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Precautionary saving and income uncertainty in Germany - new evidence from microdata

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Abstract:
The saving ratio of households in Germany has increased in the past few years when the income trend was weak. This could be due to precautionary saving. In this paper, the importance of precautionary saving against income uncertainty is analyzed empirically using micro data from the German Socio-Economic Panel Study (GSOEP). Wealth in 2002 is regressed on alternative measures of income uncertainty in a cross-section of households. In addition to the usual controls, risk aversion is also taken into account. When using net financial wealth, precautionary saving is statistically significant and economically quite important. The share of precautionary net financial wealth in total aggregate net financial wealth is on average about 20%. Compared with net financial wealth, housing wealth is not used as a buffer stock against income uncertainty, confirming the hypothesis that this kind of asset is rather illiquid.

Keywords: precautionary saving, precautionary wealth, buffer-stock model

JEL-Classification: D91, E21, J24

Non technical summary

The household saving ratio in Germany has increased in the past few years despite a weak income trend. This has been a recurring cause of debate. In similar periods in the past German households reduced their savings in most cases as a "buffer" to keep up their level of consumption. An increase in the saving ratio was only observed during the first oil crisis in the 1970s. There are several explanations for the recent increase in the household saving ratio: a growing awareness of the need for greater pension provision, the widening spread of incomes and greater caution on account of the difficult situation on the labor market. This paper investigates to what extent the latter hypothesis is valid.

In order to gauge the significance of precautionary saving against income uncertainty I make use of the provision of wealth data in GSOEP for the year 2002. Further, I estimate cross-section regressions of wealth on alternative measures of income risk. I control for risk aversion by employing a risk aversion variable provided in GSOEP. If net financial wealth is chosen as the measure of wealth, there is statistical evidence for precautionary saving, actually on a scale that is economically important too. According to our estimates the share of precautionary wealth in total net financial wealth is, on average, about 20%. Compared with financial wealth, owing to its illiquidity, housing wealth seems not to be used as a buffer against income shocks.

What does the significance of precautionary saving in Germany mean for the recent rise in the household saving ratio? In the steady state of a buffer-stock model there will be no apparent relation between the current saving rate and the uncertainty of income. But until the optimal buffer stock is achieved, the saving rate depends positively on income uncertainty, because households facing higher uncertainty will initially have to depress consumption more in order to build up the larger buffer stock of wealth. Econometric estimates of the German consumption function show persistently high negative residuals since 2002. If this change in savings behavior can be put down to the transition from one steady state to another, it is quite possible that the rise in the saving ratio after 2002 has been driven by precautionary saving under increased income uncertainty.

Nicht technische Zusammenfassung

Die Sparquote der privaten Haushalte in Deutschland ist in den letzten Jahren trotz einer schwachen Einkommensentwicklung angestiegen. Dies hat immer wieder zu Diskussionen geführt. In vergleichbaren Perioden der Vergangenheit senkten die deutschen privaten Haushalte ihre Ersparnis meistens und benutzten sie so als "Puffer", um ihr Konsumniveau aufrechtzuerhalten. Ein Anstieg der Sparquote war nur während der ersten Ölkrise in den siebziger Jahren zu beobachten. Es gibt mehrere Erklärungen für den jüngsten Anstieg der Sparquote der privaten Haushalte: die gestiegene Einsicht in die Notwendigkeit einer stärkeren Altersvorsorge, die zunehmende Spreizung der Einkommen und eine größere Vorsicht wegen der schwierigen Lage auf dem Arbeitsmarkt. In diesem Papier wird die Gültigkeit letzterer Hypothese untersucht.

Um die Bedeutung des Vorsichtssparens zu beurteilen, verwende ich Vermögensdaten des SOEP aus dem Jahr 2002. Ich schätze Querschnittsregressionen des Vermögens auf alternative Maße der Einkommensunsicherheit. Die Risikoaversion wird durch eine Risikoaversionsvariable aus dem SOEP berücksichtigt. Wenn man das Nettogeldvermögen als Maß für das Vermögen wählt, kann Vorsichtssparen statistisch nachgewiesen werden, und zwar in einem Ausmaß, das auch ökonomisch von Bedeutung ist. Der Anteil des Vorsichtsvermögens am gesamten Nettogeldvermögen beträgt nach unseren Schätzungen im Durchschnitt gut 20%. Immobilienvermögen scheint wegen seiner Illiquidität dagegen nicht als Puffer gegen Einkommensschocks verwendet zu werden.

Welcher Zusammenhang besteht nun zwischen dem signifikanten Vorsichtssparen in Deutschland und dem jüngsten Anstieg der Sparquote der privaten Haushalte? Im langfristigen Gleichgewicht eines Pufferbestandsmodells gibt es keine offensichtliche Beziehung zwischen der gegenwärtigen Sparquote und der Einkommensunsicherheit. Aber solange bis der optimale Pufferbestand erreicht ist, hängt die Sparquote positiv von der Einkommensunsicherheit ab. Dies liegt daran, dass Haushalte mit einer höheren Einkommensunsicherheit den Konsum anfangs stärker verringern müssen, um den größeren Pufferbestand an Vermögen aufzubauen. Ökonometrische Schätzungen der deutschen Konsumfunktion weisen seit 2002 anhaltend große negative

Residuen auf. Falls diese Änderung des Sparverhaltens auf den Übergang von einem langfristigen Gleichgewicht zu einem anderen zurückgeführt werden kann, ist es durchaus möglich, dass der Anstieg der Sparquote nach dem Jahr 2002 durch Vorsichtssparen bei erhöhter Einkommensunsicherheit verursacht wurde.

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1 Introduction

The household saving ratio in Germany - but also on an average of all the OECD countries - has increased in the past few years despite a weak income trend. This has been a recurring cause of debate. In similar periods in the past German households reduced their savings in most cases as a "buffer" to keep up their level of consumption. An increase in the saving ratio was only observed during the first oil crisis in the 1970s. There are several explanations for the recent rise in the saving ratio of households in Germany. Firstly, the rise in the household saving ratio can be explained by a growing awareness of the need for greater pension provision. Secondly, the spread of incomes has been widening. Disaggregated figures from the Income and Expenditure Survey (EVS) of the Federal Statistical Office for 2003 clearly show a wide dispersion in the saving ratios for the individual income categories. While households with a below-average income saved very little or even dissaved, the saving ratios of those households with very high earnings were more than 20% above average. Thus the change in the distribution of income, which has been observed for several years, tends to lead to a higher saving ratio at an aggregate level (Kaldor effect). Thirdly, greater caution on account of the difficult situation on the labor market may have played a role (see Deutsche Bundesbank (2005)).

In the following, the validity of the latter explanation is investigated. The literature on precautionary saving provides contradictory views on the importance of precautionary saving *against (uninsurable) income uncertainty*. Theoretical intertemporal models of saving based on simulations indicate potentially high levels of precautionary savings, see for example Skinner (1988), Zeldes (1989) and Caballero (1991). The results of econometric models based on microdata are rather mixed. This can be attributed to the various sources of

[1]Author: Nikolaus Bartzsch; Deutsche Bundesbank; email: nikolaus.bartzsch@bundesbank.de; I would like to thank Holger Bonin, Axel Börsch-Supan, Jörg Breitung, Heinz Herrmann, Elmar Stöß, Karl-Heinz Tödter and Gerhard Ziebarth for their very helpful comments. The author is also grateful to seminar participants at the Deutsche Bundesbank, the Mannheim Research Institute for the Economics of Aging (MEA) and the RWI. Remaining errors are mine. The opinions expressed in this paper do not necessarily reflect the opinions of the Deutsche Bundesbank or its staff.

data and empirical methodologies used as well as country-specific differences. Guiso, Jappelli and Terlizzese (1992) and Lusardi (1997) use a self-reported measure of earnings uncertainty drawn from the 1989 Italian Survey of Household Income and Wealth (SIW). The former find that precautionary savings explain 2% of total accumulation. Using OLS estimates, Lusardi (1997) confirms this result but using instrumental variables she finds that precautionary wealth ranges from 20% to 24% of total wealth. Working with data from the U.S. Consumer Expenditure Survey (CEX) and using occupation dummies as "proxies" for income variance, Skinner (1988) finds no evidence for precautionary savings. By contrast, Carroll and Samwick (1997), Carroll and Samwick (1998) and Kazarosian (1997), who estimate the variance of income using the U.S. Panel Study of Income Dynamics (PSID) or the U.S. National Longitudinal Study (NLS), report that precautionary saving generates a considerable share of wealth. Working with data from the 1984 UK Family Expenditure Survey (FES) and using the variances of labor income levels within occupational groups as proxies for the variance of future income, Dardanoni (1991) finds that more than 60% of saving in his sample is a precaution against future income risk. Murata (2003) uses subjective or self-reported uncertainty measures regarding labor earnings and public pension benefit from the Japanese Panel Survey of Consumers (JPSC). He finds no evidence for precautionary saving against income uncertainty but, rather, a positive relationship between public pension uncertainty and wealth accumulation. Institutional differences may explain the varying importance ascribed to precautionary savings in these countries. For example Engen and Gruber (2001) show that precautionary wealth declines significantly with generous unemployment insurance replacement rates.

