption of a permanent change in wealth and do not allow a differentiation between an unexpected and an expected change in wealth.

The HFCS provides detailed information on each household's assets, liabilities, income, consumption and sociodemographic characteristics. For the analysis, we define financial wealth as the sum of the values of the following components: sight accounts, savings deposits, savings plans with building and loan associations, life insurance policies, mutual funds, debt securities, publicly traded stocks, money owed to the household and a remainder category collecting all other forms of financial wealth holdings.[3] Real wealth is defined as the sum of the following assets: main residence, other real estate property, investments in self-employment businesses, vehicles, valuables and a remainder category of other real assets. On the liability side, we define debt as the sum of collateralized debt (by main residence and by other real estate property) and uncollateralized debt (bank overdrafts, credit card debt and other uncollateralized loans). Consequently, our measure of gross wealth is obtained by summing up financial and real wealth and our measure of net wealth is obtained by subtracting debt from gross wealth.

Concerning consumption, two different measures are used for the analysis. In order to be transparent about the robustness of the results toward the choice of the consumption variable, we present the results for the following two variables of consumption: One (denominated as "consumption recorded") is based on the household's self-assessment of total nondurable consumption;[4] the other (denominated as "consumption calculated") is based on the self-assessment of several components of total nondurable consumption that are summed up to obtain an alternative measure of total nondurable consumption. These components are: the amount spent on food at home, the amount spent on food outside home and the amount given as private transfers per month. There are no studies yet in Austria comparing information on consumption collected in the HFCS with consumption according to other sources. For France, Arrondel et al. (2015) find that consumption according to the HFCS (both the recorded or computed variable) is somewhat underestimated compared to consumption according to the Household Budget Survey. Also, the HFCS nondurable consumption measure in France covers about 90% of the nondurable consumption measured with the national accounts.

As mentioned in the previous section, we use several instrumental variables for wealth when regressing on consumption (matrix Z_i in the first-stage regression). One instrument for wealth are the data on local house prices per square meter as provided by the Austrian Economic Chamber for the years 2009 and 2013 (see WKO, 2010, and WKO, 2014). The 2009

[3] *This last category is only held by a very small fraction of households.*

[4] *This self-assessment is provided as an answer to the following question: "So overall, about how much does your household spend in a typical month on all consumer goods and services? Consider all household expenses including food, utilities, etc. but excluding consumer durables (e.g. cars, household appliances, etc.), rent, loan repayments, insurance policies, renovation, etc."*

house price data are used to instrument wealth according to the HFCS 2010 (first wave) and the 2013 house price data are used to instrument wealth according to the HFCS 2014 (second wave). In each case, the instrument is lagged by one year in comparison to the reference period of housing wealth in the survey. The house price data are average transaction prices of resale apartments before taxes for each one of 113 political districts in Austria (chart A1 and table A1 in the annex A for descriptive information). This information should be exogenous since an individual real estate value has only limited impact on the average house price level. Potential self-selection of households by area of residence should be an endogeneity concern of a lesser order of magnitude relative to the one created by household wealth, as Austrian households do not very often move house and house prices change over time.[5] In the annex (see section B) we provide standard test results for the validity of the instruments. Apart from local house prices, we additionally use inheritance information and the interviewer's rating of the household's main residence available in the HFCS as instruments for real and financial wealth (table A1 in the annex). More precisely, as inheritance information, we introduce two dummy variables indicating whether the following assets have been inherited: main residence, any other assets (e.g. money, other real estate properties, valuables). The rating of the household's main residence is based on a pre-interview assessment of the dwelling by the interviewer who interviewed the household living in that dwelling.[6] In some model specifications instead of the categories we use a continuous measure of this rating which is cleaned from interviewer fixed effects.

In order to control for consumption differences that are due to other factors than wealth, we use an extensive set of exogenous sociodemographic characteristics (matrix X_i in the regression equations (1) and (2)). In our case, this is particularly important as the cross-sectional variation may confound different effects, such as e.g. cohort effects resulting from the inclusion of households at very different stages of their life cycle. The household's characteristics included are the following variables: number of persons in the household (4 dummies), number of children under 16 (continuous variable), municipality size (7 dummies), education of the household head[7] (5 dummies), occupation of the household head (4 dummies), age of the household head (continuous variable), gender of the household head (1 dummy), civil status of the household head (1 dummy), education of the household head's partner (5 dummies), occupation of the household head's partner (4 dummies), age of the household head's partner (continuous variable).[8]

[5] *According to the second wave of the HFCS, less than 1.5% of homeowners acquired their main residence approximately one year before the interview, around 3.5% around two years, and 5.2% around three years before the interview.*

[6] *The interviewer's assessment is provided as an answer to the following question: "Classify this dwelling into one out of five categories: (1) luxury, (2) upscale, (3) mid-range, (4) modest, (5) low-income."*

[7] *In this analysis, the household head has been chosen to be the financially knowledgeable person (FKP) selected by the household to answer all household-level questions, such as the consumption questions.*

[8] *Please note that we do not explicitly consider either permanent labor income or outstanding debt in our equation because our focus is on the estimation of effects of wealth and its components (Bover, 2006). However, we control for those variables in a flexible nonlinear way by including a large number of sociodemographic characteristics of the households surveyed.*

All the results make use of the final household weights provided by the HFCS (Albacete et al., 2016) and are therefore representative of the population. Moreover, the sample design (500 replicate weights) is taken into account for the calculation of standard errors.

