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Working Paper

Job Security Perceptions and the Saving Behavior of German Households

Ruhr Economic Papers, No. 380

Provided in Cooperation with:

RWI – Leibniz-Institut für Wirtschaftsforschung, Essen

Suggested Citation: Klemm, Marcus (2012) : Job Security Perceptions and the Saving Behavior of German Households, Ruhr Economic Papers, No. 380, ISBN 978-3-86788-435-8, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI), Essen, <https://doi.org/10.4419/86788435>

This Version is available at:

<https://hdl.handle.net/10419/67122>

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RUHR

ECONOMIC PAPERS

Marcus Klemm

Job Security Perceptions and the Saving Behavior of German Households



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#380

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

Technische Universität Dortmund, Department of Economic and Social Sciences
Vogelpothsweg 87, 44227 Dortmund, Germany

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Ruhr Economic Papers #380

Responsible Editor: Christoph M. Schmidt

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ISSN 1864-4872 (online) – ISBN 978-3-86788-435-8

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über:
<http://dnb.d-nb.de> abrufbar.

<http://dx.doi.org/10.4419/86788435>

ISSN 1864-4872 (online)

ISBN 978-3-86788-435-8

Marcus Klemm¹

Job Security Perceptions and the Saving Behavior of German Households

Abstract

This paper investigates the co-movements of job security perceptions and household saving rates using data from the 1992 to 2010 waves of the German Socio-Economic Panel. The empirical analysis reveals that higher job insecurity is generally accompanied by slightly lower saving which suggests that employment and financial insecurity typically go hand-in-hand. When confounding changes in the perception of financial security are controlled for, slight evidence for precautionary saving behavior is found. This behavior is of rather small economic importance and limited to households that are somewhat worried about their financial situation who increase their saving by about 0.3%-points or EUR 100 annually in the light of increased job insecurity. In contrast, no significant change in saving is observed for households that are either very concerned or not at all concerned about their financial situation, i.e., either financially constrained or in possession of a buffer-stock of wealth.

JEL Classification: D12, D91, J65

Keywords: Precautionary saving behavior; job insecurity; unemployment risk

October 2012

¹ German Council of Economic Experts, Ruhr Graduate School in Economics and Ruhr-Universität Bochum. – This paper solely reflects the personal views of the author and not necessarily those of the German Council of Economic Experts. The paper is not an official publication of the German Council of Economic Experts and does not necessarily reflect the views of its members. I thank John P. Haisken-DeNew, Ingo Isphording, Christoph M. Schmidt, Jürgen Schupp, and Johannes Schwarze as well as participants at the 3rd RGS Doctoral Conference in Economics in Bochum, the 6th International Young Scholars SOEP Symposium in Delmenhorst, the 9th International SOEP User Conference in Berlin, the IAB-Workshop “Increasing Labor Market Flexibility – Boon or Bane” in Nuremberg, the 2011 SOLE Meetings in Vancouver, the 2011 EALE Conference in Paphos, and at two doctoral workshops at RWI Essen for very helpful comments and valuable suggestions. Financial support by the RGS Econ is gratefully acknowledged. In addition, I thank the Ruhr-University Research School funded by Germany’s Excellence Initiative for further support [DFG GSC 98/1]. – All correspondence to Marcus Klemm, German Council of Economic Experts, c/o German Federal Statistical Office, Gustav-Stresemann-Ring 11, 65189 Wiesbaden, Germany, E-Mail: marcus.klemm@destatis.de.

1 Introduction

Saving money for the future is among the most central economic decisions private households have to make on an ongoing basis. Therefore, saving behavior has always been a major field of interest in economic research (see, e.g., Kotlikoff 1989, Browning and Lusardi 1996). While the complexity of the saving decision renders the development of only one general theory basically impossible, researchers have always tried to disentangle the importance of certain factors that influence saving behavior. These include a great number of economic, psychological, sociological, and institutional factors. The focus of my paper lies in the realm of the precautionary motive for saving, i.e., the importance of future income or expenditure uncertainty for saving behavior. In particular, this empirical analysis contributes to the existing empirical evidence by focusing on the adaptation of household saving to changes in perceived job insecurity over time.¹

The effect of job insecurity on saving in Germany is of special interest for two reasons: First, in times of increasing job insecurity, it is important to know if or to what extent people adapt their saving and thus their consumption behavior. For instance, the effect of a policy intervention to stimulate private consumption during a recession could be heavily dampened if households use the additional resources not for consumption, but for saving. Second, demographic change puts pressure on the public social security systems in Germany which are funded mainly through employee and employer contributions. A need for complementing private insurance has been addressed concerning old-age provisions and health insurance, but much less so for the risk of unemployment. A fairly generous public unemployment insurance scheme can even crowd out private insurance (Gruber 1998, Engen and Gruber 2001). And a lack of private savings can have very negative financial consequences for households that are hit by a job loss: Keese (2009) shows that unemployment is one of the main triggers of severe over-indebtedness of households in Germany.

Theoretical models and numerical simulations predict that even small amounts of income uncertainty can lead households to increase their savings substantially, which points to the importance of the precautionary motive in explaining individual as well as aggregate savings (e.g., Skinner 1988, Zeldes 1989). Over the last twenty years, researchers have tried to confirm these predictions empirically (see Browning and Lusardi (1996) or Geyer (2011, Appendix B, Table 13) for comprehensive surveys). Today, there exists a sizable number of empirical studies yielding very mixed results ranging from no importance to great importance of the precautionary saving motive.

For Germany, there are a number of recent empirical studies by Fuchs-Schündeln and Schündeln (2005), Essig (2005b), Bartzsch (2008), Fuchs-Schündeln (2008), Schunk (2009), Fossen and Rostam-Afschar (2009), Beznoska and Ochmann (2010), Geyer (2011) and Arent (2012) that address the precautionary saving motive explicitly. This interest is not surprising since “Germany is an interesting country to study household saving behavior since it appears to contradict the familiar textbook version of the life-cycle theory of consumption and saving” (Börsch-Supan and Essig 2003, p. 3). In particular, the generosity of the German public unemployment insurance and social security system might significantly reduce the need for private saving to insure against income uncertainty arising from a possible job loss.

¹Throughout this paper, I focus on the flow of saving, i.e., the amount of money put aside during a time period. Correspondingly, savings are the stock of wealth that has been acquired at a certain time point. The saving rate is period saving divided by the respective period income.

In light of the existing literature, the study at hand can be seen as a replication study that focuses on the particular aspect of adaptation of saving behavior over time. Instead of looking at wealth holdings from a life cycle perspective as in the classical precautionary savings theory, I investigate if and to what extent short-term saving behavior responds to changes in subjectively perceived job insecurity. To this end, I use large-scale individual- and household-level data from the German Socio-Economic Panel (GSOEP) that allow me to study the link between job insecurity and saving behavior in detail. The empirical analysis accounts for the subjective nature of the risk measure, unobserved heterogeneity among households and the saving measure being left-censored at zero. Overall, perceived job insecurity is not strongly and rather negatively related to household saving behavior. A household's financial situation plays an important role in this context. A small positive correlation of job insecurity and saving – as precautionary behavior would imply – is found for households that are somewhat worried about their financial situation: If worried about job security, these households increase their saving rate by about 0.3%-points. In contrast, no significant change in saving is observed for households that are either not at all or very concerned about their financial situation, i.e., either financially constrained or already in possession of a buffer-stock of wealth.

The remainder of this paper is organized as follows: In Section 2, the existing empirical literature is briefly reviewed to highlight the major challenges for the empirical analysis, focusing on the measurement of saving and risk. In Section 3, the empirical strategy and the data are described. The estimation results are presented in Section 4. Section 5 offers some concluding remarks.

2 Empirical background

The choice between consumption and saving is at the very center of all economic decisions made by private households. Browning and Lusardi (1996) list a total of nine possible motives why people save, including the precautionary, the life-cycle, the intertemporal substitution, and the enterprise motives. Browning and Lusardi (1996) stress that not all motives give rise to the same amount of savings by each and every person: Depending upon preferences, income, age, etc. different motives will be of different importance to different people at different times. Disentangling the importance of one single motive is extremely difficult, mainly because they cannot be assumed to be independent of one another. Concerning the study at hand, “it is sometimes difficult to draw a clear-cut distinction between precautionary saving and other motives” (Browning and Lusardi 1996, p. 1821), e.g., savings for retirement could also be used to buffer against pre-retirement shocks.

My analysis focuses on the precautionary motive because it seems to be one of the two most important motives, the other being the life-cycle motive. Börsch-Supan and Essig (2003) report that “Old-age provision” and “Saving as a precaution for unexpected events” are the two most important saving motives for German households.² They find that only 4% of the respondents judge saving as a precaution to be less important but almost 60% judge it to be of great importance. I confirm this result with data from the 2001, 2003, 2005, and 2007 waves of the GSOEP, in which households were asked if they had put aside any money for emergencies. Table 1 reports the respondents' answers.³

²These results stem from the first wave of the German SAVE panel. Essig (2005a) confirms this result with data from the second SAVE wave.

³The numbers are based on the same sample that is used for the econometric analysis later. A less restricted GSOEP sample does not change the results.