For Germany, only recently have a few empirical studies on precautionary household saving been forthcoming: Essig (2005), Schunk (2006), Fuchs-Schündeln and Schündeln (2005) and Fuchs-Schündeln (2006). The first two papers are based on the *SAVE* data set while the latter two papers use GSOEP data. By using three different dependent variables, Essig (2005) finds that the evaluation of the precautionary saving motive is not homogeneous. Within one set of independent variables, the coefficients change when applying each set in the estimation of the three variables: saving rate, relative financial wealth and relative total wealth. Schunk (2006) finds that the importance households report to attaching various saving motives is related to heterogeneity

in the household saving rate at different life stages and to heterogeneity in the saver type, i.e. related to a classification of households based on whether they engage in regular saving plans, or save irregularly. Fuchs-Schündeln and Schündeln (2005) test the theory of precautionary savings and quantify the importance of self-selection into occupations due to differences in risk aversion. Their findings suggest that self-selection of risk-averse individuals into low-risk occupations is economically important and decreases aggregate precautionary wealth holdings significantly. Fuchs-Schündeln (2006) analyzes which life cycle consumption and saving theories can reproduce stylized facts concerning the comparative saving behavior of Eastern and Western Germans. She finds strong evidence in favor of the precautionary savings model.

The fact that there have been only a few empirical studies on precautionary saving in Germany may be due to the incompleteness of German microdata. There are no panels that include wealth data. The Income and Consumption Survey (EVS) provides wealth data; however it consists of repeated cross-sections based on quinquennial surveys. Only a pseudo-panel can be constructed from it, see Börsch-Supan, Reil-Held, Rodepeter, Schnabel and Winter (1999). The German Socio-Economic Panel Study (GSOEP) of the German Institute for Economic Research is an annual panel, but it contains information on wealth data only for the years 1988 and 2002. In order to close the data gap, the Mannheim Research Institute for the Economics of Aging (MEA) has set up the *SAVE* data set. The *SAVE* data offer the possibility of generating some frequently used instruments known from the literature in order to measure the extent of precautionary savings, see Essig (2005). However, the SAVE survey (about 2,000 households) is much smaller than both GSOEP (about 12,000 households) and EVS (about 60,000 households).

In order to gauge the significance of precautionary saving against income uncertainty, I utilize the provision of wealth data in GSOEP for the year 2002. I estimate cross-section regressions of wealth on alternative measures of income risk. The latter are estimated from panel data from the period 1998 to 2002. My approach to testing the theory of precautionary savings is based on the analysis by Fuchs-Schündeln and Schündeln (2005). However, in contrast to this paper, they use *estimated* household wealth in 2000 and only a civil service dummy as a measure of income uncertainty. My paper innovates by employing a risk aversion variable, which was provided in GSOEP for the first time for the year 2004, as an additional regressor. The inclusion of a well measured

risk aversion variable is important as otherwise the estimation of precautionary saving may be biased, but the direction and the size of the bias are not clear.

The remainder of the paper is organized as follows. The next section discusses the empirical strategy based on the buffer-stock model of saving. It also provides information on variable definitions and data. Section 3 discusses the estimation results, while section 4 assesses the share of precautionary wealth in total wealth. Taking up the analysis by Fuchs-Schündeln and Schündeln (2005), section 5 investigates the bias of precautionary wealth when risk aversion is omitted. The final section concludes.

2 Empirical estimation of the model

In subsection 2.1, the structural equation to be estimated is derived from the buffer-stock model of saving. The data used for estimation are described in subsection 2.2.

2.1 Estimation strategy

Carroll and Samwick (1998) examine the buffer-stock model's predictions about the relationship between target wealth and income uncertainty. They find a close to linear relationship between the target wealth-to-income ratio and measures of future income uncertainty ω. This gives a starting point for estimation:

$$\log\left(\frac{W_i}{P_i}\right) = a_0 + a_1\omega_i, \tag{1}$$

where W is assets, P is "permanent labor income" (that is, the income that the household would earn if there were no transitory shocks) and the subscript i denotes household i. Adding $\log(P)$ to both sides of equation (1) and adding an error term ν gives the following *cross-section* regression:

$$\log(W_i) = a_0 + a_1\omega_i + \log(P_i) + \nu_i. \tag{2}$$

A more general specification is

$$\log(W_i) = a_0 + a_1\omega_i + a_2\log(P_i) + a_3^{'}Z_i + \nu_i, \tag{3}$$

where the Z variables are demographic controls that will capture other wealth accumulation motives.

Because the income uncertainty measures are atheoretical measures, we have to account for risk aversion in order to avoid an omitted variable bias.

This is discussed in detail in section 5. Adding a risk aversion variable ξ to equation (3) gives the final specification for the structural cross-section equation to be estimated[2] :

$$\log(W_i) = a_0 + a_1\omega_i + a_2 \log(P_i) + a_3^{'} Z_i + a_4\xi_i + \nu_i. \tag{4}$$

In subsection 3.1, the statistical significance of precautionary saving against future income uncertainty is evaluated by means of the significance of the estimate of a_1. The data used to construct the variables are described in the next subsection. The measures for income uncertainty, ω, and permanent labor income, $\log(P)$, are estimated with household income data from the period 1998 to 2002. Thus, at the level of the individual household, both income uncertainty and permanent income are measured with considerable error. They must be instrumented in order to obtain consistent coefficient estimates. I exclude occupation, education and industry variables from the regression of wealth on uncertainty in order to identify the model. These instruments are described in subsection 2.2. The assumptions underlying this exclusion restriction are, first, that these variables have predictive power for permanent income and uncertainty (instrument relevance) and, second, that they have no predictive power for wealth *beyond* their ability to predict permanent income and uncertainty (instrument exogeneity). Carroll (1997) shows that, in buffer-stock models, the target wealth-to-income ratio is mainly determined by the degree of uncertainty and the coefficient of relative risk aversion. It is comparatively insensitive to other variables which may also differ systematically across the education-occupation-industry groups, such as the income growth rate and the interest rate. This argument attests to the exogeneity of the chosen instruments.

2.2 Data

I use the 100% sample from the German Socio-Economic Panel (GSOEP). The GSOEP is an annual panel survey that started in 1984. The sample contains about 12,000 households and about 22,000 individuals. Appendix A includes

[2]The traditional life cycle model suggests several other variables that might be related to wealth accumulation. These include the expected date of death of the members of the household, the expected pension replacement rate for wages on retirement and the expected income growth rate of the household. GSOEP data do not allow estimation of these variables. Carroll and Samwick (1997) find that none of these variables were systematically significant and none had a substantial impact on the estimated coefficients of their uncertainty variables.

a comparison of saving rates and wealth data in macroeconomic statistics and the main household income surveys in Germany, the Income and Expenditure Survey (EVS) and the GSOEP.

My starting point, the "full sample", consists of the following GSOEP subsamples: sample A "Residents in the FRG" (starting in 1984), sample B "Foreigners in the FRG" (starting in 1984), sample C "German Residents in the GDR" (starting in 1990), sample D "Immigrants" (starting in 1994), sample E "Refreshment" (starting in 1998) and sample F "Innovation" (starting in 2000). The sample is restricted as follows. I drop foreign and migrant households, which is rather arbitrary. I eliminate households where all wealth (W) sub-positions are missing. Since logs are taken of wealth I drop households with wealth smaller than or equal to zero. Households whose main income earner is self-employed are excluded from the sample. Self-employed persons do not have to contribute to the compulsory pension system. Thus, their saving behavior differs significantly from that of the rest of the population. Further, I drop households whose head (that is main income earner) is in education, in military or community service, or is a pensioner. In addition, I exclude households whose main income earner is a trainee or serving an apprenticeship, as well as households whose head is above the age of 55 (in 2002). This avoids possible selection problems that arise once individuals approach the age where they can enter early retirement. Finally, I exclude households that did not participate in each of the GSOEP surveys from 1998 to 2004.[3] This restriction follows from the construction of the variables in equation (4) as described in the next subsection. Further details about the sample restrictions may be found in appendix B.

[3]Therefore subsample F "Innovation" (starting in 2000) is eliminated, which might lead to a selectivity bias in the sample. However, as is shown in the next subsection, the exclusion of subsample F is necessary for the reliable estimation of income variances as measures of income uncertainty. In line with the estimation of permanent income these variances are derived from current and *past* income. The underlying assumption is that households are naive and take their past experience as an estimate of their likely future experience. Including subsample F would reduce the number of income observations from five (1998 to 2002) to three (2000 to 2002) which is too small to estimate variances reliably. Alternatively, the income variances could be calculated for the period 2000 to 2004. Then one would have to assume that households are adept at anticipating their future income.

2.3 Construction of variables

This section describes the construction of the variables and instruments in equation (4). *Summary statistics* of the variables are contained in tables 12, 13, 14, 15, 16, 17 and 18.

In GSOEP, *wealth data* is only available for the years 1988 and 2002. Therefore, I estimate a cross-section regression for the year 2002. Wealth data are provided in the personal assets and liabilities statement. I aggregate them to obtain household wealth. The buffer-stock model assumes that there is only one *perfectly liquid* asset, W. The model's predictions about target wealth concern the *total net worth* held in this single asset. In reality there are, of course, different kinds of assets with different degrees of liquidity. Two measures of wealth that are often used in empirical work are net financial wealth and total net worth. The latter is obtained by adding real estate and business equity to net financial wealth. Owing to the lack of reliable data on business equity, I focus on nonbusiness wealth. I use the following alternative proxies for household wealth (W):

- Net financial wealth or nonhousing, nonbusiness net wealth.[4] It is equal to financial assets minus debt excluding mortgages or housing loans. Financial assets comprise two categories: 1) savings balance, savings bonds, bonds, shares or investment fund shares and 2) life insurance, private pension plan or an account with a building and loan association. Taking logs, this dependent variable is denoted $\log(nhnbnw)$ (nonhousing, nonbusiness net wealth).