3 Descriptive statistics

Table 1 shows some descriptive statistics of the consumption and wealth variables used in the analysis. For example, Austrian households assessed their total nondurable consumption to be around EUR 900 per month at the mean and EUR 800 at the median in 2010 (first wave) and to be around EUR 1,000 per month at the mean and EUR 900 at the median in 2014 (second wave). The mean and median consumption levels of our second indicator of total consumption (calculated) are very close to each other over the two waves, with the median being identical at EUR 500. We thus see that in general, the sum of the consumption parts is below the self-assessed consumption indicator, which points to the inclusion of additional expenditure in the latter one. With respect to wealth, one can see that households' mean real assets are about five to six times larger than their financial assets. The large difference between median and mean (net) wealth is an indication of the highly unequal distribution of (net) wealth across households.[9]

Additionally, looking at the consumption patterns across standard sociodemographic indicators also gives us a first idea of consumption differences (table 2). Mean and median consumption levels increase with wealth, income and education level. With respect to the household reference person's age, the relationship between consumption and age provided in this simple cross tabulation shows an inverse U-shaped pattern. As expected, household size

Table 1

Descriptive statistics for consumption information and wealth indicators in the HFCS (rounded)

	First wave		Second wave		First and second waves	
	Mean	Median	Mean	Median	Mean	Median
	EUR					
Expenses for food at home	380	350	370	350	380	350
Expenses for food outside home	140	100	130	100	130	100
Expenses for monthly transfers unconditional	40	0	30	0	40	0
Expenses for monthly transfers conditional	370	250	290	190	330	200
Total consumption expenditure (calculated)	560	500	530	500	550	500
Total consumption expenditure (survey response)	930	800	990	900	960	850
	EUR thousand					
Gross household income	43.9	32.3	43.3	35.7	43.6	34.1
Real assets	235.1	52.1	237.3	60.0	236.2	55.8
Financial assets	46.7	13.3	38.4	15.3	42.5	14.3
Gross wealth	281.8	92.8	275.7	100.4	278.7	96.0
Net wealth	265.0	76.4	258.4	85.9	261.7	81.4

Source: HFCS Austria 2014 and 2010, OeNB.

Note: All estimates are unconditional in the sense that all households are taken into account, even those who, e.g., own real assets with a value of 0.

[9] *See Fessler et al. (2016) for a much more detailed analysis of the wealth composition and wealth concentration in Austria and Arrondel et al. (2016) for a similar analysis in the euro area.*

Table 2

Descriptive statistics for consumption expenditure broken down by socioeconomic indicators (first and second waves taken together; rounded)

	Total consumption recorded		Total consumption calculated	
	Mean	Median	Mean	Median
Single households	690	640	400	350
Two-person households	1,020	900	580	500
Three-person households	1,140	1,000	660	600
Four-person households	1,280	1,200	700	650
Households with 5 persons or more	1,420	1,300	810	700
0–34 years	880	800	500	450
35–49 years	1,060	980	610	550
50+ years	940	800	530	450
Male household reference person	1,020	900	600	500
Female household reference person	910	800	510	450
Household reference person with primary education only	820	810	480	390
Household reference person with secondary education	910	800	520	450
Household reference person with tertiary education	1,110	1,000	620	550
Owners (including free usage)	1,060	980	590	500
Renters	840	750	500	440
Households without risky financial assets	910	800	520	450
Households with risky assets	1,210	1,100	690	600
1st income quintile	600	550	340	300
2nd income quintile	780	710	440	400
3rd income quintile	960	900	540	500
4th income quintile	1,100	1,000	620	560
5th income quintile	1,350	1,200	790	700
1st net wealth quintile	710	640	430	370
2nd net wealth quintile	830	790	490	430
3rd net wealth quintile	940	850	530	490
4th net wealth quintile	1,040	990	580	520
5th net wealth quintile	1,260	1,130	710	600

Source: HFCS Austria 2014 and 2010, OeNB.

displays a strong correlation with consumption, as more persons consume more. In the regression analysis we thus include various indicators for household size as control variables (see also section 2.2). Finally, households headed by women seem to spend less on consumption goods than those with male household heads, both at the mean and median levels for both consumption indicators. As we also investigate the wealth effect channels discussed in the literature, we include a breakdown according to the ownership structure of the households' main residence and holdings of risky financial assets for completeness.

4 Results

In the first subsection of section 4, we present the results regarding overall wealth effects based on the instrumental-variable (IV) approach. For comparison, we also show the results of the simple OLS approach in order to see the potential endogeneity bias. In the second subsection, we present IV regression estimates of wealth effects on consumption across the wealth distribution. In the third subsection, we show the results based on quantile regressions estimating the wealth effects for various consumption quantiles. Finally, in the fourth subsection, again based on IV regressions, we pres-

ent the results of our attempt to find evidence regarding the nature or channel of the correlation between wealth and consumption (see also section 1.2). In all the regressions we estimate the wealth effect of net wealth and gross wealth in a separate but similar model, exchanging only the wealth indicator. For modelling the difference in real and financial wealth, we estimate one model including both wealth indicators.[10]

4.1 Overall wealth effects on consumption

The results of the estimation of the first stage equation (1) will not be discussed here but can be found in the annex (section C). Likewise, the results concerning the tests for the validity of the instrumental-variable approach can also be found in the annex (see section B).