While the share of households that possess savings for emergencies has declined continuously from 76% in 2001 to 62% in 2007, the share of households that do not have these savings because of financial reasons has increased from 79% to 91%. This hints at income constraints playing an important role for the explanation of potentially non-existent precautionary saving behavior of many households. Combining these numbers, only about 5% of the households deliberately choose not to have any financial reserves for emergencies, i.e., they report not to possess any savings for emergencies because of reasons other than financial ones.

TABLE 1: Possession of emergency savings
(Share of population in percent)

		2001	2003	2005	2007
Savings for emergencies	Mean	75.4	67.6	65.5	62.2
	Std. deviation	43.0	46.8	47.5	48.5
	Observations	5,717	5,543	5,168	5,156
No savings because of financial reasons	Mean	78.6	86.5	89.5	91.1
	Std. deviation	41.0	34.2	30.7	28.5
	Observations	1,258	1,502	1,466	1,616

Note: Data weighted using cross-sectional weights of the GSOEP.
Source: GSOEP, own calculations

The beginning of empirical studies on the precautionary saving motive is marked by the work of Skinner (1988). Much of the empirical work has focused on the US and the UK. Recently, a number of studies have used data from Germany to study precautionary saving behavior, including Fuchs-Schündeln and Schündeln (2005), Essig (2005b), Bartzsch (2008), Schunk (2009), Fossen and Rostam-Afschar (2009), Beznoska and Ochmann (2010), Geyer (2011) and Arent (2012). The empirical findings so far are widely mixed, ranging from none or only limited (e.g., Skinner 1988, Dynan 1993, Lusardi 1998) to great importance of the precautionary motive (e.g., Carroll and Samwick 1998, Ventura and Eisenhauer 2005). For Germany, findings also vary from a negative correlation between employment or income uncertainty and saving (Essig 2005b, Arent 2012) to uncertainty explaining a significant amount of household savings (Fuchs-Schündeln and Schündeln 2005, Bartzsch 2008, Geyer 2011). Schunk (2009) finds that the importance of the precautionary saving motive increases over the life-cycle and that heterogeneity in household saving behavior is related to heterogeneity in saving motives. The mixed evidence might lead one to the conclusion that “while the precautionary motive is important for some people at some times, it is unlikely to be so for most people” (Browning and Lusardi 1996, p. 1838).

Another explanation for the different empirical findings are the vastly different estimation strategies employed. Kennickell and Lusardi (2006) list eight potential “pitfalls and biases” that can arise when estimating precautionary saving. These include the measurement of wealth and risk, the underlying preferences, possible insurance mechanisms, functional specifications, and the influence of other saving motives. A study that “traces all of the sources of differences in conclusions to sample period, sample selection, functional form, variable definition, demographic controls, econometric technique, stochastic specification, instrument definition, etc.” (Browning and Lusardi 1996, p. 1822) does not exist and very likely never will exist.

The measures that have been used as the dependent variable by empirical researchers can be grouped into three categories: consumption, wealth, and saving. While the choice of modeling consumption, saving or wealth seems to be merely a matter of taste or data availability, there

are distinct issues that relate particularly to each measure besides the issue of potentially large measurement error that is common to all of them. Measures of financial or total wealth are most prominent, and used by, e.g., Lusardi (1997, 1998), Carroll and Samwick (1998), Carroll *et al.* (2003), Kennickell and Lusardi (2006) and Fuchs-Schündeln and Schündeln (2005). The main problem of wealth measures is the determination of the components (which differ in terms of liquidity and accessibility) to include when testing for precautionary savings. Fuchs-Schündeln and Schündeln (2005) find stronger evidence in favor of precautionary savings for measures of financial than for housing wealth, but Carroll *et al.* (2003) find a significant precautionary motive only for broad measures of wealth that include home equity which typically represents the largest component of wealth for most households. The wealth stock is also heavily influenced by past events that are not observable in the data. Past shocks might have simultaneously depleted household wealth and raised income insecurity, which would bias findings against the precautionary motive. Kennickell and Lusardi (2006) use information about desired precautionary wealth from the US Survey of Consumer Finance and find evidence in favor of the precautionary motive but its quantitative importance seems to be limited.

Direct measures of the flow of saving have been employed by Guariglia (2001), Fuchs-Schündeln (2008), Giavazzi and McMahon (2010) and Geyer (2011) who all find a positive effect of income or policy uncertainty on saving. Many of the above mentioned problems of wealth measures also apply to saving measures, e.g., the type of saving to be included or the relevance of past events. The type of saving is especially important when using self-reported information as in these four studies because the respondents cannot be expected to calculate their saving economically correct. And typically, only positive saving values are observed which renders the dependent variable left-censored at zero.

Guariglia (2001), De Lucia and Meacci (2005) and Benito (2006) study the effect of job or income uncertainty on household consumption and find evidence in favor of the precautionary saving motive even for the consumption of basic necessities such as food. This is somewhat surprising since variation in basic consumption goods can be expected to be fairly low. Different income elasticities of different consumption goods pose a problem to the estimation of precautionary behavior. Therefore, Benito (2006) also studies the effect on durables consumption, and finds that purchases of durables are delayed when job insecurity increases. In contrast, Stephens, Jr. (2004) does not find any mitigating effect of prior job loss expectations on consumption declines in case of a realized job loss.

When investigating precautionary saving behavior, the most important explanatory variable is the measure of uncertainty. “The central problem that faces anyone who wishes to determine the role of precautionary saving in this way is to identify some observable and exogenous source of risk that varies significantly across the population” (Browning and Lusardi 1996, p. 1835). Although income is not the only source of uncertainty that people want to insure themselves against, most research has focused on this particular type of risk. Kennickell and Lusardi (2006) see a strong need to move beyond earnings risk when studying precautionary behavior and Kotlikoff (1989) presents evidence that uncertainty concerning labor earnings as well as uncertainty concerning remaining life time and possible health expenditures can explain great amounts of precautionary savings in life-cycle simulation studies (see also Geyer 2011). The importance of expenditure risks, such as health and longevity, should not be underestimated, but they should be much less important for the explanation of saving in Germany than in, e.g., the US because of the German social security system

which provides coverage for these major risks. Therefore, the focus here is on income uncertainty, and in particular on the risk of becoming unemployed because unemployment represents the biggest threat to income for most households. Doi (2004) finds that unemployment risk but not income uncertainty helps to explain the increase of saving rates in Japan in the 1990's. Other examples of studies that focus on the risk of job loss are Lusardi (1998), Carroll *et al.* (2003) for the US, and Guariglia (2001) as well as Benito (2006) for the UK. While the first two studies find significant but quantitatively limited evidence, the latter two find rather strong evidence for precautionary behavior due to job insecurity. For Germany, the empirical evidence is mixed (Essig 2005b, Geyer 2011, Arent 2012).

Perceptions of risk can be asked for directly or approximated with other available data. Several authors use the variance of observed income or consumption processes as risk measures (e.g., Carroll and Samwick 1998, Bartzsch 2008, Geyer 2011). This approach has several shortcomings, the most important being that variation does not necessarily reflect risk (Carroll *et al.* 2003, Geyer 2011). Bonin *et al.* (2007) criticize these measures for their endogeneity which stems from past choices and individual preferences. If risk aversion and prudence are positively correlated, people might at the same time choose less risky jobs and still save substantial amounts which would lead to a false rejection of the theory. Fuchs-Schündeln and Schündeln (2005) provide evidence for the presence of self-selection and a resulting negative bias regarding precautionary wealth. In contrast, Bartzsch (2008) argues that risk averse individuals save less than others.⁴ In addition, a positive effect of the income variance on saving might not be due to precaution, but could well reflect intertemporal substitution.⁵

At first sight, subjective measures are more attractive because they contain private forward-looking information (Guiso *et al.* 1992, Stephens, Jr. 2004). Kotlikoff (1989) concludes that “pinning down empirically the extent of precautionary saving will require new surveys that examine [...] the extent of subjective uncertainties” (p. 30). Guiso *et al.* (1992) were the first to use a subjective measure of income risk. They argue that “given the unobservable nature of households’ perceived uncertainty, there is no alternative as to rely upon direct survey information on the households’ subjective assessment of specific risks” (p. 309). Alessie and Kapteyn (2001) note the great potential of subjective risk measures for the understanding of saving behavior. A big advantage of subjective measures might actually lie in the possibility that respondents do not precisely answer to one isolated specific question, but include other associated aspects in their answers. Curtin (2003) argues that subjective unemployment expectations contain private forward-looking information as well as publicly available information on economic conditions which makes them useful as measures of future income uncertainty. Most importantly, while people are probably not able to estimate the true risk of losing their job precisely, their consumption and saving behavior should nevertheless be based on their expectations. But of course, subjective measures must always be treated with due caution in empirical applications because they, too, are at risk of being endogenous in many settings. In particular, unobservable third factors might simultaneously affect job loss expectations

⁴This result could be due to the fact that the study of Bartzsch (2008) is based on risk aversion regarding financial matters. However, self-selection should be based rather on risk aversion regarding occupational choice.

⁵Assuming a constant relative risk aversion, constant absolute risk aversion or quadratic utility function, prudence, risk aversion and intertemporal substitution are governed by the same parameter. Using the variance of income as a risk measure, one might also attribute the same measure of risk to different households with very different income processes, e.g., one with steadily increasing income, and one with steadily decreasing income.

and saving behavior and induce spurious correlation between these two variables. The potential endogeneity of my risk measure is discussed in more detail in Section 3.2 and addressed in the interpretation of the estimation results in Section 4.