- Nonbusiness net wealth. This is equal to net financial wealth plus housing wealth minus mortgages minus building loans.[5] Taking logs, this dependent variable is denoted $\log(nbnw)$ (nonbusiness net wealth).

Applying the method described by Westerheide (2005), wealth data are imputed as follows. In order not to lose too many observations, missing values for wealth sub-positions are replaced with zero. Moreover, only those households are included where at least one wealth sub-position is not missing.

As pointed out by Lusardi (1997), the estimates of precautionary saving are very sensitive to the measure of income uncertainty. In order to evaluate

[4]Business wealth is equal to "other equity". However, in financial accounts other equity is part of financial assets.

[5]Housing wealth consists of property where the owner himself lives and other property.

the robustness of my estimates I use five alternative measures for *income risk* ω which are taken from Carroll and Samwick (1997) and Carroll and Samwick (1998):

- *risk_lvarly*: logarithm of the (unbiased estimator of the) variance of the detrended logarithm of total household non-capital net income,
- *risk_lvary*: logarithm of the (unbiased estimator of the) variance of detrended total household non-capital net income,
- *risk_varly*: (unbiased estimator of the) variance of the detrended logarithm of total household non-capital net income,
- *risk_vary*: (unbiased estimator of the) scaled variance of detrended total household non-capital net income; the scaling factor is 10^{-9}; *risk_vary* is the measure of income uncertainty that has been used in most previous studies of precautionary saving,
- *risk_global*: scaled square difference in detrended total household non-capital net income between 1998 and 2002, divided by four to yield an annual rate. The scaling factor is 10^{-9}. *risk_global* is an overall measure of income uncertainty over the 1998-2002 sample period.

Each of the five measures of income uncertainty is calculated with longitudinal data for the time period 1998 to 2002. Total household non-capital net income of household i in year t, $y_{i,t}$ is defined as household labor income plus household private transfers plus household public transfers plus household social security pensions minus total household taxes. These income data stem from the Cross-National Equivalent File (CNEF), 1980-2003.[6] Total household non-capital net income is detrended in order to adjust for both predictable growth owing to economy-wide income growth (overall aggregate productivity growth) and predictable growth owing to life cycle aging. For details see appendix C.

[6]The Cross-National Equivalent File 1980-2003 contains equivalently defined variables for the Panel Study of Income Dynamics (PSID), the German Socio-Economic Panel (GSOEP), the British Household Panel Study (BHPS), and the Canadian Survey of Labour and Income Dynamics (SLID). The data are designed to allow cross-national researchers not experienced in panel data analysis to access a simplified version of these panels, while providing experienced panel data users with guidelines for formulating equivalent variables across countries. Most importantly, the equivalent file provides a set of constructed variables (for example pre- and post-government income and United States and international household equivalence weights) that are not directly available in the original surveys.

The distribution of the measures of income uncertainty is described in table 14.[7] As shown in subsection 2.1, the quality of the measures depends upon whether they have a linear relationship with the log of the target wealth-to-income ratio. Due to the lack of corresponding simulations for Germany, I assume that such a relationship exists for each of my measures of income uncertainty. There is at least some evidence for *risk_lvary* and *risk_lvarly*. Using U.S. data, Carroll and Samwick (1998) regress the simulated log of the target wealth-to-income ratio on *risk_lvary* and *risk_lvarly*. They find a close to linear relationship for both measures (R^2 value of 0.96 for *risk_lvary* and R^2 value of 0.99 for *risk_lvarly*). An advantage of *risk_lvarly* and *risk_lvary* is that they correspond to elasticities in equation (4) and are therefore easier to interpret than the other measures which are semielasticities.

An estimator *pinc* for *permanent labor income* P is derived from an autoregressive *cross-section* regression with panel data:

$$y_{i,2002} = \alpha_0 + \alpha_1 y_{i,2001} + \alpha_2 y_{i,2000} + \alpha_3 y_{i,1999} + \alpha_4 y_{i,1998} + \alpha_5 Z_i + u_i, \qquad (5)$$

$$pinc_i = \hat{y}_{i,2002}, \qquad (6)$$

where $\hat{y}_{i,2002}$ is the fitted value of $y_{i,2002}$ from the OLS regression (5).[8] That is, permanent income is estimated as a weighted average of past total household non-capital net income conditioned by the household composition Z. The estimation of permanent income by a weighted pattern of past income goes back to Friedman (1963). Conditioning on Z controls for the position in the life-cycle, see Deaton (1992).

The *Z variables* are demographic controls for age, age squared, sex (male = 1) and marital status of the head of the household, the number of adults and number of children in the household and the region where the household lives (Western Germany = 1). The head of the household is defined as the main income earner, that is the person with the highest individual labor earnings.[9] The Z variables mainly control for other wealth accumulation motives like saving for retirement, saving for bequests or saving for children's education.

[7]Since *risk_lvarly* and *risk_varly* refer to the logarithm of income these variance measures are less sensitive to outliers.

[8]Using first differences instead of (income) levels in equation (5) leads to similar estimates of P.

[9]For households with more than one "highest" individual labor earner, a second criterion is applied: the closeness of the relation to the *head of the household according to the GSOEP classification.*

Marital status may be either *married*, *divorced* or *separated*. The categories omitted are *single* and *widowed*.

Measures for risk aversion ξ are provided in GSOEP for the first time for the year 2004. I choose the willingness to take risks in financial matters ($risk\_avers\_fin$) as a measure of risk aversion. It is a discrete variable which can take 11 values (0: fully prepared to take risks, ..., 10: risk averse). Further details about the risk aversion measures in GSOEP are contained in appendix C. As shown there, all of the risk aversion measures are behaviorally relevant and the underlying risk preference is stable.

Education, occupation and industry variables are used as *instruments* for income uncertainty and permanent income in the regression described by equation (4). All of these variables refer to the status of the head of the household in 2002. I use 3 occupations (blue-collar worker, civil servant, and white-collar worker), 5 education levels (college, intermediate/technical schooling, secondary schooling, secondary schooling not completed, and vocational training) and 16 NACE industry sectors (agriculture and forestry, mining and quarrying, manufacturing, electricity and gas, construction, wholesale and retail trade, hotels, transport and communication, financial intermediation, real estate and consulting, public administration and defense, education, health and social work, activities of households, other community activities, and extra-territorial organizations). In addition, education and occupation indicator variables are interacted with age and age^2 to allow for occupation-specific and education-specific age-income and age-uncertainty profiles.

3 Statistical significance of precautionary saving

This section presents GMM estimates for the regressions of wealth on income uncertainty according to equation (4) using the variable and sample specifications in subsection 2.2. Subsection 3.1 deals with net financial wealth. The results for nonbusiness net wealth are discussed in subsection 3.2.

3.1 Net financial wealth

The results for the regressions of (the log of) net financial wealth, $\log(nhnbnw)$, on different measures of income uncertainty are shown in table 2. Test statistics to analyze instrument validity are reported at the bottom of the table.

Instrument exogeneity is examined using the heteroskedasticity-robust test of the overidentifying restrictions given in Hansen (1982). Bound, Jaeger and Baker (1993) draw attention to problems when using instruments that explain little of the variation in the endogenous explanatory variables. To gauge the severity of these problems, I follow their advice and also report the partial R^2 and the F-statistic of the excluded instruments from the first stage estimation. For each of the five regressions, the overidentification test clearly does not reject the specification. The partial R^2s of the excluded instruments in the first-stage regressions are all equal to 0.2313 for (the log of) permanent income and between 0.0594 and 0.0820 for the alternative income uncertainty measures. The smaller values of the partial R^2s of income uncertainty are due to the lack of natural instruments for variances. The p-values for the F-test of joint significance of the instruments are always 0.0000. Thus, my estimates of equation (4) should not suffer from the econometric problems highlighted by Bound, Jaeger and Baker (1993) which can arise when the first-stage regressions perform poorly.

Income uncertainty is the main variable of interest. The sign of the estimated coefficient is positive for all of the alternative income uncertainty measures, which is in line with theory. The statistical significance differs across the variables. While the coefficients on *risk_global*, *risk_varly* and *risk_vary* are significant, those on *risk_lvarly* and *risk_lvary* are not. The latter two coefficients correspond to the elasticity of *nhnbnw* with respect to *risk_varly* or *risk_vary*. Two of the three significant coefficients are significant at the 5% level. The p-values range from 0.011 for *risk_vary* to 0.164 for *risk_lvarly*. The upper bound is not very high. Reducing this to a common denominator, I conclude that the data do not seem to reject the hypothesis of significant precautionary saving against income uncertainty.

The following description of the estimation results for the other regressors is valid for all of the five regressions. Most controls are significant and exhibit the expected signs.[10] The coefficient of permanent income (log(*pinc*)) is positive and highly significant. Households with a main income earner who is married, divorced or separated are significantly less wealthy than those with a single or widowed head of household. Wealth holdings are decreasing both in terms of the number of adults and the number of children in the household. The

[10]By "significant" I mean significant (at least) at the 10% level. I use this upper bound instead of the 5% upper bound because I am working with cross-section data.

latter is consistent with the U-shape of the saving rate over a working life as described in appendix A.1. It might indicate that expenditure for current children's consumption exceeds wealth accumulation for children's education or bequests. Wealth holdings of households living in Western Germany in 2002 are significantly higher than those of households living in Eastern Germany. The coefficient of risk aversion ($risk\_avers\_fin$) is highly significant and negative.[11] As shown by Carroll (1997), this means that the effect of a lower intertemporal elasticity of substitution is stronger than the precautionary saving motive.