The results of the estimation of the second-stage equation (2) are reported in table 3. All regressions control for the wave indicator and the extensive set of sociodemographic control variables.

We find evidence for a limited but statistically significant positive wealth effect on consumption in Austria: the estimated marginal propensity to consume out of net wealth is about 0.01 (column 1), meaning that an additional EUR 1 of net wealth would be associated with 1 cent of additional annual consumption. The effect is the same when considering gross wealth instead of net wealth (column 2). When considering the components of wealth,

Table 3

Results of the IV and OLS regressions

	Total consumption recorded						Total consumption calculated					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	IV	IV	IV	OLS	OLS	OLS	IV	IV	IV	OLS	OLS	OLS
Real assets			0.000			0.001**			–0.001			0.001**
Standard error			(0.002)			(0.000)			(0.002)			(0.000)
Financial assets			0.050***			0.008***			0.035**			0.005***
Standard error			(0.018)			(0.003)			(0.014)			(0.002)
Gross wealth		0.010***			0.001***			0.007***			0.001***	
Standard error		(0.003)			(0.000)			(0.002)			(0.000)	
Net wealth	0.010***			0.001***			0.007***			0.001***		
Standard error	(0.003)			(0.000)			(0.002)			(0.000)		
Dummy for wave	×	×	×	×	×	×	×	×	×	×	×	×
Extended set of controls	×	×	×	×	×	×	×	×	×	×	×	×

Source: HFCS 2014 and 2010, OeNB.

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
The real estate price level, information on inheritances and paradata for the quality of a household's main residence are used as instruments for the models with real and financial assets. The information on inheritances is excluded as an instrument for the models with gross or net wealth.

[10] *As is discussed in the annex the appropriate set of instruments changes from the models on net and gross wealth to the model for real and financial wealth.*

namely real and financial assets, we find that the corresponding marginal propensities to consume differ substantially between each other (column 3). While the estimated marginal propensity to consume out of financial wealth is relatively large (5 cent), the marginal propensity to consume out of real wealth is almost zero and statistically insignificant. When using the alternative consumption definition ("consumption calculated" in columns 7–9), the results are very similar, although the magnitude decreases to some degree. The OLS estimates (columns 4–6 and 10–12) are generally lower than the IV estimates, suggesting that there is evidence of endogeneity in wealth and, therefore, OLS might underestimate wealth effects. This is also supported by the endogeneity tests (section B in the annex).

Our estimates of the marginal propensity to consume out of total wealth for Austria are lower than the ones obtained by Fenz and Fessler (2008), who use aggregate data. We attribute this fact to differences in the measurement of wealth and in the sample definition. A comparison with studies on other countries (see also literature review in section 1.2) shows that the marginal propensity to consume out of total wealth for Austria is slightly below the spectrum of the estimated propensities in the U.S.A. The estimated propensities for Austria, however, seem to be in line with the results for other European countries (e.g. Guiso et al., 2005, for Italy or Arrondel et al., 2015, for France). The higher marginal propensity to consume out of financial wealth than out of real wealth as found for Austria was also found in several studies for Italy (Guiso et al., 2005 and Paiella, 2007), but was not shown in studies for Spain or France (Bover, 2006 and Arrondel et al., 2015), where real wealth effects were found to be larger than financial wealth effects.

4.2 Wealth effects across the wealth distribution

We now consider a more flexible specification where we allow the marginal propensity to consume out of wealth to vary across the net wealth distribution. To this end, we divide all households into five groups homogenous in terms of wealth (wealth quintiles) and construct dummy variables indicating whether a household belongs to the corresponding wealth quintile. These dummies are then interacted with wealth values. Table 4 presents the results of this exercise. Again, the results are based on an IV approach where all the potentially endogenous wealth indicator and wealth distribution indicator combinations are instrumented.[11] Additionally, all the control variables are used again.

Our estimates confirm the concavity of the consumption function with respect to wealth in Austria. We obtain a statistically significant marginal propensity to consume out of net wealth decreasing from 8.4 cent for households in the second wealth quintile to 0.5 cent for households in the highest wealth quintile (see table 4, column 1).[12] The effect is very similar when considering

[11] *Each instrument is interacted with net wealth quintile dummies. As a robustness check, we have also estimated IV regressions for each wealth quintile instead of using interaction terms over the whole sample. This estimation approach leads to similar, but less efficient estimates than the ones presented in this subsection using interaction terms.*

[12] *Please note that the estimated interaction coefficients shown in table 4 refer to the highest wealth quintile, which is the omitted category. Therefore, in order to obtain the marginal propensity of one of the other wealth quintiles (e.g. 8.4 cent for wealth quintile = 1) one has to add the coefficient of the main effect term (e.g. 0.5 cent) to the coefficient of the interaction term in question (e.g. 7.9 cent).*