3 Empirical strategy

3.1 Econometric specification

The theory on precautionary saving behavior predicts that higher income or expenditure uncertainty leads to higher saving. The reduced form regression equation typically used to estimate precautionary saving behavior with panel data is specified as follows (e.g., Schunk 2009)

$$SR_{it} = \beta R_{it} + X'_{it}\gamma + \epsilon_{it}. \quad (1)$$

The variable SR_{it} measures the saving rate of household i in year t , the variable R_{it} captures job insecurity, and the vector X_{it} comprises additional explanatory variables, mainly income, household composition and individual socio-economic characteristics. Finally, ϵ_{it} represents an i.i.d. error term.

With the GSOEP saving data, which are described in detail in Section 3.2, it seems reasonable to follow the approach of Giavazzi and McMahon (2010) and use the change, i.e., the first difference of the saving rate as the dependent variable:

$$\Delta SR_{it} = \beta R_{it} + X'_{it}\gamma + \alpha_{it} + \epsilon_{it}. \quad (2)$$

This regression equation is estimated using a linear fixed effects model which splits the error term into a household-specific error α_i and the random error ϵ_{it} . This approach has two major advantages: On the one hand, it purges the data from household-specific time trends in the saving rate which Figure 1 suggests exist; on the other hand, this approach eliminates the problem of the saving data being left-censored at zero (Giavazzi and McMahon 2010). In addition, this approach also deals with the highly right-skewed shape of the saving-rate distribution.

One third of all households report not to be able to put any money aside, i.e., a saving rate of zero. In the baseline regressions, I also use the level of the household saving rate as well as a dummy variable for having a positive saving rate as dependent variables. The respective regression models are a linear fixed effects and a conditional fixed effects logit model that only includes household who switch between a zero and a positive saving rate at least once (Chamberlain 1980).⁶ For the saving rate level regressions, three samples are used: all households, only households that report a positive saving rate at least once and only households with a positive saving rates. Therefore, the importance of the censoring issue become implicitly visible by comparing the estimation results for the different samples. It does not appear to be of major importance.

⁶Given the left-censored nature of the dependent variable, a tobit or a sample-selection model might seem most appropriate. However, these models typically impose strong distributional assumptions on the data, and controlling for unobserved heterogeneity is difficult. But unobservable individual- or household-specific effects are important for saving behavior. Consequently, Hausman specification tests of random- versus fixed-effects models strongly reject the hypothesis that the error term is uncorrelated with the explanatory variables. The results of Fuchs-Schündeln and Schündeln (2005) and Geyer (2011) also suggest that a tobit model would not change any estimation results in a significant way.

3.2 Data

The availability of suited data on individual or household saving behavior and employment dynamics at the same time might be one of the reasons why there has not been very much research on the subject of precautionary saving in Germany until recently. The data used here comes from the German Socio-Economic Panel (GSOEP) (for a detailed description of the dataset, see Wagner *et al.* 2007).⁷ This interdisciplinary panel study has been carried out annually since 1984. Börsch-Supan and Essig (2003) and Basten *et al.* (2012) stress that many aspects of saving decisions can only be understood by using longitudinal data. Browning and Lusardi (1996) suggest a minimum of two business cycles (approximately 15 years) as a sufficient survey period because findings from shorter sample periods could be misleading due to common macro shocks. The saving measure that I use here has been available since 1992, which allows me to construct an unbalanced panel covering 19 years.

While the GSOEP data on employment characteristics and income are numerous and very detailed, data on consumption and saving are not. However, the studies of Fuchs-Schündeln and Schündeln (2005), Bartzsch (2008), Beznoska and Ochmann (2010) as well as Freyland (2005), Bauer and Sinning (2011), Giavazzi and McMahon (2010), Fuchs-Schündeln (2008) and Geyer (2011) show that the GSOEP data can very well be utilized for the analysis of saving behavior. In the study at hand, household saving S_{it} is the self-reported flow amount of monthly household saving as used in the latter five studies mentioned above. Thus, the focus lies on adaptation of saving behavior due to changes in job insecurity in a longitudinal context, and not on the accumulation of wealth in a life-cycle context.

The exact wording of this income screener-type question on household saving reads as follows: “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?” This is a rather simple approach to approximate the true amount of saving per time. Stein (2009) and Freyland (2005) discuss the problems that surround this measure in detail. These include, e.g., measurement error arising from individuals not defining saving in an exhaustive way, the monthly time-frame, or the left-censored nature of the data. Nevertheless, this self-reported measure is well suited for studying precautionary saving behavior for two reasons. First, this measure captures better than others the fraction of total saving that households can adjust rather easily, i.e., the margin of total saving (Giavazzi and McMahon 2010). This margin should respond to respond to unexpected changes in future employment or income risk if households engage in precautionary saving behavior. Second, monthly net income and monthly saving are reported by the households directly one after the other. Therefore, the subjective perception of the fraction of income that is put aside every month should be quite accurate.

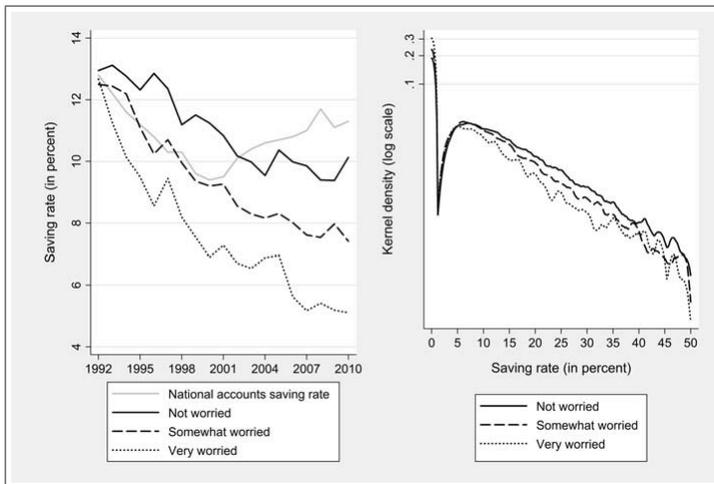
Due to the question design, no negative saving is observed. I attribute a value of 0 to all households that report not to put any money aside.⁸ Comparing the GSOEP saving rate to that from the

⁷The data used in this paper were extracted using the Add-On package PanelWhiz v3.0 (Nov 2010) for Stata. PanelWhiz was written by Prof. Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The PanelWhiz generated do-file to retrieve the GSOEP data used here and any PanelWhiz plugins are available upon request. Any data or computational errors are my own. Haisken-DeNew and Hahn (2010) describe PanelWhiz in detail.

⁸Whenever log transformations are applied to the level of saving, I add 1 EUR to the amount of saving before taking logs (Cameron and Trivedi 2009).

German national accounts, the former is on average about 2%-points lower.⁹ This difference is similar to that reported by Freyland (2005) and Bartzsch (2008), but significantly lower than that reported by Stein (2009). However, it is not the absolute level of saving that matters for the estimation of precautionary saving here, but the relative change from one period to another. The left panel of Figure 1 plots my GSOEP and the national accounts saving rates for the years 1992 to 2010. The course of the saving rates accord reasonably well until the year 2001; the subsequent increase in the national accounts saving rate is not mirrored in my GSOEP data, though.

FIGURE 1: Development and distribution of the household saving rate by worries about job security, 1992 – 2010



Notes: GSOEP sample, see Section 3.3; data weighted using cross-sectional weights of the GSOEP.

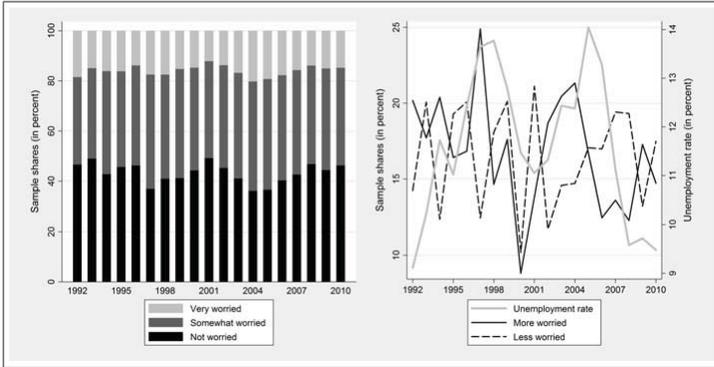
Source: GSOEP, German Bundesbank, own calculations

As discussed in Section 2, subjective measures are best suited for the study of precautionary saving because they contain private forward-looking information. My risk measure R_{it} is identified from information about subjective individual worries about job security available for all waves from 1992 to 2010. The question reads as follows: “What is your attitude toward the following areas – are you concerned about them? [...] Your job security? [the answers being] very concerned, somewhat concerned, not concerned at all.” This information is used to construct indicator variables reflecting whether an individual is either somewhat or very worried about job security, or not at all. The GSOEP also includes another variable concerning job insecurity which I use in a robustness check: A self-reported job loss probability. In the years 1992 to 1994, 1996 and 1998, this question had 4 possible answer categories ranging from “definitely not” to “definitely”. Since 1999, this probability has been asked every two years with 11 answer categories ranging from 0% to 100%. The information on job worries is better suited for my investigation of precautionary saving behavior for three reasons: First, it is available for a longer time period without any gaps. Second, the loss of variability is limited because the answers to the more detailed question on the job loss probability are clustered