3.2 Nonbusiness net wealth

The results for the regressions of nonbusiness net wealth, $\log(nbnw)$, on the alternative measures of income uncertainty are shown in table 3. Test statistics for instrument validity are reported at the bottom of the table. Industry dummies are excluded from the instrument set to obtain reasonable p-values for Hansen's J-statistic.[12] The p-values range from 0.125 to 0.225, i.e. the specification is not rejected by the overidentification test. The p-values for the partial R^2s of the instruments excluded in the first-step regressions are all equal to 0.2053 for permanent income and between 0.0281 and 0.0682 for income uncertainty. The p-values for the F-test of joint significance of the instruments range from 0.0000 to 0.0035.

Again, income uncertainty is the main variable of interest. Nonbusiness net wealth is decreasing in the income uncertainty measures, but this relationship is at best significant for two measures of income uncertainty ($risk\_lvarly$ and $risk\_lvary$). It is important to note the negative sign of the estimated coefficients of income uncertainty. According to theory buffer-stock wealth should increase with income uncertainty. Therefore nonbusiness net wealth, which mainly consists of housing wealth, is not used as a buffer stock against income uncertainty.[13] Nonbusiness net wealth is a rather illiquid asset. It is less useful

[11] In order to take into consideration possible nonlinearities that result from the ordinal measurement of $risk\_avers\_fin$, I experimented with including the square and cube powers of $risk\_avers\_fin$ among the controls. None of these variables are significant and I leave them out of the final specification.

[12] I also performed the analysis using the industry dummies as additional controls. Only mining is significant and none of these variables have a substantial impact on the estimated coefficients on the other controls. Hence, I omit them.

[13] I also performed regressions using (the log of) housing net wealth as a dependent variable. Housing net wealth, which is equal to nonbusiness net wealth minus net financial wealth, is also decreasing in the income uncertainty measures but none of the corresponding

as a safeguard against bad income shocks because of the extra time or money required to turn it into the cash needed to replace income. Thus, nonbusiness net wealth or housing (net) wealth rather serves as retirement savings or mainly has a consumption value (see Engen and Gruber (2001)). However, it should be noted that housing wealth is not necessarily too illiquid to serve as precautionary wealth. Firstly, in some countries like the U.S. it is more liquid than in Germany. U.S. consumers spend more when housing wealth increases, especially when capital gains from home sales and home equity borrowing escalate in tandem with rising home values (see Belsky and Prakken (2004)). Secondly, as Carroll and Samwick (1998) point out, it may be worthwhile to pay the transaction costs required to liquidate illiquid assets in the case of a rare but large shock to income. Indeed, they find highly significant coefficients for their measures of income uncertainty even for total net worth.[14]

The following description of the estimation results for the other regressors is valid for all of the five regressions. As in the case of net financial wealth, the permanent income coefficient is positive and highly significant and households with a main income earner who is married or divorced are significantly less wealthy than those with a head of the household who is single or widowed. The marital status *separated* is not significant anymore. The number of adults in the household is significant in only two regressions. In contrast to the regressions of net financial wealth, the estimated coefficients of *adults* and *children* exhibit a positive sign. This seems plausible, since nonbusiness net wealth largely consists of housing wealth (see table 12). Wealth holdings of households living in Western Germany are again significantly higher than those of households living in Eastern Germany. As for risk aversion, the estimated coefficient is once more highly significant and negative.

4 Quantifying precautionary wealth

Having analysed the statistical significance of precautionary saving in the last section, I now conduct a simulation to approximate the amount of precautionary wealth as a percentage of overall wealth holdings (see Carroll and Samwick

coefficients is significant.

[14] According to the personal assets and liabilities statement provided by the 2002 GSOEP survey total net worth is equal to the sum of nonbusiness net wealth, business net wealth and tangible assets in the form of gold, jewellery, coins and valuable collections.

(1998)).[15] The idea is to compare the actual distribution of wealth with the distribution that would prevail if all households faced the same, small amount of income uncertainty ω^*. Recall equation (4):

$$\log(W_i) = a_0 + a_1\omega_i + a_2 \log(P_i) + a_3^{'} Z_i + a_4\xi_i + \nu_i.$$

Denoting the fitted values and coefficient estimates presented in the preceding section by the hat symbol and using $risk\_*$ as a placeholder for the measures of income uncertainty ω, it follows that

$$\log(W_i) = \widehat{\log(W_i)} + \widehat{\nu_i}, \tag{7}$$

where

$$\widehat{\log(W_i)} = \hat{a}_0 + \hat{a}_1 risk\_*_i + \hat{a}_2 \log(pinc_i) + \hat{a}_3^{'} Z_i + \hat{a}_4 risk\_avers\_fin_i.$$

A new measure of wealth W^* is given by

$$\log(W_i^*) = \log(W_i) - \hat{a}_1(\hat{\omega}_i - \omega^*) \tag{8}$$

which tells us how wealth would change if uncertainty changed from $\hat{\omega}_i$ to ω^*. The values $\hat{\omega}_i$ are predicted by the first-stage regression of $risk\_*_i$ on the instrument set. Were I to use the measured values $risk\_*_i$, I would probably choose a household for which measurement error in uncertainty was large and negative. The value chosen for ω^* is the minimum value of $\hat{\omega}_i$ in the sample. ω^* is not set to zero because the model's coefficient estimates were obtained in a region of the data very far from zero uncertainty, and even models with a good in-sample fit can produce poor out-of-sample forecasts.

My measure for the share of precautionary wealth in total wealth is defined as

$$\frac{\frac{1}{N}\sum_{i=1}^{N} W_i - \frac{1}{N}\sum_{i=1}^{N} W_i^*}{\frac{1}{N}\sum_{i=1}^{N} W_i} * 100\%$$

In order to obtain representative shares of precautionary wealth, the averages in this expression have to be projected. Table 4 shows the projected

[15] A terminological clarification is in order here. As pointed out by Carroll and Kimball (2006), "precautionary saving" and "precautionary savings" should not be confused. "Precautionary saving" is a response of current spending to future risk, while "precautionary savings" at any date is the stock of extra wealth that results from the past flow of precautionary saving. Except for section 1, I use the phrase "precautionary wealth" in place of "precautionary savings".

shares of precautionary wealth in total wealth for the different specifications of wealth and income uncertainty.

The share of precautionary wealth in total net financial wealth ranges between 14.6% and 26.7% and, for most of the income uncertainty variables, is close to the average of 20.6%. Thus, the precautionary net financial wealth of German households is economically important. When interpreting this figure, one has to differentiate between "average" and "marginal" effects. Here, only average effects are reflected, i.e. the accumulation of precautionary (net financial) wealth in the period between the currency reform in Western Germany in 1948 and the survey year 2002 in relation to the corresponding accumulation of aggregate wealth. No indication is given about the "marginal" effect; that is, the importance of precautionary saving at the current economic development before 2002.

The share of precautionary net financial wealth in total net financial wealth (on average 20.6%) is almost equal to the corresponding share (22.1%) obtained by Fuchs-Schündeln and Schündeln (2005). This correspondence is far from self-evident, because they *estimate* wealth and use the *civil servant dummy* as a measure of income uncertainty. For their cross-section regression they pool the three sample years 1998-2000 and also use data for the year 2000 alone. As described in subsection 2.2, the GSOEP provides wealth data only for the years 1988 and 2002. Therefore, they have to estimate household financial wealth from information about interest and dividend income, which can be problematic. In view of the sensitivity of the estimates of precautionary saving to the measure of income uncertainty, their choice of the civil servant dummy could also lead to discrepancies.[16]

As described in section 3, nonbusiness net wealth is not used as a buffer against income uncertainty. Accordingly, the shares of precautionary nonbusiness net wealth in total nonbusiness net wealth listed in table 4 have negative signs. These can be interpreted as "precautionary dissavings" if this phenomenon is at all statistically significant. It means that households with high income uncertainty hold less wealth. The shares range between -11.2% and -39.1% and are on average equal to -22.7%. Thus, in absolute terms, these shares are on average close to those for net financial wealth, but the variance of the former is higher.

[16]To identify my model appropriately, occupation variables must be included in the set of instruments (see subsection 2.1).

5 Bias of precautionary wealth when risk aversion is omitted

As shown in section 3, the estimates of precautionary saving are quite sensitive to the measures of earnings uncertainty. These measures might suffer from the problems of measurement error and self-selection, which may lead to the extent of precautionary saving being calculated incorrectly. Possible measurement errors are taken into account by instrumental variables and the problem of self-selection is allowed for by adding a measure of risk aversion to the set of control variables. In this section I investigate the bias that results for precautionary wealth if one does not control for risk aversion.

The magnitude of precautionary wealth, when risk aversion is omitted, is derived analogously to section 4 but starting from equation (3) instead of equation (4). The results of the GMM regressions can be found in tables 19 and 20.[17] Table 5 reports the corresponding projected shares of precautionary wealth in total wealth. A comparison of these with the figures in table 4, section 4 shows that not controlling for risk aversion leads to an *over*estimation of precautionary wealth.[18] The (weighted) share of precautionary net financial wealth in total net financial wealth is on average about two percentage points higher. Thus, there is a small and positive omitted variable bias.