Table 4

Results of the IV regressions across the wealth distribution

	Total consumption recorded			Total consumption calculated		
	(1)	(2)	(3)	(4)	(5)	(6)
	IV	IV	IV	IV	IV	IV
Real assets * dummy net wealth quintile=1			−0.080			−0.165
Standard error			*(0.194)*			*(0.169)*
Real assets * dummy net wealth quintile=2			0.066			0.071
Standard error			*(0.069)*			*(0.051)*
Real assets * dummy net wealth quintile=3			0.028*			0.020
Standard error			*(0.015)*			*(0.013)*
Real assets * dummy net wealth quintile=4			0.011			0.012
Standard error			*(0.009)*			*(0.007)*
Real assets (dummy quintile=5 omitted)			0.001			0.000
Standard error			*(0.002)*			*(0.002)*
Financial assets * dummy net wealth quintile=1			0.567			0.875
Standard error			*(0.830)*			*(0.757)*
Financial assets * dummy net wealth quintile=2			0.119			0.118
Standard error			*(0.107)*			*(0.102)*
Financial assets * dummy net wealth quintile=3			−0.004			0.006
Standard error			*(0.030)*			*(0.021)*
Financial assets * dummy net wealth quintile=4			−0.008			−0.022
Standard error			*(0.042)*			*(0.027)*
Financial assets (dummy quintile=5 omitted)			0.038**			0.029**
Standard error			*(0.015)*			*(0.013)*
Gross wealth * dummy net wealth quintile=1		0.079			0.063	
Standard error		*(0.068)*			*(0.060)*	
Gross wealth * dummy net wealth quintile=2		0.080***			0.055**	
Standard error		*(0.030)*			*(0.024)*	
Gross wealth * dummy net wealth quintile=3		0.020***			0.011**	
Standard error		*(0.007)*			*(0.005)*	
Gross wealth * dummy net wealth quintile=4		0.007***			0.004***	
Standard error		*(0.002)*			*(0.001)*	
Gross wealth (dummy quintile=5 omitted)		0.006***			0.003***	
Standard error		*(0.002)*			*(0.001)*	
Net wealth * dummy net wealth quintile=1	−0.113			−0.086		
Standard error	*(0.164)*			*(0.099)*		
Net wealth * dummy net wealth quintile=2	0.079**			0.049*		
Standard error	*(0.040)*			*(0.025)*		
Net wealth * dummy net wealth quintile=3	0.022**			0.010*		
Standard error	*(0.009)*			*(0.005)*		
Net wealth * dummy net wealth quintile=4	0.007***			0.004**		
Standard error	*(0.003)*			*(0.001)*		
Net wealth (dummy quintile=5 omitted)	0.005***			0.003***		
Standard error	*(0.002)*			*(0.001)*		
Dummy for wave	×	×	×	×	×	×
Extended set of controls	×	×	×	×	×	×

Source: HFCS Austria 2014 and 2010, OeNB.

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
The real estate price level, information on inheritances and paradata for the quality of a household's main residence are used as instruments for the models with real and financial assets. The information on inheritances is excluded as an instrument for the models with gross or net wealth. Each instrument is interacted with net wealth quintile dummies.

the marginal propensity to consume out of gross wealth instead of the one out of net wealth (table 4, column 2). For households in the lowest wealth quintile we cannot find any statistically significant marginal propensity to consume. There is some indication that this might be due to a larger hetero-

Table 5

Average elasticity of consumption to wealth across the wealth distribution

	Mean net wealth	Total consumption recorded			Total consumption calculated		
	EUR thousand	*Mean yearly consumption in EUR thousand*	(1) Elasticity	(2) Elasticity	*Mean yearly consumption in EUR thousand*	(3) Elasticity	(4) Elasticity
Gross wealth quintile=1	0.2	8.2		0.002	5.0		0.002
Gross wealth quintile=2	17.0	10.2		0.144	5.9		0.168
Gross wealth quintile=3	89.9	11.3		0.208	6.4		0.198
Gross wealth quintile=4	233.9	12.6		0.242	6.9		0.236
Gross wealth quintile=5	968.3	15.3		0.379	8.6		0.336
Net wealth quintile=1	–5.7	8.5	0.072		5.1	0.093	
Net wealth quintile=2	17.1	10.0	0.144		5.9	0.152	
Net wealth quintile=3	85.2	11.3	0.203		6.3	0.175	
Net wealth quintile=4	236.0	12.5	0.226		7.0	0.236	
Net wealth quintile=5	977.6	15.2	0.322		8.5	0.344	
Dummy for wave			×	×		×	×
Extended set of controls			×	×		×	×

Source: HFCS Austria 2014 and 2010, OeNB.

Note: The elasticities are obtained by multiplying the estimated marginal propensity to consume out of wealth (table 4) by the ratio of the average net wealth out of the average consumption within the considered wealth quintile.

geneity of households in this quintile.[13] When using the alternative consumption definition ("consumption calculated"), the results are very similar, although the magnitude decreases somewhat (table 4, columns 4 and 5). When disaggregating wealth into its components real and financial wealth, the pattern of decreasing effects across the wealth distribution is confirmed but it is not statistically significant anymore (table 4, columns 3 and 6).