⁹According to the German Income and Expenditure Survey, the average household saving rate in Germany was 11.1% in 2003 and 10.5% in 2008. For employees and civil servants only, the saving rate was approximately 12.5% and 13.5%, respectively.

at certain values, in particular at 0% and 50%. Third, the two questions are positioned differently in the questionnaire. The subjective job loss probability is asked in a part on current employment characteristics at the beginning of the survey, whereas the subjective worries about job security are asked in a part on attitudes and opinions toward the end of the survey. Because of this framing and the wording, the former question likely captures a number of foreseeable job terminations that do not necessarily represent a risk to the individual, e.g., voluntary quits or ending temporary contracts. In contrast, the latter question specifically captures the worries that surround the future employment situation of the respondents. Therefore, this question does not only capture the pure likelihood of a job loss, but also its consequences which is important for the interpretation of the variable as an adequate risk measure (Geishecker 2010).¹⁰

FIGURE 2: Development of worries about job security, 1992 – 2010



Notes: GSOEP sample, see Section 3.3. The unemployment rate is the state unemployment rate at the month of an interview. Data weighted using cross-sectional weights of the GSOEP.

Source: GSOEP, Federal Employment Agency, own calculations

In order to check the validity of using the dummy variables for individual job security worries as risk measures in saving rate regressions, three descriptive analyses are carried out: First, Figure 1 shows that while people who worry about losing their job have lower saving rates (left panel), the distribution of the saving rate is not too different for different job security perceptions (right panel). That is, very low as well as very high saving rates are observed for people who worry about losing their job as well as for those without worries. Second, Figure 2 shows that the measure provides a sizable amount of variation over time between (right panel) as well as within (left panel) individuals: Each year, about 30% of the observed individuals are either more or less worried about losing their job than in preceding year. The within-panel standard deviation of the job security measure amounts to more than 80% of the between-panel standard deviation.

Third, Figure 2 also suggests that the subjective job worries are meaningfully related to the corresponding state unemployment rates and thus to true unemployment risk. The relationship of expected and realized job losses is analyzed more closely by regressing realized job losses on socio-economic characteristics and the subjective job loss worries as suggested by Stephens, Jr. (2004). Table 2 reports the results from fixed effects logit regressions for the risk of losing one's job due to

¹⁰In the same section of the questionnaire, respondents are also asked about their worries regarding the development of the overall and their personal economic situation. Therefore, the respondents can be expected to distinguish between job security and their financial situation, and endogeneity should be largely limited.

a dismissal or a company closure. Obviously, the inclusion of the subjective information about job insecurity greatly improves the estimation model: The subjective variables are strongly significant and positive, the Pseudo R-squared almost doubles, and the information criteria greatly improve.¹¹

TABLE 2: Correlates of a future job loss (dismissals and company closures)

<i>Sample years:</i>	Without job loss expectations		Worried about job security		Job loss probability
	(1992 – 2010)	(1999 – 2009)	(1992 – 2010)	(1999 – 2009)	(1999 – 2009)
Worried about job security			0.441*** (0.052)	0.271** (0.118)	
Very worried about job security			1.258*** (0.061)	1.244*** (0.135)	
Job loss probability					0.022*** (0.002)
State unemployment rate	0.029*** (0.010)	0.045** (0.021)	0.018* (0.010)	0.011 (0.022)	0.008 (0.022)
Age	-0.143*** (0.023)	-0.152*** (0.056)	-0.162*** (0.024)	-0.163*** (0.058)	-0.204*** (0.059)
Age squared (/100)	0.185*** (0.029)	0.275*** (0.070)	0.199*** (0.030)	0.268*** (0.072)	0.311*** (0.073)
Bad health	0.411*** (0.146)	0.048 (0.352)	0.337** (0.154)	-0.011 (0.377)	-0.046 (0.375)
Poor health	0.202*** (0.068)	0.149 (0.144)	0.182*** (0.070)	0.111 (0.151)	0.047 (0.153)
Good health	-0.008 (0.047)	-0.023 (0.102)	0.029 (0.048)	0.035 (0.106)	-0.010 (0.106)
Very good health	-0.119 (0.078)	-0.036 (0.178)	-0.064 (0.081)	0.040 (0.186)	-0.023 (0.186)
Married	-0.133* (0.079)	-0.076 (0.168)	-0.099 (0.082)	-0.067 (0.175)	-0.065 (0.178)
Number of children	0.012 (0.036)	-0.004 (0.087)	0.006 (0.037)	0.007 (0.090)	0.055 (0.090)
Tenure	0.102*** (0.005)	0.127*** (0.012)	0.094*** (0.005)	0.114*** (0.013)	0.103*** (0.012)
Trained for occupation	0.309*** (0.055)	0.228* (0.117)	0.303*** (0.057)	0.258** (0.121)	0.176 (0.123)
Temporary work contract	-0.136** (0.063)	0.084 (0.128)	-0.293*** (0.066)	-0.076 (0.133)	-0.326** (0.137)
Pseudo R2	0.05	0.09	0.08	0.14	0.17
AIC	15,902	2,763	14,885	2,560	2,546
BIC	16,357	3,112	15,354	2,920	2,902
Observations	29,083	4,244	28,036	4,099	4,244
Individuals	3,731	1,166	3,654	1,138	1,166

Notes: Table reports coefficients from conditional fixed effects logit regressions. The dependent variable is an indicator variable for losing the job due to a dismissal or a company closure within the subsequent year. Columns (1999 – 2009) only include data from every second wave. All regressions include sector, occupation, company size and federal state dummies. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

The richness of the GSOEP data allows the vector of control variables X_{it} to include a large number of income, household, personal, job, and financial and wealth characteristics in order to control for the most important aspects that influence household saving decisions, and to isolate the pure effect of job insecurity. I use the same income measure as Fuchs-Schündeln and Schündeln (2005), Bauer and Sinning (2011) and Freyland (2005): The self-reported household net monthly income which is reported by the households directly before the saving information. Following Giavazzi and McMahon (2010), the change in monthly household income in real 2010 EUR is used whenever ΔSR_{it} is employed as the dependent variable in the regression analysis.¹² In contrast to many other studies, no measure of permanent income is used because the focus is not on wealth holdings over

¹¹The results also hold for random effects regressions and when a dummy variable for being unemployed in the subsequent year is used as the dependent variable.

¹²Different income specifications (e.g., quadratic terms, income quantile dummies, or splines) were tested, and never affected any estimation results.

the life cycle, but on adaptation of saving behavior due to changes in risk perceptions.¹³

Household composition is known to have a strong influence on consumption and saving behavior (Freyland 2005). Here, the household size, and dummy variables that indicate if the main earner of the household is married, divorced or widowed, has any children, owns a home, or resides in Eastern Germany are included. In addition, two dummies indicating if a partner household relies on one income only or has two or more income sources; the reference group comprises single households. Regarding personal characteristics of the household's main income earner (see Section 3.3), age, age squared and age cubed are included to allow for a different saving behavior at different points in life. I also include dummy variables for the self-rated current health status because health changes can strongly affect current income and expenditures, and thus current saving potential. In addition, I include dummy variables for being a blue collar worker or a civil servant. In robustness checks, I add more job and employment characteristics (e.g., tenure, company size, industry sector, unemployment experience) or dummy variables for panel attrition in the regressions. In all regressions, year dummies are included and interacted with the dummy for Eastern Germany to account for macroeconomic effects and the immediate response and adaptation of saving in Eastern Germany after the large shock of German reunification (Fuchs-Schündeln 2008). Table 3 lists all variables used in the baseline specification of the empirical analysis.

3.3 Sample construction

Since the saving data are only available at the household level but many of the explanatory variables – especially the measure of job insecurity – are recorded for the individual household members, one must attribute the individual characteristics to the respective household. Following the approach of Fuchs-Schündeln and Schündeln (2005), the household data is merged with the characteristics of the main income earner. The main income earner is defined as the person who has the highest net monthly labor income, i.e., higher than that of the partner or any other household member. For those households with two or more main income earners, the person who is the head of the household remains in the sample.¹⁴

The sample is restricted as follows in order to exclude households that have a very different saving behavior, and to make the findings comparable to previous studies. First, measurement error that arises through the utilization of self-reported saving and income measures is reduced: Only households that report reasonable saving rates of less than or equal to 0.5 are included. Households that report unreasonably low income, i.e., less than EUR 500 per month, and those with extremely high income, i.e., more than EUR 15,000 per month, are excluded. The same applies to main earners with a monthly labor income of less than EUR 300 or more than EUR 15,000.¹⁵ Households in which the income share of the main earner exceeds 200% are also excluded.

Job insecurity being the main explanatory variable of interest, all individuals that are unemployed,

¹³Since I only estimate fixed effects regressions, a measure of permanent income cannot be included due to a lack of within-panel variation.