This contradicts Fuchs-Schündeln and Schündeln (2005) who suggest that, owing to self-selection of risk-averse individuals into the civil service, aggregate precautionary financial wealth holdings decrease significantly when not controlling for risk aversion. They derive their result by estimating a wealth regression of the type presented in equation (3), that is without controlling for risk aversion. They use civil servant status as a measure of income uncertainty

[17] I use the same samples as in section 3 to ensure the comparability of the coefficient estimates.

[18] Accordingly, the estimates for the income uncertainty coefficients are bigger if risk aversion is not controlled for. This is the opposite of what Skinner (1988) would expect, since he argues that only the less risk-averse households would enter risky occupations, because less risk-averse households have a smaller precautionary saving motive. If this were true, the effect would be to bias these coefficients down when risk aversion is not controlled for. The findings in Carroll and Samwick (1997) confirm my conclusion. Instead of a measure of risk aversion they add dummy variables for occupation to the controls. This causes the estimated coefficients on income uncertainty to decline substantially and lose significance. The two occupation groups mainly responsible for this effect are farmers and the self-employed. If the argument put forward by Skinner (1988) about occupation and sample selection was correct, the effect would be to bias these coefficients down when occupation is used as an instrument.

and regress financial wealth on it separately for the Western German sample and the Eastern German sample.[19] In both samples, the estimated coefficient of the civil service dummy exhibits a negative sign and is significant.[20] The coefficient in the West sample is much smaller in absolute terms than the one in the East sample. According to Fuchs-Schündeln and Schündeln (2005), this result suggests a self-selection bias in the West sample that causes precautionary savings to be underestimated.[21] By a procedure similar to that outlined in section 4, they conclude that, without self-selection, almost twice as much precautionary financial wealth (22.1% instead of 12.9%) would be observed in the West sample.

Their reasoning is based on the assertion that "facing the same labour income risk, individuals with higher risk aversion hold strictly more wealth than individuals with lower risk aversion." While this is supported by simulations it does not necessarily apply theoretically and empirically. As mentioned in section 3, Carroll (1997) finds that the overall effect of risk aversion on wealth is theoretically ambiguous. Moreover my estimates of the risk aversion coefficients are significantly negative, in other words wealth decreases in risk aversion. Therefore, unlike Fuchs-Schündeln and Schündeln (2005) I find that not controlling for risk aversion leads to an *over*estimation of precautionary wealth.

6 Conclusion

Regressing wealth on income uncertainty in a cross-section of German households in 2002 yields the following results. The statistical significance of precautionary saving depends on the measure of income uncertainty. For net financial wealth, there is statistical evidence for precautionary saving and it is economically important. The share of precautionary wealth in total net financial wealth is, on average, about 20% (for the sample described in subsection

[19]Here "Eastern" and "Western" refer to the place where households lived *before* reunification and, in particular, where they chose their occupation.

[20]The theoretical prediction for the sign of the civil servant dummy in the presence of precautionary saving is opposite from that of the income uncertainty measures used in section 3 because the civil servant dummy is equal to one if income risk is low.

[21]This conclusion is based on the fact that, after reunification, many individuals in occupations that would typically have the status of civil servant in the Federal Republic of Germany were indeed granted the status of civil servant. For those individuals self-selection should be absent; that is, labor income risk should be independent of risk aversion.

2.2). Not controlling for risk aversion leads to an overestimation of this share of about two percentage points. This result contradicts the findings in Fuchs-Schündeln and Schündeln (2005) which suggest that, owing to self-selection, not controlling for risk aversion results in a significant reduction of aggregate precautionary wealth holdings. If nonbusiness net wealth (net financial wealth plus net housing wealth) is chosen as measure of wealth, precautionary saving is statistically not significant for most of the measures of income uncertainty. Moreover, precautionary saving is negative, which means that this kind of asset is not used as a buffer against income shocks. This is due to the illiquidity of housing wealth.

This brings me back to my starting point, i.e. the contribution made by precautionary saving under income uncertainty to the increase of the saving ratio of households in Germany since 2000. As pointed out in Carroll and Samwick (1997), in the steady state of a buffer-stock model there will be *no* apparent relation between the current saving rate and the uncertainty of income. But until the optimal buffer stock is achieved, the saving rate depends positively on income uncertainty, because the household facing higher uncertainty will initially have to depress consumption more in order to build up the larger buffer stock of wealth. Econometric estimates of the German consumption function show persistently high negative residuals since 2002 (compare Deutsche Bundesbank (2004)), which may indicate a structural break. If this change in savings behavior can be put down to the transition from one steady state to another, it is quite possible that the increase in the saving ratio after 2002 has been driven - at least partly - by precautionary saving under increased income uncertainty.

7 Appendices

A Comparison of GSOEP, EVS and macroeconomic statistics

The main household surveys in Germany, the Income and Expenditure Survey (EVS) and the GSOEP, are compared with macroeconomic statistics with regard to saving rates (subsection A.1) and net financial wealth (subsection A.2). The EVS is the German equivalent of the U.S. Consumer Expenditure Survey (CEX). It consists of repeated cross-sections based on quinquennial surveys conducted by the Federal Statistical Office and spans about 60,000 households. A detailed comparison between EVS and GSOEP can be found in Becker, Frick, Grabka, Hauser, Krause and Wagner (2003).

A.1 Saving rates

For the purpose of comparability, the saving rates calculated with GSOEP are projected from the full sample described at the end of subsection 2.2. They are defined as the sum of financial savings across households divided by the sum of disposable income (including household imputed rental value). The question for my savings measure reads: "Do you usually have an amount of money left over at the end of the month that you can save for larger purchases, emergency expenses or to acquire wealth? If yes, how much?" Repayments of consumer and mortgage loans are not taken into account. The former are excluded because the GSOEP does not contain any information on *net* repayments (repayments of consumer loans minus incurred consumer loans). The latter are excluded since the GSOEP only reports the sum of repayments and interest payments. For further details see Fuchs-Schündeln (2006).

Table 7 contains the saving rates of households according to GSOEP, EVS and national accounts data of the Federal Statistical Office for the period 1992 to 2004. While the national accounts saving rate declined between 1992 and 2000 and has been rising since 2001, the GSOEP saving rate has broadly dropped since 1994. For most years, the national accounts saving rates are higher. The difference between the saving rates is less than 0.5 percentage points between 1996 and 2001. The largest difference is 2.4 percentage points in 2004.

The GSOEP and EVS saving rates both declined between 1993 and 2003 but the latter saving rate is about 2.5 percentage points higher. Tables 6 and 8 show that the differences are bigger for the age specific saving rates.[22] The GSOEP saving rate follows a U-shaped path over one's working life.[23] The increase in the saving rate continues after retirement. If at all, a significant decline can only be observed for households whose head is aged 80 years or over. In contrast to the GSOEP saving rate, the EVS rate rises until middle age, then declines until after retirement only to rise again in later life (70 and over).

A.2 Net financial wealth

Net financial wealth is defined here somewhat differently from subsection 2.2. It is delimited according to the financial accounts of the Deutsche Bundesbank. Tables 10 and 11 report 2002 net financial wealth data for German households according to GSOEP and the financial accounts. The corresponding data from EVS are contained in table 9.[24] Wealth data in GSOEP and EVS are both projected. Net financial wealth is much higher in the financial accounts than in the microdata sets. This can be explained by

- **reporting differences:** Households are averse to reporting or calculating their financial wealth correctly or are unable to do so. For example, the discrepancy between financial accounts and EVS wealth in securities (bonds, shares, other equity and mutual fund shares) is especially large.[25] Another indication of the difficulties in recording financial wealth in microdata surveys is the large (and not plausible) share of households that

[22]The following comparison refers to Germany and does not distinguish between Eastern and Western Germany. The GSOEP and the EVS saving rates are both mainly determined by the respective Western German saving rates.

[23]This is consistent with incorporating precautionary motives into a life cycle model: young people are typically liquidity constrained and face a high cumulative income risk over their life cycle. Thus, they want to build up wealth to buffer consumption against (transitory) income shocks. Tobin (1967) shows that taking into account family composition also leads to a U-shaped saving rate over one's working life.

[24]In EVS, inquiries about household wealth were made at the beginning of 2003.

[25]GSOEP provides only two financial wealth categories: 1) savings balance, savings bonds, bonds, shares or investments and 2) life insurance, private pension plan or an account with a building and loan association.

supposedly possess no financial assets (about 10% in EVS and more than 40% in GSOEP).

- **censoring:** Due to the lack of a sufficient number of "rich" participants, EVS does not take into account households with a monthly net income of more than EUR 18,000. Schüssler, Lang and Buslei (2000) estimate the share of financial wealth not reported due to censoring in EVS financial wealth to be about 10%. This corresponds to an underreporting of about EUR 150 billion in the EVS 2003.

- **differences in definition of financial wealth:** Financial wealth is more comprehensive in the financial accounts than in GSOEP and EVS. The following items are included only in the financial accounts: currency and transferable deposits, certain claims on insurance corporations (for example health insurance plans and private pension funds) as well as claims from company pension commitments. All in all, these items add up to about EUR 950 billion, which explains almost half of the difference between financial wealth in the financial accounts and EVS.

- **difference in sector classification:** Unlike in the microdata sets, non-profit institutions serving households are considered part of households in the financial accounts. At the end of 2002, financial wealth of non-profit institutions serving households amounted to about EUR 150 billion.