The overall effect of a change in the value of some asset on aggregate consumption crucially depends on the weight of that asset in the aggregate portfolio. In order to investigate the implications for aggregate consumption in Austria, we compute the average consumption elasticity with respect to wealth for each wealth group employing the methodology used by Arrondel et al. (2015). Given that wealth is highly unequally distributed in Austria, with a large share of wealth being concentrated in the top percentiles (Fessler et al., 2016), the decreasing marginal propensity to consume out of wealth is counterbalanced in the aggregate: a 1% change of wealth is an amount so much higher for households in the upper tail of the wealth distribution than for those in the lower tail that it even counterbalances the mpc effect on consumption. We obtain an increasing average elasticity of consumption to net wealth ranging from 0.07% for households in the lowest wealth quintile to 0.32% for households in the highest wealth quintile (table 5, column 1), meaning that an additional 1% of average net wealth would be associated with 0.07% of additional annual average consumption for the lowest wealth quintile and with

[13] *The changing signs of the marginal propensity estimate depending on whether gross or net wealth is considered might be an indication of the lowest wealth quintile being very heterogeneous, which would lead to estimates with low statistical power. The lowest wealth quintile might group households with relatively high debt together with households with relatively low wealth.*

0.32% for highest wealth quintile. The elasticities are very similar when considering gross wealth and/or the alternative consumption definition (table 5, columns 2–4).

All in all, the consumption concavity result is in line with what is also found in most of the literature (section 1.2). An explanation of this result that is consistent with the life-cycle model of household spending behavior is the so-called precautionary savings channel (section 1.1): less wealthy households have higher precautionary savings, which do not allow them to adopt their optimal consumption; therefore, their consumption is more sensitive to wealth.[14] However, as we have seen, due to the distribution of wealth elasticities the impact on the aggregate is expected to be larger for higher wealth quintiles in Austria.

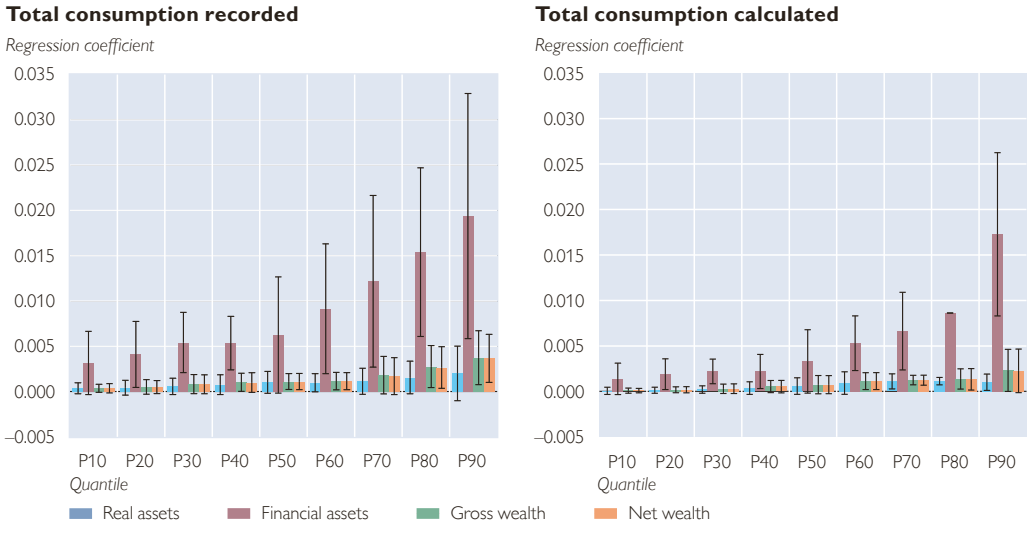
4.3 Wealth effects across the consumption distribution

Based on the estimation of quantile regressions we further investigate the marginal propensity to consume out of wealth for specific quantiles of the consumption distribution.[15] Chart 2 displays the corresponding regression coefficients for nine consumption quantiles (from the 10th percentile up to the 90th percentile) and its confidence intervals for all four wealth specifications, i.e. net and gross wealth as well as real and financial assets.

It can be seen that the marginal propensity to consume out of wealth – the extent of which depends on the wealth specification – increases across the con-

Chart 2

Results of the quantile regression



Source: HFCS Austria 2010 and 2014, OeNB.

Note: The 95% confidence intervals are constructed assuming that the coefficients and their variance come from a normal distribution.

[14] *Another explanation of this result that is consistent with the life-cycle model of household spending behavior is the collateral channel hypothesis (section 1.1). However, in a further analysis below (section 4.4) this channel is found not to be relevant in Austria.*

[15] *We have done a similar exercise estimating IV regressions across the consumption distribution. This estimation approach leads qualitatively to the same conclusions as the ones presented in this subsection using quantile regressions.*

sumption distribution. The general pattern can be observed for all specifications of wealth. For example, while the marginal propensity to consume out of financial wealth of a household located in the 10th percentile of the consumption distribution is insignificantly different from zero, a household located in the 90th percentile of the consumption distribution has a marginal propensity to consume out of financial wealth of almost 2 cent. Thus, everything else being equal, the consumption of households with higher consumption levels is more sensitive to the value of wealth than the consumption of households with lower consumption levels. One possible interpretation could be that households with lower consumption levels are low-income households that are less confident (e.g. they expect unemployment) and tend to delay spending decisions; conversely, households with higher consumption levels can be assumed to be high-income households that are more confident about the future, which encourages them to spend. The trend, however, could also reflect differences in preferences. It seems clear from the estimation that households who spend more are in general also households whose consumption behavior is more sensitive to wealth differences.