¹⁴In addition, the main income earner has to be the head of the household, her partner or her spouse, and the household questionnaire must have been answered by the head of the household, her partner or her spouse. In the final sample, 75% are the household head, and 25% the partner. Within household changes of the main earner are rare and addressed in a sensitivity analysis. They do not impact on the results.

¹⁵These values are all based on the 1st and 99th percentile of the income distributions but less strict.

apprentices, trainees or interns are disregarded. Focusing on the working population, only households whose main income earner is between the age of 18 and the age of 60 are included. Especially younger households might be relevant for the study of precautionary saving because these households have not yet established a buffer-stock of wealth (Carroll 1997). Retired and older households are left out from the study because the focus lies on the risk of becoming unemployed, which does not exist for retirees.¹⁶

Entrepreneurs are excluded from the sample because they cannot really lose their jobs (compared to employees), do not contribute to the German public unemployment insurance system, and might have very different preferences and saving motives. Hurst *et al.* (2006) and Fossen and Rostam-Afschar (2009) study the saving behavior of entrepreneurs and find that pooling them with other population groups leads to artificially high estimates in favor of precautionary savings. Civil servants represent another occupational group of special interest in Germany because they basically do not face any unemployment risk. Fuchs-Schündeln and Schündeln (2005) use this status in combination with German reunification to study precautionary savings in Germany. They find that risk averse individuals self-select into low risk jobs but still save substantial amounts, which leads to an underestimation of the precautionary saving motive. I still include civil servants because the fixed effects estimations should account for their potentially different risk attitude and they must also be expected to respond to subjectively perceived changes in job security.

After further eliminating a few observations with missing values on one or more of the employed variables, my final sample comprises a total of 89,372 observations of 14,869 households over a maximum of 19 waves from 1992 to 2010. On average, households are observed for 6 years. In the preferred econometric specification that uses the first difference of the saving rate as the dependent variable, the sample comprises 67,565 observations of 11,319 households.

4 Estimation results

Table 3 reports the mean values and standard deviations of the variables included in the regression analysis separately for those households that are not worried about job security, those that are somewhat worried, and those that are very worried. The self-reported probability of a job loss and the state unemployment rate increase with job worries as one would expect, which lends support to the assumption that subjective job worries adequately reflect the job loss risk of the individuals/households. The saving measures turn out to be lower for households that worry about losing their job: The share of households that are able to save is 18%-points lower for those who are very worried compared to those who are not worried; the saving rates are 7.4% and 11.2%, respectively, and the amount of monthly saving is more than EUR 150, i.e., more than 40%, lower for the very worried households. Those who worry also have a significantly lower monthly income.

In sum, these descriptive statistics clearly show that job security and financial well-being typically go hand-in-hand. That is, households in a secure employment situation typically find themselves in a sound financial situation, too. In contrast, households at risk of losing their job typically

¹⁶The age of 60 instead of the official retirement age of 65 is chosen because of the possibility of early retirement. In Germany, retired households save substantial amounts, contradicting the life-cycle permanent income hypothesis (Börsch-Supan and Essig 2003). While this behavior cannot be explained by unemployment risk, it might reflect precautionary behavior with regard to uncertainty surrounding health expenditures and longevity.

TABLE 3: Variable means (standard deviations)
by worries about job security

Variable	Not worried	Somewhat worried	Very worried
State unemployment rate	10.4 (3.9)	11.4 (4.6)	12.3 (4.9)
Job loss probability	9.9 (18.4)	26.6 (22.5)	45.9 (29.8)
Able to save?	0.72 (0.45)	0.65 (0.48)	0.54 (0.50)
Household saving	351 (412)	273 (358)	197 (300)
Household saving rate	11.1 (11.2)	9.3 (10.4)	7.4 (10.0)
Household income	2974 (1394)	2710 (1206)	2424 (1046)
White collar	0.55 (0.50)	0.56 (0.50)	0.43 (0.49)
Blue collar	0.27 (0.44)	0.42 (0.49)	0.56 (0.50)
Civil Servant	0.18 (0.38)	0.02 (0.16)	0.01 (0.11)
Years of education	12.6 (2.8)	12.1 (2.5)	11.6 (2.2)
Unemployment experience	0.33 (1.08)	0.52 (1.39)	0.79 (1.73)
Not worried about finances	0.47 (0.50)	0.10 (0.30)	0.02 (0.15)
Worried about finances	0.45 (0.50)	0.71 (0.45)	0.35 (0.48)
Very worried about finances	0.07 (0.26)	0.19 (0.39)	0.63 (0.48)
Age	41.9 (10.6)	41.3 (9.6)	42.1 (9.8)
Female	0.34 (0.47)	0.31 (0.46)	0.33 (0.47)
German	0.94 (0.24)	0.91 (0.29)	0.88 (0.33)
Health status	2.36 (0.85)	2.49 (0.82)	2.72 (0.91)
Children	0.35 (0.48)	0.40 (0.49)	0.41 (0.49)
Married	0.59 (0.49)	0.62 (0.49)	0.62 (0.49)
Divorced	0.12 (0.32)	0.11 (0.32)	0.14 (0.35)
Widowed	0.02 (0.13)	0.01 (0.12)	0.02 (0.15)
Single household	0.29 (0.46)	0.27 (0.45)	0.27 (0.45)
1-income partner household	0.38 (0.48)	0.38 (0.49)	0.37 (0.48)
2-income partner household	0.33 (0.47)	0.35 (0.48)	0.35 (0.48)
Household size	2.48 (1.27)	2.62 (1.30)	2.64 (1.27)
Homeowner	0.41 (0.49)	0.38 (0.49)	0.32 (0.47)
East Germany	0.11 (0.31)	0.20 (0.40)	0.28 (0.45)
Observations	37,466	35,329	13,770

Note: Pooled data from 1992 – 2010, weighted using cross-sectional weights of the GSOEP.

Source: GSOEP, own calculations

acquire and possess less wealth. This also shows when looking at the subjective perception of the own financial situation: While only 7% of households that are not worried about job security are worried about their financial situation, 63% of those that are very worried about job security are also very worried about their financial situation. Therefore, any empirical analysis that compares saving behavior or wealth holdings between households or individuals likely finds saving or wealth to be negatively related to job insecurity. Concerning household and personal characteristics of the main income earner, no unexpected large differences emerge: Very worried individuals are in slightly worse health and less likely to own a home, but more likely to live in the Eastern part of Germany. The standard deviations also suggest that “common support” for the saving and job security measures is given. That is, the distributions of the saving and the job security measures largely overlap for different socio-economic characteristics.¹⁷

The use of fixed effects estimation models takes care of unobserved differences between households as long as this heterogeneity is time-invariant because the relationship between the explanatory variables and the saving rate is only identified from changes in the variables within households over time. For this estimation approach to deliver meaningful results, enough within-panel variation of the key variables is needed. In addition, endogeneity due to reverse causality or time-varying unobserved heterogeneity is a concern, especially because I use a very subjective indicator as the

¹⁷The “common support” assumption is addressed directly via the estimation of propensity scores in a robustness check.

main explanatory variable. Regarding variation, the discussion in Section 3.2 shows that there is a lot of variation in my job security measure that can be exploited to identify a correlation between saving and job security. The saving measures also offer enough variation over time: For the saving rate, the within-panel standard deviation amounts to 75% of the between-panel standard deviation.

With regards to the exogeneity of the included explanatory variables, reverse causality, i.e., a causal impact of household saving on personal job security concerns, seems to be highly unlikely (Arent 2012). Saving and consumption must be considered the outcome of an economic optimization problem: Given current and expected future income, a household decides how much money to spend and save in a particular year. All of the included explanatory variables are chosen because they represent possibly important determinants of saving behavior that are set before the saving decision is made, in particular the income situation and household composition. Time-varying unobserved heterogeneity is more critical issue for the interpretation of the estimation results. It is possible that unobserved factors not included in the regressions affect saving behavior and job insecurity simultaneously. It is not too obvious which factors this could be. One candidate is a shock to the financial situation of the household which I address in more detail below.

Although the risk of an endogeneity bias should be limited, the estimation results must be primarily seen as descriptive evidence for the link between job insecurity and household saving behavior. The coefficients of the fixed effects regressions must be interpreted as deviations from household-specific saving trends holding the other confounding variables, especially income, constant.

4.1 Baseline estimations

Table 4 reports the results of my baseline regressions for the explanation of changes in the household saving rate over time. The first column shows the results of the preferred specification with the first difference of the saving rate ΔSR_{it} as the dependent variable. The results presented in the second to fourth columns refer to the level of the saving rate SR_{it} ; and the last column presents results from a fixed effects logit regression model for the probability to have a positive saving rate $P(SR_{it} > 0)$. None of the regression coefficients for the job insecurity dummies support the hypothesis of precautionary saving behavior. Instead, current job worries and current saving are rather negatively correlated. That is, households whose perceived job insecurity increases save less. While these negative correlations are not statistically different from zero for ΔSR_{it} , they are statistically significant in the other four specifications. In economic terms, the households that are somewhat or very worried about job security have on average – controlling for income, personal and household characteristics – a 0.3 and 0.5%-points lower saving rate, respectively. The respective deviations from the household-specific trend in the saving rate are only 0.1 and 0.15%-points. Overall, the findings suggest that changes in job security perceptions do not impact much on concurrent saving behavior.