B Sample restrictions

Starting from the "full sample" I exclude

- foreign and migrant households, which is rather arbitrary.[26]
- households where all wealth (W) sub-positions are missing. That means at least one component of wealth has to be reported, for example the housing wealth sub-position of nonbusiness net wealth.[27]
- households with wealth smaller than or equal to zero. This is necessary because logs are taken of wealth as the dependent variable. Finding the log is a suitable transformation for smoothing the distribution of wealth and reducing the influence of very wealthy households. In the *full* sample mentioned above, the distribution of wealth (in 2002) is highly skewed at the top end, with the net financial wealth (nonbusiness net wealth) of the median household amounting to only 12% (13%) of the average. At the bottom end of the distribution, 46% (37%) of households have zero or negative net financial wealth (nonbusiness net wealth). The wealth distribution in the *final* sample, that is the sample that results from imposing all of the restrictions on the full sample, is much smoother (see table 12).
- households whose main income earner is in education, engaged in military or community service, or is a pensioner. Further, I also drop households whose main income earner is a trainee or serving an apprenticeship.
- households whose head is above the age of 55 (in 2002). This avoids possible selection problems that arise once individuals approach the age where they can enter early retirement. Using U.S. household data, Carroll (1997) showed that buffer-stock saving behavior can be observed during most of a person's working life until roughly age 50, and behavior that resembles the standard Life Cycle/Permanent Income Hypothesis

[26] Using information drawn from the GSOEP for 1996 to 2003, Bauer and Sinning (2005) show that differences in the saving rate between native and immigrant households can mainly be attributed to differences in observable socioeconomic characteristics rather than differences in saving behavior.

[27] Missing values for wealth sub-positions are replaced with the value zero in order to avoid losing too many observations.

(LC/PIH) only (roughly) for the period between age 50 and retirement. To the best of the author's knowledge there are no corresponding studies for Germany. As described in Carroll and Samwick (1997), a life cycle model, in which the time preference rate is low enough for retirement saving to be important at an early age, predicts a much higher response by wealth holdings to the degree of uncertainty in (permanent) income.[28] Thus, if households in Germany became LC/PIH-savers *before the age of 55* I would overestimate the importance of precautionary saving.

- households whose main income earner is self-employed. Self-employed persons do not have to contribute to the compulsory pension system. As a substitute, they might choose to accumulate retirement savings in private funds. Thus, there is a significant difference in saving behavior between wage and salary earners and civil servants on the one hand and self-employed persons on the other.

- households that did not participate in each of the GSOEP surveys from 1998 to 2004. Equation (4) is a cross section regression that refers to the year 2002. As described above, measures for permanent income, P, and income uncertainty, ω, are estimated with balanced panel data from 1998 to 2002. Risk aversion variables from the 2004 GSOEP survey are used as measures of risk aversion, ξ. Merging these risk aversion variables requires eliminating all of the households which did not participate in each of the years 2002 to 2004.

Table 1 shows the order in which the full sample is narrowed down according to these sample restrictions.[29]

[28] Carroll and Samwick (1997) decompose uncertainty into a variance of shocks to permanent (lifetime) income and a variance of shocks to transitory income.

[29] It should be the noted that the reduction in the sample size depends on the order in which the restrictions are imposed.

C Construction of variables

Detrended total household non-capital net income ($\tilde{\tilde{y}}_t$) is calculated in the following way. To adjust for predictable growth owing to overall aggregate productivity growth, the average income of all households ($i = 1, \ldots, N$) in year t ($t = 1998, \ldots, 2002$) is subtracted from y_t:

$$\tilde{y}_{i,t} = y_{i,t} - \frac{1}{N} \sum_{i=1}^{N} y_{i,t}. \tag{9}$$

To adjust for predictable growth due to life cycle aging, the predicted value $\hat{\tilde{y}}_t$ from a regression in period t of $\tilde{y}_t$ on occupation, education, age (of the head of the household), interaction terms between age and occupation, interaction terms between age and education and household demographic variables is subtracted from $\tilde{y}_t$:

$$\tilde{\tilde{y}}_{i,t} = \tilde{y}_{i,t} - \hat{\tilde{y}}_{i,t}. \tag{10}$$

The logarithm of total household non-capital net income is detrended accordingly.

Measures for risk aversion ξ are provided in GSOEP for the first time for the year 2004.[30] These measures include the following discrete variables which can take 11 values (0: fully prepared to take risks, ..., 10: risk averse)[31]: personal willingness to take risks ($risk\_avers\_pers$), willingness to take risks while driving ($risk\_avers\_driv$), willingness to take risks in financial matters ($risk\_avers\_fin$), willingness to take risks in leisure and sports ($risk\_avers\_leis$), willingness to take risks in occupation ($risk\_avers\_occup$), willingness to take health risks ($risk\_avers\_health$) and willingness to take risks in trusting other people ($risk\_avers\_trust$). $risk\_avers\_fin$ is my measure of ξ in equation (4). The distribution of all of these seven risk variables is described in table 18. Comparing the mean, the median and the 75% percentile, we see that risk aversion is most distinct with regard to financial matters. It is striking that aversion to financial risks is even stronger than aversion to health risks.

Dohmen, Falk, Huffman, Sunde, Schupp and Wagner (2005) show that each of the seven risk aversion measures is behaviorally relevant in the sense that

[30] Each year, the GSOEP individual questionnaire contains special topics such as assets in 1988 (wave 5) and 2002 (wave 19) and risk aversion in 2004 (wave 20).

[31] In the GSOEP scale 0 means "risk averse" and 10 means "fully prepared to take risks". I have reversed this scale so that ascending values indicate increasing risk aversion.

it predicts several risky behaviors across different aspects of life. These behaviors include portfolio choices, participation in sports, occupational choice, smoking, migration, life satisfaction and traffic offenses. This is especially true for $risk\_avers\_pers$ which is the only measure to predict all of the behaviors. The best predictor for investment in stocks is $risk\_avers\_fin$.

The stability of risk preferences is supported by Dohmen, Falk, Huffman and Sunde (2006). Using the above risk measures they find some of the first direct evidence that risk preferences are transmitted from parents to children and that the role of parents on children's preferences is a lasting one. This justifies taking (the above mentioned GSOEP) risk aversion variables for 2004 as measures of risk aversion in 2002.

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Table 1: Sample restrictions

	change in number of households	number of households remaining
$W = \log(nhnbnw)$:		
full sample		11,467
drop foreign and migrant households	-883	10,584
drop households with only missing $nhnbnw$ items	-3,835	6,749
drop households where $nhnbnw \leq 0$	-899	5,850
drop if household head is in education, military or community service, a pensioner, a trainee or serving an apprenticeship	-1,617	4,233
drop if household head is older than 55	-677	3,556
drop if household head is self-employed	-289	3,267
drop if $risk\_avers\_fin$ is not available	-344	2,923
drop if household did not participate in each of the waves 1998 to 2002	-1,448	1,475
drop if $risk\_varly$ or $risk\_lvarly$ cannot be calculated	-3	1,472
$W = log(nbnw)$:		
full sample		11,467
drop foreign and migrant households	-883	10,584
drop households with only missing $nbnw$ items	-2,934	7,650
drop households where $nbnw \leq 0$	-761	6,889
drop if household head is in education, military or community service, a pensioner, a trainee or serving an apprenticeship	-1,993	4,896
drop if household head is older than 55	-809	4,087
drop if household head is self-employed	-353	3,734
drop if $risk\_avers\_fin$ is not available	-400	3,334
drop if household did not participate in each of the waves 1998 to 2002	-1,662	1,672
drop if $risk\_varly$ or $risk\_lvarly$ cannot be calculated	-3	1,669

Table 2: IV regression of net financial wealth

	dependent variable: log($nhnbnw$)				
constant	-8.495***	-11.165***	-11.476***	-11.322***	-8.376***
	(2.367)	(2.384)	(2.434)	(2.388)	(2.356)
risk_global	5.791**				
	(2.547)				
risk_lvarly		0.116			
		(0.083)			
risk_lvary			0.144		
			(0.096)		
risk_varly				2.513*	
				(1.521)	
risk_vary					6.623**
					(2.591)
log(*pinc*)	1.902***	2.186***	1.942***	2.163***	1.872***
	(0.221)	(0.218)	(0.227)	(0.212)	(0.222)
age	-0.037	-0.015	-0.015	-0.025	-0.028
	(0.043)	(0.047)	(0.046)	(0.044)	(0.043)
age squared ($*10^{-1}$)	0.007	0.005	0.005	0.006	0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
sex (1 = male)	-0.077	-0.109	-0.095	-0.074	-0.066
	(0.082)	(0.081)	(0.081)	(0.083)	(0.082)
married	-0.523***	-0.553***	-0.531***	-0.527***	-0.505***
	(0.106)	(0.104)	(0.104)	(0.105)	(0.109)
divorced	-0.543***	-0.551***	-0.564***	-0.537***	-0.563***
	(0.162)	(0.165)	(0.167)	(0.163)	(0.163)
separated	-0.646***	-0.746***	-0.766***	-0.666***	-0.713***
	(0.242)	(0.261)	(0.260)	(0.253)	(0.253)
adults	-0.287***	-0.312***	-0.305***	-0.297***	-0.300***
	(0.054)	(0.058)	(0.056)	(0.054)	(0.054)
children	-0.054	-0.063*	-0.062*	-0.070*	-0.060
	(0.038)	(0.037)	(0.037)	(0.037)	(0.037)
region (1 = West)	0.130*	0.161**	0.153**	0.136*	0.111
	(0.072)	(0.070)	(0.071)	(0.073)	(0.073)
risk_avers_fin	-0.055***	-0.054***	-0.056***	-0.057***	-0.057***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
observations	1,472	1,472	1,472	1,472	1,472
R^2	0.112	0.144	0.144	0.151	0.107
overidentification test (p-value)	0.873	0.664	0.668	0.695	0.890

Notes: Results from GMM regressions. Robust standard errors are reported in parenthesis. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Instruments used for permanent income and the five alternative measures of income uncertainty: education dummies, occupation dummies, industry sector dummies and interaction terms of education and occupation dummies with *age* and *age squared*.