4.4 Nature of the correlation between wealth and consumption

Finally, we investigate whether next to the precautionary savings channel we can find any evidence for the other hypotheses discussed in the literature regarding the nature of the correlation between wealth and consumption (section 1.2): If wealth has a direct effect on consumer spending, real wealth effects should be most relevant for real estate owners (compared to renters) and/or financial wealth effects should be most relevant for stockholders (compared to non-stockholders). Both hypotheses cannot be supported by the results found in the HFCS for Austria (see table 6, columns 1, 2, 6 and 7): First, the housing wealth effect among owners is not statistically different from the one among renters.[16] Second, we even find some weak evidence of a larger financial wealth effect for non-stockholders compared to stockholders (see column 7) indicated by a significant positive estimate of the interaction. In the specification in column 2 there is no significant difference between stockholders and non-stockholders.

Furthermore, under the common causality hypothesis, younger households' consumption can be expected to grow more than that of older households, as a permanent revision to all expected future earnings would be more significant for the young, who have longer remaining working lives. Similarly, under this hypothesis, households expecting a positive average income growth rate one year ahead can be expected to have larger wealth effects than other households (Arrondel et al., 2015). For Austria, none of these effects seem to be true (table 6, columns 3, 4, 8 and 9) as we cannot find any statistically significant different wealth effects between young and old household reference persons.

Finally, under the collateral channel hypothesis, an increase in housing wealth would increase the value of equity available to homeowners and may encourage them to borrow more, in the form of mortgage equity with-

[16] *It must be noted that we use the local house price indicator as a proxy for real estate wealth (real assets) in this specification as they are also observed for renters and not only for owners.*

Table 6

Results of the IV regressions across household groups

	Total consumption recorded					Total consumption calculated				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
Local house prices * dummy household=renter	–0.047					0.112				
Standard error	*(0.196)*					*(0.138)*				
Local house prices * (dummy household=real estate owner or other omitted)	0.214					0.262				
Standard error	*(0.282)*					*(0.202)*				
Financial assets * dummy household=non-stockholder		0.022					0.027*			
Standard error		*(0.020)*					*(0.015)*			
Financial assets * (dummy household=stockholder omitted)		0.040**					0.018*			
Standard error		*(0.017)*					*(0.011)*			
Net wealth * dummy household reference person aged under 35			–0.003					–0.003		
Standard error			*(0.006)*					*(0.004)*		
Net wealth * dummy household reference person aged 35–49			0.001					0.000		
Standard error			*(0.003)*					*(0.002)*		
Net wealth * (dummy household reference person age over 49 omitted)			0.008***					0.006***		
Standard error			*(0.002)*					*(0.002)*		
Net wealth * dummy household=has no positive income expectation				0.000					0.000	
Standard error				*(0.002)*					*(0.002)*	
Net wealth * (dummy household=has positive income expectation omitted)				0.008**					0.006**	
Standard error				*(0.004)*					*(0.003)*	
Real assets * (dummy household=non-mortgage holder)					–0.001					–0.003
Standard error					*(0.006)*					*(0.004)*
Real assets * (dummy household=mortgage holder omitted)					–0.001					–0.000
Standard error					*(0.004)*					*(0.003)*
Dummy for wave	×	×	×	×	×	×	×	×	×	×
Extended set of controls	×	×	×	×	×	×	×	×	×	×

Source: HFCS Austria 2014 and 2010, OeNB.
*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
The real estate price level, information on inheritances and paradata for the quality of a household's main residence are used as instruments for the models with financial assets and real assets. For the model with local house prices too the same instruments are used for financial wealth (but not for real assets as they are substituted by the exogenous local house prices variable). The information on inheritance is excluded as an instrument for the model with net wealth. Each instrument is interacted with the corresponding dummies.

drawal, enabling them to finance higher consumption. This effect can be expected to be stronger among mortgage holders.[17] However, not surprisingly, this is not found to be true in Austria where the form of mortgage equity withdrawal is not common among households (table 6, columns 5 and 10).

All in all, for the case of Austria, we cannot find support either for the direct wealth effect hypothesis or for the common causality hypothesis, or the collateral channel hypothesis. We only find support for the precautionary savings channel hypothesis (section 4.2). It is acknowledged that the lack of statistical significance might be due to sample size. A larger sample might help to improve significance levels.

5 Conclusion

This analysis uses microdata from the HFCS in order to evaluate one part of the monetary policy transmission mechanism, namely wealth effects for households in Austria. Applying an instrumental-variable methodology, we find positive and significant but relatively small wealth effects for households in Austria.

A separate analysis of real and financial wealth yields a considerable difference. Our results point toward a larger sensitivity of household to shocks to their financial wealth whereas changes of real assets seem to have small effects on consumption. Although in line with theory, marginal propensities to consume out of wealth decrease over the wealth distribution, the aggregate impact of changes in consumption behavior increase with wealth (as indicated with the provided elasticities): for households in the upper tail of the wealth distribution, a 1% change of wealth is an amount so much higher than for households in the lower tail that it even counterbalances the different mpc effects on consumption over the wealth distribution. Additionally, households with a higher level of consumption expenditure are on average likely to be those households who are more sensitive to changes of wealth levels.

Future similar studies could concentrate on potential changes of wealth effects over time. For such an exercise, however, a longer time horizon of microdata needs to become available first.