The difference between the results for the change and the level of the saving rate can be attributed to job security-specific time trends in the saving rate as depicted in Figure 1: The higher the job worries, the steeper the decline in saving over time, which speaks against job insecurity motivating precautionary saving. In order to account for these different trends, I stick to the specification with ΔSR_{it} as the dependent variable.

TABLE 4: Saving rate regressions – Baseline results
(Coefficients from fixed effects linear and logit regressions)

Dependent variable:	Δ SR	SR (level)			D(SR > 0)
		All	Ever SR > 0	SR > 0	
<i>Sample households:</i>	<i>All</i>	<i>All</i>	<i>Ever SR > 0</i>	<i>SR > 0</i>	<i>Ever SR \geq 0</i>
Worried about job security	-0.110 (0.107)	-0.262*** (0.083)	-0.274*** (0.088)	-0.347*** (0.099)	-0.025 (0.029)
Very worried about job security	-0.149 (0.146)	-0.497*** (0.114)	-0.544*** (0.123)	-0.476*** (0.147)	-0.142*** (0.040)
Household income ^a	0.066*** (0.007)	5.499*** (0.204)	5.949*** (0.219)	2.449*** (0.261)	2.558*** (0.062)
Blue collar	0.026 (0.163)	0.097 (0.138)	0.106 (0.149)	0.120 (0.178)	-0.051 (0.044)
Civil Servant	-0.340 (0.349)	-0.374 (0.368)	-0.420 (0.378)	-0.236 (0.396)	-0.134 (0.105)
Age	-0.080 (0.264)	0.418 (0.279)	0.399 (0.294)	-0.330 (0.342)	0.261*** (0.074)
Age squared (/100)	0.509 (0.616)	-1.388** (0.674)	-1.366* (0.710)	0.264 (0.822)	-0.668*** (0.182)
Age cubed (/100)	-0.539 (0.472)	1.398*** (0.529)	1.403** (0.557)	0.242 (0.641)	0.567*** (0.145)
Very good health	0.519** (0.204)	0.451*** (0.145)	0.475*** (0.153)	0.323* (0.173)	0.173*** (0.049)
Good health	0.046 (0.105)	0.191** (0.078)	0.204** (0.083)	0.044 (0.095)	0.103*** (0.029)
Poor health	-0.109 (0.149)	-0.040 (0.109)	-0.043 (0.119)	0.055 (0.143)	-0.057 (0.043)
Bad health	-1.019** (0.402)	-0.475* (0.277)	-0.548* (0.309)	0.106 (0.403)	-0.326*** (0.104)
Married	-0.664** (0.273)	0.281 (0.267)	0.316 (0.275)	0.661** (0.308)	-0.059 (0.072)
Divorced	-0.550* (0.331)	-0.450 (0.328)	-0.512 (0.349)	-0.467 (0.419)	-0.215** (0.089)
Widowed	0.320 (0.595)	-0.315 (0.770)	-0.378 (0.826)	1.377 (0.853)	-0.441** (0.173)
1-income partner household	-0.651*** (0.239)	-1.134*** (0.242)	-1.226*** (0.256)	-0.813*** (0.296)	-0.434*** (0.067)
2-income partner household	-0.013 (0.238)	-0.866*** (0.252)	-0.985*** (0.267)	-0.571* (0.307)	-0.392*** (0.069)
Household size	-0.172** (0.076)	-1.472*** (0.096)	-1.570*** (0.103)	-1.429*** (0.118)	-0.320*** (0.026)
Children	-0.020 (0.128)	0.380** (0.148)	0.454*** (0.156)	0.219 (0.177)	0.194*** (0.046)
Homeowner	-1.070*** (0.169)	-2.919*** (0.196)	-2.991*** (0.203)	-2.387*** (0.223)	-0.654*** (0.049)
Within R2 / Pseudo R2	0.007	0.064	0.067	0.076	0.064
Model p-value	0.000	0.000	0.000	0.000	0.000
Observations	67,373	88,178	81,401	59,076	53,808
Households	11,266	13,900	11,718	11,508	6,221

^a Column 1: Δ Household income (/100); Columns 2 – 5: Log household income
Notes: Table reports coefficients from linear fixed effects and conditional fixed effects logit regressions, std. errors in parentheses are adjusted for clustering on households (except for the logit regression). The dependent variable is either the change in the self-reported household saving rate (in %-points), the level of the saving rate (in %-points), or a dummy variable that indicates a positive saving rate. All regressions additionally include year dummies, a dummy for Eastern Germany and their interactions. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

As mentioned above, this preferred specification also accounts for the left-censoring issue of the saving variable (Giavazzi and McMahon 2010). When the level of the saving rate is used, the results for the different samples show the possible importance of the censoring issue, especially with regard to income: For the samples of all households (including those with zero saving) and of those households that report a positive saving rate at least once, the correlation between income and the saving rate is much stronger than for the sample of only households with a positive saving rate. The conditional fixed effects logit model strengthens the importance of the censoring issue concerning household income, but much less so concerning job worries. Since the coefficients of the job insecurity dummies do not differ significantly across the three samples of the saving rate level regressions, I conclude that my job security-specific results are largely immune to a censoring problem, especially in the specification in spirit of Giavazzi and McMahon (2010).

Current household income is of course by far the most important determinant of saving. Concerning the other confounding variables, the estimation results accord well with economic theory and plain intuition: Occupational changes are not significantly related to household saving, but the respective coefficients are only identified from a rather low number of observations. A significant age pattern emerges for the saving rate level regressions, but not for the ΔSR_{it} -specification. A better health status, which implies a better economic standing as well as less health-related expenditures, is related to higher saving. Not surprisingly, saving behavior is significantly related to changes in the family status or household composition. Buying an own house is associated with a much lower reported saving rate.¹⁸

While each of the included covariates potentially represents an important saving determinant in its own right, their main purpose here is to control for possible confounding effects concerning the relationship of job security perceptions and saving behavior. Therefore, the corresponding estimation results are not discussed in the following analyses. But since subjective data must be used with due caution in applied microeconomic research, a number of robustness checks are carried out to test the sensitivity of the baseline estimation results with regard to the most important underlying assumptions.

The first robustness checks are concerned with the dependent and, in particular, the job insecurity variables. When the amount, and not the rate of monthly saving is used as the dependent variable, either in first differences or in logarithms, the results remain unchanged (see Table A in the Appendix): Job insecurity perceptions are negatively correlated with saving. In the case of first differences, the correlations are insignificant in statistical as well as economic terms; in the case of saving levels, the correlations are partly statistically significant and non-negligible in terms of size: Being very worried about job security is related to an up to 13% or EUR 40 lower monthly saving amount. No signs of precautionary behavior emerge. Since using the amount instead of the rate of saving as the dependent variable implies a different functional relationship between income and saving, one can also be reassured that the precise modeling of this relationship does not affect the estimation results for job insecurity.¹⁹

¹⁸This relationship is very likely due to mortgage payments that are not included in the reported saving amount by the households (Freyland 2005).

¹⁹Table B in the Appendix shows estimation results for the sample split by household income quintiles. Almost all correlations are not statistically different from zero. The largest positive correlations are found in the fifth and third quintiles, the largest negative correlations in the second and fourth quintiles. That is, no evidence emerges for a dependence of the relationship between job security and saving on household income.

When changes in the worries about job security are used as risk measures, i.e., indicator variables for being more or less worried than in the year before, the results remain robust, too. The same applies to the use of the self-rated job loss probability on a scale from 0% to 100%, as can be seen from Table 5. The significant coefficients for being more or less worried speak very strongly against precautionary behavior by suggesting that an increase (decrease) in job worries is accompanied by a negative (positive) deviation from trend saving of approximately 0.25%-points. The stronger correlations for the dummy variables indicating changes in job worries also suggest that the deviation from the household-specific saving trend is stronger in the short than in the long run. There is also no evidence for precautionary behavior when the subjective job loss probability is used. As this variable is available every second year from 1999 to 2009, the regressions using the other risk measures are also run for this time frame, yielding very similar results which suggest that the findings are not overly sensitive to the choice of the time period.

TABLE 5: Saving rate regressions – Different risk measures
(Coefficients from linear fixed effects regressions)

Dependent variable:	Δ Household saving rate				
	Sample years:	1992 – 2010	1999 – 2009	1992 – 2010	1999 – 2009
Worried about job security	-0.116 (0.107)	-0.104 (0.181)	-	-	-
Very worried about job security	-0.154 (0.146)	-0.385 (0.252)	-	-	-
More worried	-	-	-0.242** (0.111)	-0.407** (0.178)	-
Less worried	-	-	0.267** (0.112)	0.155 (0.178)	-
Job loss probability	-	-	-	-	-0.005 (0.003)
Within R2	0.007	0.007	0.007	0.007	0.007
Model p-value	0.000	0.000	0.000	0.000	0.000
Observations	67,565	25,390	66,356	24,965	25,390
Households	11,319	8,897	11,266	8,832	8,897

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). Regressions in columns 1999 – 2009 only include data from every second wave. All regressions include the same control variables as the regressions in Table 4. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

Further robustness checks are concerned with particular sample restrictions and variable specifications are reported in the Appendix, Table C. In all cases, the correlation between job worries and saving is negative and slightly stronger than in the baseline regressions, but still insignificant in most cases. This applies to (1) changing the panel dimension from the household to the individual level, (2) the exclusion all households whose main earner changes, (3) the inclusion of dummy variables which indicate if a household is observed in the preceding or following year, (4) a “common support” sample that only includes households that have a reasonable estimated propensity to be in any of the three job worry categories²⁰, (5) the exclusion of large income changes of more than EUR 1,000 (top and bottom percentile of the income changes distribution), (6) the inclusion of important job characteristics (e.g., tenure, required training, industry sector, company size), (7) the exclusion of civil servants, and (8) the inclusion of household asset income in the last year as a proxy variable for the wealth situation of the household. Clearly, the estimation results negate the existence of

²⁰The propensity for being not, somewhat or very worried about job security is estimated using an ordered probit model with the same explanatory variables as in the saving regressions. The households in the “common support” sample have predicted propensities between 20% and 60%, 30% and 50% and 4% and 40%, respectively. Appendix Figure A plots the corresponding propensity scores.

precautionary saving behavior, households do not raise but rather lower their concurrent saving when perceived job insecurity increases. While the descriptive evidence for a negative correlation of job worries and saving is strong and robust, an interpretation of this correlation as a purely causal relationship is less convincing.