Table 3: IV regression of nonbusiness net wealth

	dependent variable: log(*nbnw*)				
constant	-9.802***	-6.181**	-5.834*	-7.251**	-9.022***
	(3.021)	(3.072)	(3.135)	(3.095)	(2.922)
risk_global	-5.602				
	(4.144)				
risk_lvarly		-0.185*			
		(0.113)			
risk_lvary			-0.224		
			(0.136)		
risk_varly				-1.886	
				(2.085)	
risk_vary					-3.369
					(4.211)
log(*pinc*)	1.903***	1.530***	1.907***	1.655***	1.823***
	(0.290)	(0.289)	(0.285)	(0.276)	(0.283)
age	0.022	-0.018	-0.009	0.016	0.020
	(0.051)	(0.057)	(0.055)	(0.052)	(0.050)
age squared ($*10^{-1}$)	0.001	0.006	0.005	0.002	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
sex (1 = male)	0.078	0.076	0.066	0.068	0.080
	(0.101)	(0.097)	(0.098)	(0.101)	(0.100)
married	-0.361***	-0.329**	-0.361***	-0.372***	-0.367***
	(0.132)	(0.130)	(0.130)	(0.131)	(0.132)
divorced	-0.481***	-0.425**	-0.414**	-0.499***	-0.488***
	(0.186)	(0.190)	(0.192)	(0.186)	(0.183)
separated	-0.448	-0.286	-0.276	-0.456	-0.435
	(0.291)	(0.314)	(0.318)	(0.289)	(0.286)
adults	0.062	0.130*	0.117*	0.082	0.075
	(0.060)	(0.072)	(0.068)	(0.062)	(0.060)
children	0.133***	0.141***	0.142***	0.146***	0.141***
	(0.044)	(0.043)	(0.043)	(0.042)	(0.042)
region (1 = West)	0.505***	0.506***	0.512***	0.503***	0.501***
	(0.088)	(0.087)	(0.088)	(0.090)	(0.092)
risk_avers_fin	-0.058***	-0.057***	-0.057***	-0.054***	-0.055***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
observations	1,669	1,669	1,669	1,669	1,669
R^2	0.184	0.201	0.191	0.209	0.205
overidentification test (p-value)	0.225	0.178	0.189	0.125	0.141

Notes: Results from GMM regressions. Robust standard errors are reported in parenthesis. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Instruments used for permanent income and the five alternative measures of income uncertainty: education dummies, occupation dummies and interaction terms of each of these dummies with *age* and *age squared*.

Table 4: Share of precautionary wealth in total wealth

	(weighted) share of precautionary wealth in %	
	nhnbnw	*nbnw*
risk_global	20.79	-23.32
risk_lvarly	20.35	-24.49
risk_lvary	20.57	-39.08
risk_varly	14.58	-11.24
risk_vary	26.67	-15.57
average	20.59	-22.74

Table 5: Share of precautionary wealth in total wealth when risk aversion is not taken into account

	(weighted) share of precautionary wealth in %	
	nhnbnw	*nbnw*
risk_global	22.10	-22.04
risk_lvarly	22.71	-23.20
risk_lvary	22.18	-38.13
risk_varly	16.02	-10.54
risk_vary	28.30	-14.80
average	22.26	-21.74

Table 6: EVS saving rates according to region and age

	Germany	Western Germany	Eastern Germany
1993			
total	13.1	13.1	12.2
aged 70 and over	8.4	8.3	8.5
aged 65 - 70	7.5	6.9	6.4
aged 55 - 65	12.1	12.0	11.0
aged 45 - 55	15.5	15.7	14.1
aged 35 - 45	15.3	15.5	14.1
aged 25 - 35	13.5	13.7	13.3
aged under 25	6.5	7.6	1.8
1998			
total	11.9	11.9	10.8
aged 70 and over	5.9	6.1	6.7
aged 65 - 70	2.6	2.8	5.7
aged 55 - 65	10.6	10.1	10.3
aged 45 - 55	14.8	15.1	11.6
aged 35 - 45	14.5	14.8	12.7
aged 25 - 35	14.0	13.8	11.5
aged under 25	10.0	8.7	13.9
2003			
total	11.1	11.4	9.4
aged 80 and over	10.2	9.3	16.3
aged 70 - 80	7.6	7.7	7.0
aged 65 - 70	4.8	4.1	8.1
aged 55 - 65	8.7	9.0	6.4
aged 45 - 55	13.7	14.2	11.2
aged 35 - 45	14.2	14.4	13.0
aged 25 - 35	11.2	12.7	2.0
aged under 25	4.8	4.6	5.5

Source: Federal Statistical Office

Notes: (1) The EVS saving rates are defined as the percentage of saving in disposable income including imputed rental value.

(2) The EVS saving rate is a "macro" or "weighted" saving rate, which means it is defined as the sum of savings divided by the sum of disposable income (including imputed rental value).

(3) The EVS saving rates are projected.

Table 7: German saving rates

	National accounts	GSOEP	EVS
1992	12.7	10.3	
1993	12.1	10.5	13.1
1994	11.4	10.6	
1995	11.0	10.4	
1996	10.5	10.2	
1997	10.1	10.0	
1998	10.1	9.6	11.9
1999	9.5	9.8	
2000	9.2	9.2	
2001	9.4	9.1	
2002	9.9	8.6	
2003	10.3	8.5	11.1
2004	10.5	8.1	

Source: Federal Statistical Office and own calculations based on GSOEP

Notes: (1) The saving rates are defined as the percentage of saving in disposable income including imputed rental value.

(2) The GSOEP and EVS saving rates are "macro" or "weighted" saving rates, that is they are defined as the sum of savings divided by the sum of disposable income (including imputed rental value).

(3) The GSOEP and EVS saving rates are projected.

(4) Repayments of consumer and mortgage loans were not taken into account when calculating the GSOEP saving rates. The question for my savings measure reads: "Do you usually have an amount of money left over at the end of the month that you can save for larger purchases, emergency expenses or to acquire wealth? If yes, how much?"

Table 8: GSOEP saving rates according to region and age

	Germany	Western Germany	Eastern Germany
1993			
total	10.5	9.9	14.2
aged 80 and over	11.8	11.8	11.2
aged 70 and over	12.3	12.1	13.3
aged 70 - 80	12.5	12.3	14.2
aged 65 - 70	10.6	10.1	15.3
aged 55 - 65	10.8	10.4	13.5
aged 45 - 55	10.5	9.6	16.3
aged 35 - 45	9.7	8.7	14.5
aged 25 - 35	10.4	10.0	12.5
aged under 25	10.5	10.0	13.2
1998			
total	9.6	9.3	11.2
aged 80 and over	12.8	12.2	16.9
aged 70 and over	12.1	11.5	15.9
aged 70 - 80	11.8	11.1	15.6
aged 65 - 70	12.2	12.1	12.5
aged 55 - 65	10.7	10.3	12.7
aged 45 - 55	8.0	7.5	10.6
aged 35 - 45	8.9	8.7	9.6
aged 25 - 35	8.8	8.7	9.2
aged under 25	8.3	8.3	8.5
2003			
total	8.5	8.4	9.0
aged 80 and over	9.9	9.5	12.2
aged 70 and over	10.8	10.6	12.3
aged 70 - 80	11.2	11.1	12.3
aged 65 - 70	10.0	9.6	12.0
aged 55 - 65	9.6	9.6	10.0
aged 45 - 55	7.4	7.4	8.0
aged 35 - 45	7.5	7.5	7.8
aged 25 - 35	8.2	8.3	8.1
aged under 25	5.0	4.9	5.6

Source: own calculations based on GSOEP

Notes: (1) The GSOEP saving rates are defined as the percentage of saving in disposable income including imputed rental value.

(2) The GSOEP saving rate is a "macro" or "weighted" saving rate, which means it is defined as the sum of savings divided by the sum of disposable income (including imputed rental value).

(3) The GSOEP saving rates are projected.

(4) The question for my savings measure reads: "Do you usually have an amount of money left over at the end of the month that you can save for larger purchases, emergency expenses or to acquire wealth? If yes, how much?" Repayments of consumer and mortgage loans are not taken into account.