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[17] *This effect can be expected to be stronger among highly indebted households (compared to less-indebted households), too. The results concerning this group of households are not shown here but they are qualitatively the same as when considering mortgage/nonmortgage holders.*

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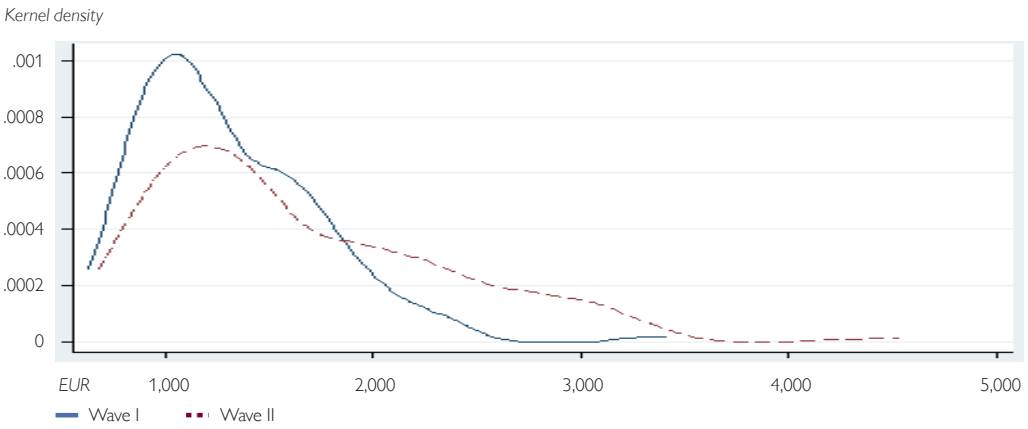
Annex

A Descriptive statistics for the instrument variables

Chart A1

Distribution of average house prices per sqm



Source: WKO 2010 and 2014.

Table A1

Descriptive statistics for instrumental variables

	First wave	Second wave	First and second waves
	Share of households in % of all households		
Inheritance			
Households' main residence	15.2	13.9	14.5
Other inheritances	22.6	28.2	25.4
	Share of households in % of all households		
Paradata: dwelling rating by the interviewer			
Luxury	5.3	2.6	3.9
Upscale	48.2	46.6	47.4
Mid-range	35.3	39.9	37.6
Modest	8.6	9.3	8.9
Low-income	2.6	1.6	2.1
	EUR/sqm		
WKO real estate price level in a political district[1]			
Mean	1,309	1,659	
Median	1,181	1,387	

Source: HFCS Austria 2014 and 2010, OeNB and WKO real estate price data.

[1] *For these estimates we use the unweighted mean and median over the political districts.*

B Instrument test results

In order to test for the validity of the instrumental-variable approach, we perform three different types of tests: the Wooldridge's robust score test of the endogeneity of wealth, a joint significance F-test of the instruments in the first stage and the Wooldridge's robust score test of overidentifying restrictions. To the best of our knowledge, it is still largely unexplored in the literature how these tests should be performed for an instrumental-variable regression model like in equation (1), which takes into account multiply imputed data, household weights and sample design (replicate weights). Our strategy is to perform all tests for each one of the five imputation implicates and for each one of the following versions of the model: (a) unweighted without cluster-robust standard errors,[18] (b) weighted without cluster-robust standard errors, (c) unweighted with cluster-robust standard errors, (d) weighted with cluster-robust standard errors.[19,20] If the test results remain relatively robust across at least a majority of the imputation implicates then they are judged to be representative of the estimated model in equation (1).

Due to space constraints, the results of the instrument tests are reported in table A2 and correspond to

[18] *For the "unweighted without robust standard errors" version of the model we use a Wu-Hausman test for endogeneity and a Sargan's test for overidentifying restrictions instead of the Wooldridge's robust score tests. In addition, when this version of the model uses the specification with real and financial wealth a Stock and Yogo's Wald test is used instead of an F-test to test the joint significance of the instruments in the first stage.*

[19] *For versions (b) to (d) of the model, when the specification with real and financial wealth is used, we cannot test the joint significance of the instruments in the first stage because it is not implemented in the statistical software (Stata). Also, for the same reason, in any specification for version (c) and (d) of the model, it is not possible to perform the Wooldridge's robust score test of overidentifying restrictions.*

[20] *Please note that the versions of the model including cluster-robust standard errors ((c) and (d)) still do not fully take into account the sample design information which is included in the replicate weights. For example, stratification and the finite population correction are ignored.*

Table A2

Instrument tests for imputation implicate 2 (weighted)

	Total consumption recorded			Total consumption calculated		
	(1)	(2)	(3)	(4)	(5)	(6)
	1st stage: F-statistic	Wooldridge's robust score test of endogeneity: chi2-statistic	Wooldridge's robust score test of overidentifying restrictions: chi2-statistic	1st stage: F-statistic	Wooldridge's robust score test of endogeneity: chi2-statistic	Wooldridge's robust score test of overidentifying restrictions: chi2-statistic
Real and financial assets	n.a.	47.90	4.646	n.a.	22.53	6.984
p-value	*n.a.*	*0*	*0.0980*	n.a.	*1.28e-05*	*0.0304*
Gross wealth	5.589	58.23	2.760	5.589	30.76	6.976
p-value	*3.84e-05*	*0*	*0.599*	*3.84e-05*	*2.92e-08*	*0.137*
Net wealth	4.912	57.84	2.954	4.912	30.33	6.935
p-value	*0.000173*	*0*	*0.566*	*0.000173*	*3.65e-08*	*0.139*
Imputation implicate	2	2	2	2	2	2
Weights	×	×	×	×	×	×
Cluster-robust standard errors						
Dummy for wave	×	×	×	×	×	×
Extended set of controls	×	×	×	×	×	×

Source: HFCS Austria 2014 and 2010, OeNB.