4.2 Accounting for changes in the financial situation

The major concern one might have when a subjective measure of job insecurity is used in a regression analysis, is time-varying unobserved heterogeneity which could render any observed correlation between job insecurity and household saving spurious. The information about job worries stems from a section in the household questionnaire of the GSOEP that asks a battery of questions related to different worries a household might have. Since 1992, households have been asked each year about their worries regarding their own financial situation, the overall economic development, the ecological environment and world peace.²¹

One can presume a strong negative relationship between worries about the own financial situation and saving because households that are unable to save are likely concerned about their wealth situation (see Table 3). In contrast, worries about the economy, the environment or peace can confidently be regarded as unrelated to the personal saving behavior. This allows me to test whether some unobserved shock affects the correlation between job insecurity and saving simply via the reporting behavior of the individual. If reporting behavior was generally distorted by an unobserved event that is also related to lower saving, a negative correlation with saving should be found particularly for the global questions. But the results in Table 6 strongly suggest that a common reporting bias can be ruled out. The correlations between the macroeconomic worries and saving are mostly insignificant; in the case of large environmental worries, even a significantly positive relationship shows. In addition, the correlations of these worries with the job insecurity or financial worries are rather low (see lower part of Table 6).

In contrast, the correlation between job insecurity and financial worries is not negligible. Hence, while a reporting bias is unlikely, the documented small negative correlation between job insecurity and saving might well be affected by simultaneous changes in the financial situation of the household. Table 6 shows a strong negative correlation (statistically and economically) between financial worries and household saving, which must be attributed to reverse causality of low saving leading to financial worries.²²

In order to control for changes in a household's financial situation, I add the corresponding subjective worries as explanatory variables to the baseline specification from Table 4. Of course, this approach can only be seen as an experiment because including the worries about the financial situation creates an endogeneity problem.²³ The results in the last column of Table 7 suggest that financial constraints are indeed one main reason why no evidence for precautionary saving behavior due to job security perceptions is found: When controlling for financial worries, negative job security perceptions are positively related to saving. However, the correlations are small and not

²¹There are even more topics, e.g., crime or migration, but these have not been asked in all waves.

²²Precautionary behavior would imply that people who worry about their financial situation save more in order to increase their wealth holdings. However, the reverse relationship appears to be much stronger.

²³The decision to include financial worries in the regression can be seen as a trade-off between either a possible omitted variable or a possible reverse causality bias.

TABLE 6: Saving rate regressions – Worried about different life areas
(Coefficients from linear fixed effects regressions)

	Own job security	Own financial situation	State of the economy	Ecological environment	World peace
Somewhat worried about ...	-0.116 (0.107)	-0.993*** (0.129)	0.068 (0.181)	0.170 (0.144)	-0.150 (0.134)
Very worried about ...	-0.154 (0.146)	-1.320*** (0.165)	-0.106 (0.199)	0.365** (0.174)	0.027 (0.154)
Within R2	0.007	0.009	0.007	0.007	0.007
Model p-value	0.000	0.000	0.000	0.000	0.000
Observations	67,565	67,565	67,528	67,502	67,479
Households	11,319	11,319	11,317	11,316	11,315
<i>Spearman's rank correlation coefficients between worries (in levels)</i>					
Job security	1.00	0.52	0.25	0.16	0.06
Financial situation	0.52	1.00	0.37	0.19	0.10
<i>Spearman's rank correlation coefficients between worries (in first differences)</i>					
Job security	1.00	0.25	0.13	0.07	0.05
Financial situation	0.25	1.00	0.26	0.08	0.08

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. "Somewhat worried" and "Very worried" refer to the column headlines. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

statistically different from zero.

A different and less critical approach to account for the financial situation of the households is to split the sample according to their financial worries. That is, the baseline specification is estimated separately for households who are either not at all or somewhat or very worried about their own financial situation. This approach is much less prone to endogeneity problems because households whose perception of financial security changes do not contribute to the identification of the coefficients of the job security variables in each of the three fixed effects regressions. The estimation results show the correlation of perceived job insecurity and saving behavior conditional on financial worries.

The corresponding estimation results are presented in Table 7. For those households that are not or very worried about their financial situation, no significant correlations are found: Being somewhat concerned about job security is related to a small decrease in saving, being very concerned to an even smaller increase in saving. In contrast, the change in saving of those households that are somewhat worried about their financial situation is approximately 0.3%-points higher when these households worry about losing their jobs. Statistically, the correlation is only significantly different from zero in case of being somewhat worried, at the 5%-significance level. Economically, the relationship is small, but not negligible: The deviation from the household-specific trend in saving of 0.3%-points translates into a higher annual saving of approximately EUR 100.

The results for the different samples suggest that the link between job insecurity and saving behavior is subject to a considerable degree of heterogeneity related to the wealth situation of the households. In essence, three groups of household must be distinguished: For the first group, job and financial insecurity go hand-in-hand. These households are financially constrained and unable to raise their saving. The second group is in a financially sound situation and thus does not need to adjust saving behavior, e.g., because they have already established a large enough buffer-stock of wealth (Carroll 1997). The third group is somewhere in-between. For these households, changes

TABLE 7: Saving rate regressions – By worries about financial situation
(Coefficients from linear fixed effects regressions)

	Own financial situation			All households
	Not worried	Somewhat worried	Very worried	
Worried about job security	-0.257 (0.321)	0.319** (0.151)	-0.194 (0.293)	0.116 (0.111)
Very worried about job security	0.104 (1.096)	0.290 (0.242)	0.072 (0.308)	0.212 (0.155)
Worried about financial situation	-	-	-	-1.027*** (0.133)
Very worried about financial situation	-	-	-	-1.389*** (0.175)
Within R2	0.010	0.009	0.017	0.009
Model p-value	0.000	0.000	0.000	0.000
Observations	16,489	37,450	13,626	67,565
Households	5,441	9,304	5,048	11,319

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. Significance levels: *10% **5% ***1%

Source: GSOEP, own calculations

in perceived job security are related to current saving behavior in a way that supports the idea of precautionary behavior.

Motivated by the studies of, e.g., Benito (2006), Schunk (2009) and Giavazzi and McMahon (2010), I split the sample not only by financial worries, but also by the age and the type of the household (The results are reported in the Appendix, Tables D and E, respectively).²⁴ Positive regression coefficients are again mainly found for those households that are somewhat worried about their financial situation, and less often for those that are not or very concerned. Overall, the results suggest an even larger degree of heterogeneity. That is, the relationship between perceived job security and saving behavior also varies with age or household type. However, the estimation results do not show any clear patterns. Tentatively, job insecurity seems to be related more strongly to the saving of older than of younger households, and less strongly to the saving of households with 2 or more income sources. The latter finding could be interpreted as slight evidence for risk sharing within households (Lusardi 1998, Browning 2000, Mazzocco 2004). The strongest statistically significant positive coefficient is found for partner households who are somewhat worried about their financial situation and rely on one income only. For them, being worried about job security is related to an almost 1%-point higher saving rate. The strongest negative correlation is found for households between the age of 30 and 40, for whom being somewhat worried about job security is related to a 1%-point lower saving rate.

²⁴The age groups are: Under 30, 30 to 40, 40 to 50 and 50 or older. The household types are: Singles, partner households with one main income and with two or more incomes. Partner households are either married couples living together or couples that are not married but living together. If both partners are working and each contributing at least 25% to household income, they are classified as a 2-income household. If the partner of the main income earner is unemployed, retired, a trainee or in education, the household is classified as a 2-income household if the income of the main earner is less than 50% of the household income. 1-income households are thus all partner households for which the labor income of the main earner accounts for the main share of household income. The longitudinal consistency of household types is relatively high, the probability to remain in one type are 90% for singles, and 80% for 1-income and 2-income households.