Table 9: Net financial wealth of German households in 2003 according to EVS

		total (billion euro)	per household (euro)
1	financial assets	1,529	40,300
2a	consumer loans	53	1,400
2b	mortgage loans	971	25,600
2	liabilities (2a + 2b)	1,024	27,000
3	net financial wealth (1 - 2)	504	13,300

Source: Federal Statistical Office

Table 10: Net financial wealth of German households in 2002 according to GSOEP

		total (billion euro)	per household (euro)
1	financial assets	922	23,580
2a	consumer loans	141	3,606
2b	mortgage loans	672	17,197
2	liabilities (2a + 2b)	813	20,803
3	net financial wealth (1 - 2)	109	2,777

Source: own calculations based on GSOEP

Table 11: Net financial wealth of German households in 2002 according to financial accounts

		total (billion euro)	per household (euro)
1	financial assets	3,690	95,300
2a	consumer loans	204	5,269
2b	mortgage loans	1,002	25,878
2	liabilities (2a + 2b)	1,206	31,147
3	net financial wealth (1 - 2)	2,484	64,153

Source: Federal Statistical Office

Table 12: Financial variables

	number of observations	mean	median	standard deviation
net financial wealth (*nhnbnw*)	1,472	36,880	20,000	51,139
nonbusiness net wealth (*nbnw*)	1,472	133,107	76,325	165,025
estimate of permanent labor income (*pinc*)	1,472	34,793	34,026	12,804
total household non-capital net income	1,472	34,771	33,097	14,451

Note: values are in euro and refer to the year 2002

Table 13: Household composition

variable	sample size	comment
adults	1,472	sample mean is 2.3 adults
age	1,472	sample mean is 41.6 years
children	1,472	number of individuals in the household under age 16, sample mean is 0.7
divorced	1,472	9% of household heads are divorced
married	1,472	68% of household heads are married
region (1 = West)	1,472	70% of households live in Western Germany
separated	1,472	1% of household heads are separated
sex (male = 1)	1,472	71% of household heads are male
single	1,472	21% of household heads are single
widowed	1,472	2% of household heads are widowed

Table 14: Income uncertainty

	risk_global	*risk_lvarly*	*risk_lvary*	*risk_varly*	*risk_vary*
0.01-quantile	3.02e-06	-7.79	12.58	0.0004	0.00029
0.05-quantile	0.000056	-6.57	13.95	0.0014	0.00114
0.10-quantile	0.000179	-6.05	14.57	0.0024	0.00214
0.25-quantile	0.001267	-5.14	15.48	0.0058	0.00528
0.50-quantile	0.005846	-4.25	16.39	0.0142	0.01309
0.75-quantile	0.021512	-3.37	17.29	0.0342	0.03221
0.90-quantile	0.056303	-2.46	17.98	0.0858	0.06416
0.95-quantile	0.101903	-1.99	18.48	0.1361	0.10569
0.99-quantile	0.240501	-0.94	19.20	0.3892	0.21907
mean	0.02	-4.27	16.32	0.04	0.03
standard deviation	0.06	1.40	1.37	0.08	0.06
skewness	9.83	-0.16	-0.32	9.21	9.39
kurtosis	161.99	3.56	3.38	131.50	134.71
number of observations	1,472	1,472	1,472	1,472	1,472

Table 15: Indicator variables for education

education group	sample size	percent of sample
college	1,472	28.0
intermediate/technical schooling	1,472	45.0
secondary schooling	1,472	26.0
secondary schooling not completed	1,472	0.5
vocational training	1,472	74.4

Table 16: Indicator variables for occupation

occupation group	sample size	percent of sample
blue-collar worker	1,472	30.6
civil servant	1,472	9.2
white-collar worker	1,472	56.1

Table 17: Indicator variables for industry

industry group	sample size	percent of sample
agriculture, forestry, fishing	1,472	1.2
mining and quarrying	1,472	0.5
manufacturing	1,472	28.9
electricity, gas and water supply	1,472	1.5
construction	1,472	7.3
wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods	1,472	8.3
hotels and restaurants	1,472	0.8
transport, storage and communication	1,472	5.7
financial intermediation	1,472	5.8
real estate, renting and business activities, consulting	1,472	6.2
public administration and defense, compulsory social security	1,472	12.0
education	1,472	4.6
health and social work	1,472	7.3
activities of households	1,472	2.3
other community, social and personal service activities	1,472	2.2
extra-territorial organizations and bodies	1,472	0.1

Table 18: Risk aversion

	risk_avers_ driv	*risk_avers_ fin*	*risk_avers_ health*	*risk_avers_ leis*	*risk_avers_ occup*	*risk_avers_ pers*	*risk_avers_ trust*
0.01-quantile	0	2	1	1	1	1	1
0.05-quantile	2	3	3	2	2	2	2
0.10-quantile	3	4	3	3	3	3	3
0.25-quantile	4	5	5	4	4	3	5
0.50-quantile	6	7	7	6	5	5	7
0.75-quantile	8	9	8	8	8	7	8
0.90-quantile	10	10	10	9	9	8	10
0.95-quantile	10	10	10	10	10	8	10
0.99-quantile	10	10	10	10	10	10	10
mean	6.16	6.89	6.62	5.90	5.78	5.06	6.42
standard deviation	2.51	2.26	2.35	2.40	2.42	2.04	2.30
skewness	-0.23	-0.31	-0.27	-0.03	0.04	0.25	-0.31
kurtosis	2.38	2.22	2.30	2.34	2.34	2.63	2.47
number of observations	1,472	1,472	1,472	1,472	1,472	1,472	1,472

Table 19: IV regression of net financial wealth when risk aversion is not taken into account

	dependent variable: log(*nhnbnw*)				
constant	-10.116***	-12.965***	-13.350***	-13.192***	-10.092***
	(2.314)	(2.294)	(2.368)	(2.323)	(2.290)
risk_global	6.179**				
	(2.600)				
risk_lvarly		0.131			
		(0.084)			
risk_lvary			0.157		
			(0.098)		
risk_varly				2.716*	
				(1.540)	
risk_vary					6.993***
					(2.647)
log(*pinc*)	2.002***	2.306***	2.043***	2.284***	1.980***
	(0.218)	(0.214)	(0.225)	(0.209)	(0.219)
age	-0.022	0.002	0.001	-0.009	-0.013
	(0.043)	(0.047)	(0.046)	(0.045)	(0.044)
age squared (*10-1)	0.005	0.002	0.002	0.004	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
sex (1 = male)	-0.049	-0.080	-0.064	-0.044	-0.035
	(0.083)	(0.082)	(0.083)	(0.084)	(0.083)
married	-0.566***	-0.596***	-0.575***	-0.574***	-0.549***
	(0.106)	(0.103)	(0.104)	(0.105)	(0.109)
divorced	-0.533***	-0.548***	-0.559***	-0.534***	-0.555***
	(0.164)	(0.168)	(0.169)	(0.165)	(0.165)
separated	-0.631**	-0.745***	-0.760***	-0.657**	-0.706***
	(0.255)	(0.274)	(0.272)	(0.267)	(0.266)
adults	-0.310***	-0.338***	-0.331***	-0.321***	-0.327***
	(0.054)	(0.058)	(0.056)	(0.054)	(0.054)
children	-0.059	-0.068*	-0.068*	-0.076**	-0.067*
	(0.038)	(0.037)	(0.037)	(0.037)	(0.037)
region (1 = West)	0.133*	0.164**	0.156**	0.139*	0.113
	(0.074)	(0.072)	(0.073)	(0.075)	(0.075)
observations	1,472	1,472	1,472	1,472	1,472
R^2	0.087	0.122	0.122	0.130	0.081
overidentification test (p-value)	0.826	0.588	0.584	0.616	0.840

Notes: Results from GMM regressions. Robust standard errors are reported in parenthesis. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Instruments used for permanent income and the five alternative measures of income uncertainty: education dummies, occupation dummies, industry sector dummies and interaction terms of education and occupation dummies with *age* and *age squared*.

Table 20: IV regression of nonbusiness net wealth when risk aversion is not taken into account

	dependent variable: log(*nbnw*)				
constant	-11.472***	-8.021***	-7.647**	-8.991***	-10.693***
	(2.931)	(2.939)	(3.021)	(2.960)	(2.823)
risk_global	-5.274				
	(4.123)				
risk_lvarly		-0.180			
		(0.113)			
risk_lvary			-0.217		
			(0.136)		
risk_varly				-1.769	
				(2.095)	
risk_vary					-3.233
					(4.212)
log(*pinc*)	2.006***	1.652***	2.015***	1.769***	1.929***
	(0.286)	(0.282)	(0.281)	(0.269)	(0.278)
age	0.037	-0.003	0.005	0.030	0.034
	(0.051)	(0.058)	(0.055)	(0.053)	(0.051)
age squared (*10-1)	-0.000	0.004	0.003	0.000	-0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
sex (1 = male)	0.118	0.114	0.105	0.104	0.116
	(0.101)	(0.097)	(0.099)	(0.102)	(0.101)
married	-0.401***	-0.369***	-0.400***	-0.408***	-0.405***
	(0.130)	(0.128)	(0.128)	(0.129)	(0.130)
divorced	-0.479**	-0.422**	-0.412**	-0.495***	-0.484***
	(0.188)	(0.192)	(0.195)	(0.188)	(0.185)
separated	-0.434	-0.278	-0.269	-0.448	-0.425
	(0.302)	(0.326)	(0.331)	(0.299)	(0.297)
adults	0.030	0.096	0.084	0.051	0.043
	(0.060)	(0.071)	(0.067)	(0.061)	(0.059)
children	0.125***	0.132***	0.133***	0.138***	0.133***
	(0.044)	(0.043)	(0.044)	(0.042)	(0.043)
region (1 = West)	0.506***	0.510***	0.515***	0.505***	0.504***
	(0.089)	(0.088)	(0.089)	(0.091)	(0.093)
observations	1,669	1,669	1,669	1,669	1,669
R^2	0.178	0.192	0.183	0.201	0.197
overidentification test (p-value)	0.231	0.189	0.201	0.135	0.151

Notes: Results from GMM regressions. Robust standard errors are reported in parenthesis. *** significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Instruments used for permanent income and the five alternative measures of income uncertainty: education dummies, occupation dummies and interaction terms of each of these dummies with *age* and *age squared*.

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