*Note: *** p<0.01, ** p<0.05, * p<0.1.*
The real estate price level, information on inheritances and paradata for the quality of a household's main residence are used as an instrument for the real and financial assets. The paradata for the quality of the household's main residence is excluded as an instrument for the gross and net wealth.

only one imputation implicate, but they are representative of the majority of the implicates. Furthermore, the results reported in this table are based on the version of the model with weights but without cluster-robust standard errors (version (2)) because we want to capture as many aspects of the complex survey design as possible without losing the possibility of performing all three tests for at least some of the wealth specifications (net and gross wealth).

The Wooldridge's robust score test of the endogeneity of wealth (see table A2, columns 2 and 5) gives values above 20 for the test statistic, which is F-distributed and significant at the level of 1% for all three specifications of the model and for both consumption measures. We therefore reject the null hypothesis that our instrumented wealth variables are exogenous.[21]

Additionally, to test the validity of instruments, we test for joint significance of the instruments in the first stage of the instrumental variable regression (table A2, columns 1 and 4). This gives values above 4 for the test statistic, which is F-distributed and significant at the level of 1% for all available specifications of the model and for both consumption measures. We conclude that our instruments are relevant/not weak.[22]

Finally, we use the Wooldridge's robust score test for overidentifying restrictions where the null hypothesis is that all instruments are uncorrelated with the estimated residuals table A2, columns 3 and 6). This gives values below 7 for the test statistic, which is *chi2* distributed and not significant at the level of 1% for all three specifications of the model and for both consumption

[21] *This result is obtained in all five imputation implicates for both consumption measures.*

[22] *This result is obtained in all five imputation implicates for both consumption measures.*

measures. We conclude that our instruments are exogenous.[23]

C First-stage results

The above tests for joint significance of the instruments in the first stage suggest that our instruments are not weak. Table A3 sheds further light on the relationship between our instruments and wealth and shows the instruments' coefficients in the first stage of the iv-modelling approach.[24] Concerning the interviewers' ratings of the households' main residences, it can be seen that a bad rating is related to significantly less gross or net wealth than a good rating. Similarly, a higher dwelling rating score (which means a worse rating) is positively related with both financial and real wealth. The two inheritance indicators are only used as instruments for the specification with financial and real assets. The table shows that in this specification the inheritance indicators are positively related to both wealth components. Only the relationship between financial wealth and the indicator whether the household has inherited the main residence or not is not statistically significant. In this case it seems plausible that the relevant instrument in terms of statistical significance is the indicator whether the household has inherited other types of assets (including money). Finally, the average house prices at political district level turn out to be, although positively related with all wealth definitions, *ceteris paribus,* statistically insignificant. This, however, is likely to be true because of the low number of observations due to the limited number of political districts in Austria.

Table A3

First-stage regression for the various wealth indicators

	Net wealth	Gross wealth	Financial assets	Real assets
Real estate price level	72.488	73.215	2.986	64.613
Standard error	*(54.295)*	*(54.486)*	*(4.054)*	*(52.208)*
Dwelling rating (continuous measure)			–33,944.068***	–159,268.355***
Standard error			*(7,939.108)*	*(49,307.221)*
Dummy dwelling rating=upscale	–144,431.277	–156,504.983		
Standard error	*(103,895.382)*	*(103,785.646)*		
Dummy dwelling rating=mid-range	–213,626.675**	–232,140.306**		
Standard error	*(96,613.991)*	*(96,429.351)*		
Dummy dwelling rating=modest	–228,676.393**	–251,152.012**		
Standard error	*(102,554.233)*	*(101,481.427)*		
Dummy dwelling rating=low-income	–267,819.513**	–289,203.010**		
Standard error	*(120,328.691)*	*(120,870.712)*		
Inheritance households main residence			6,339.644	290,499.494***
Standard error			*(6,116.265)*	*(107,576.150)*
Other inheritance			25,526.809***	148,713.833***
Standard error			*(7,176.661)*	*(46,229.992)*
Indicator for the wave	61,128.450*	62,029.937	16,679.558**	50,073.442
Standard error	*(36,854.020)*	*(38,620.015)*	*(8,023.274)*	*(36,625.265)*
Extended set of controls	×	×	×	×

Source: HFCS Austria 2014 and 2010, OeNB.

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
The information from the paradata are only in the first stages of the model including financial and real assets.

[23] *This result is obtained in all five imputation implicates when using the consumption recorded measure and in all five imputation implicates, too, when using the consumption calculated measure for the specifications with gross or net wealth. For the specification with real and financial wealth, the result is obtained in only two out of five imputation implicates when using the consumption calculated measure.*

[24] *To be precise, for simplicity reasons, the estimates shown in table A3 are multiple imputation estimates which are not the ones used in the second stage. For the second stage each one of the five multiple imputation implicates is used separately.*