5 Discussion and conclusion

In this paper, I study the relationship between perceived job insecurity and household saving behavior with large-scale micro-data from the 1992 to 2010 waves of the German Socio-Economic Panel. In the empirical analysis, first differences of the household saving rate are regressed on a subjective measure of job insecurity and predetermined confounding variables in order to control for household-specific saving trends and time-invariant unobserved heterogeneity. The subjective risk measure captures the typically unobserved private concerns about a possible job loss. By and large, the estimation results suggest that (changes in) job insecurity and concurrent saving are rather negatively, but not strongly related – neither statistically nor economically. While a general reporting bias can be confidently ruled out, the negative correlation between job insecurity and saving partly reflects that job worries are accompanied by worries about the own financial situation. That is, employment and financial security deteriorate or improve simultaneously in many cases.

When the perception of the financial situation is accounted for, saving behavior is positively, but not significantly correlated to increase in job insecurity. In particular, evidence of small precautionary saving behavior emerges for households that are somewhat worried about their financial situation: These households raise their saving rate by approximately 0.3%-points or EUR 100 annually when worried about a job loss. In contrast, no significant correlations between job worries and saving are found for households that are either not at all or very concerned about their financial situation. I interpret these results as a non-linear impact of household wealth on the relationship between job insecurity and flow saving. Households at the bottom of the wealth distribution are financially constrained and thus unable to adapt their saving behavior; households in the middle of the distribution show signs of precautionary behavior by raising their saving; households at the top of the distribution have already established a buffer-stock of wealth and thus do not need to change their saving behavior.

My results of no or only very limited precautionary saving behavior due to job insecurity in Germany support the findings of Essig (2005b) and Arent (2012), but not those of Geyer (2011). One reason for non-existent precautionary saving can be seen in the fairly generous German public unemployment insurance system which might crowd out private wealth accumulation (Gruber 1998, Engen and Gruber 2001). However, as job security and financial worries appear to be very closely related for many households, a public unemployment insurance is likely needed to cover financially constrained households who cannot adequately protect themselves against income depletions caused by unemployment.

Since I particularly study changes in the flow of saving, it is difficult to relate my results to the economic literature that looks at wealth holdings, i.e., the stock of savings. Non-existent precautionary saving behavior at the top of the wealth distribution might well be explained by the existence of a buffer-stock of precautionary savings due to job insecurity (e.g., Lusardi 1998, Carroll *et al.* 2003, Fuchs-Schündeln and Schündeln 2005). The relationships of job insecurity with saving or savings must be carefully distinguished and both represent important research questions in their own rights. What carries over from my study to those that investigate household wealth is the importance of financial constraints that a sizable number of households face, roughly one quarter of all households in my sample: These households typically face the highest unemployment risk and thus constitute a high-risk group with regard to economic well-being.

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Appendix: Additional tables and figures

TABLE A: Saving amount regressions – Baseline results
(Coefficients from linear fixed effects regressions)

Dependent variable:	Δ Saving	Log saving amount		
		All	Ever $S > 0$	$S > 0$
<i>Sample households:</i>	<i>All</i>	<i>All</i>	<i>Ever $S > 0$</i>	<i>$S > 0$</i>
Worried about job security	-3.108 (3.553)	-0.032 (0.022)	-0.033 (0.023)	-0.024*** (0.007)
Very worried about job security	-1.660 (4.623)	-0.117*** (0.032)	-0.130*** (0.034)	-0.029*** (0.011)
Household income ^a	11.487*** (0.365)	2.487*** (0.052)	2.681*** (0.055)	1.126*** (0.019)
Blue collar	0.219 (4.803)	-0.013 (0.038)	-0.011 (0.041)	0.004 (0.013)
Civil Servant	-3.353 (12.716)	-0.065 (0.088)	-0.078 (0.090)	-0.007 (0.026)
Age	-2.607 (7.638)	0.168** (0.071)	0.169** (0.075)	-0.020 (0.023)
Age squared (/100)	15.705 (18.200)	-0.452*** (0.172)	-0.463** (0.181)	0.011 (0.056)
Age cubed (/100)	-16.401 (14.222)	0.401*** (0.134)	0.416*** (0.141)	0.023 (0.044)
Very good health	11.241* (6.730)	0.144*** (0.037)	0.154*** (0.039)	0.029** (0.012)
Good health	1.373 (3.546)	0.081*** (0.021)	0.088*** (0.022)	0.012* (0.007)
Poor health	0.492 (4.983)	-0.040 (0.031)	-0.044 (0.033)	-0.000 (0.011)
Bad health	-23.205* (12.012)	-0.208** (0.082)	-0.229** (0.091)	0.025 (0.028)
Married	-22.098*** (8.520)	-0.015 (0.063)	-0.021 (0.065)	0.038* (0.021)
Divorced	-15.116 (10.655)	-0.162* (0.083)	-0.194** (0.089)	-0.035 (0.031)
Widowed	-0.444 (17.974)	-0.262 (0.182)	-0.318 (0.194)	0.126** (0.054)
1-income partner household	-6.803 (7.072)	-0.307*** (0.060)	-0.356*** (0.064)	-0.045** (0.021)
2-income partner household	7.215 (7.285)	-0.264*** (0.062)	-0.322*** (0.066)	-0.037* (0.022)
Household size	-6.396** (2.895)	-0.298*** (0.025)	-0.316*** (0.027)	-0.105*** (0.008)
Children	-3.150 (4.587)	0.156*** (0.040)	0.179*** (0.042)	0.026** (0.013)
Homeowner	-38.588*** (5.676)	-0.575*** (0.047)	-0.598*** (0.049)	-0.164*** (0.015)
Within R2	0.068	0.070	0.075	0.170
Model p-value	0.000	0.000	0.000	0.000
Observations	67,373	88,178	81,401	59,076
Households	11,266	13,900	11,718	11,508

^a Column 1: Δ Household income (/100); Columns 2 – 5: Log household income
Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is either the change in the amount of self-reported household saving (in logs), or the level of monthly household saving (in logs). All regressions additionally include year dummies, a dummy for Eastern Germany and their interactions. Significance levels: *10% **5% ***1%

Source: GSOEP, own calculations

TABLE B: Saving rate regressions – By income quintiles
(Coefficients from linear fixed effects regressions)

	Household income quintile				
	First	Second	Third	Fourth	Fifth
Worried about job security	-0.112 (0.263)	-0.433* (0.262)	0.079 (0.287)	-0.301 (0.285)	0.052 (0.289)
Very worried about job security	-0.230 (0.327)	-0.092 (0.378)	-0.233 (0.400)	-0.383 (0.436)	0.522 (0.506)
Within R2	0.019	0.014	0.014	0.011	0.008
Model p-value	0.000	0.000	0.000	0.001	0.007
Observations	12,008	13,632	13,991	14,160	13,774
Households	4,196	4,952	5,223	4,855	3,864

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. Income quintiles are based on equalized household income (income divided by the square root of the household size). Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

TABLE C: Saving rate regressions – Robustness checks
(Coefficients from linear fixed effects regressions)

	Individual, not household level	No changes in main earner	Panel attrition	Common support	Excl. large income changes	Incl. job characteristics	Excluding civil servants	Including asset income
Worried about job security	-0.194* (0.115)	-0.150 (0.111)	-0.116 (0.107)	-0.183 (0.118)	-0.197* (0.113)	-0.126 (0.108)	-0.121 (0.110)	-0.116 (0.107)
Very worried about job security	-0.274* (0.158)	-0.220 (0.153)	-0.153 (0.146)	-0.285* (0.163)	-0.204 (0.155)	-0.187 (0.148)	-0.161 (0.149)	-0.152 (0.146)
Within R2	0.006	0.006	0.007	0.007	0.007	0.007	0.008	0.007
Model p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	63,332	62,974	67,565	52,910	60,143	66,573	60,818	67,565
Households	12,463	11,155	11,319	9,917	10,946	11,219	10,457	11,319

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. Column “panel attrition” also includes dummy variables for being observed in the preceding and subsequent years, column “job characteristics” tenure, unemployment experience and dummies for company size, industry sector, public employer, temporary work contract and being trained for the specific job, and column “incl. asset income” Δ household asset income as additional explanatory variables. Significance levels: *10% **5% ***1%

Source: GSOEP, own calculations

TABLE D: Saving rate regressions – By age and worries about financial situation
(Coefficients from linear fixed effects regressions)

	Age 30 or younger	Age 30 to age 40	Age 40 to age 50	Age 50 or older
Sample: Not worried about financial situation				
Worried about job security	-1.079 (1.445)	-0.671 (0.649)	-0.447 (0.547)	0.332 (0.644)
Very worried about job security	-6.641 (4.270)	3.169 (2.202)	-0.357 (1.742)	0.843 (1.777)
Observations	1,891	5,264	5,482	5,277
Households	1,073	2,210	2,213	2,042
Sample: Somewhat worried about financial situation				
Worried about job security	0.738 (0.656)	0.206 (0.275)	0.575** (0.256)	-0.110 (0.334)
Very worried about job security	0.779 (1.050)	0.044 (0.501)	0.530 (0.421)	0.127 (0.498)
Observations	4,625	12,753	13,606	9,747
Households	2,226	4,199	4,396	3,342
Sample: Very worried about financial situation				
Worried about job security	-0.372 (1.046)	-0.998* (0.567)	-0.061 (0.509)	0.519 (0.758)
Very worried about job security	0.784 (1.127)	-0.301 (0.599)	-0.309 (0.551)	0.042 (0.821)
Observations	1,749	4,465	5,045	3,585
Households	1,033	2,095	2,268	1,621

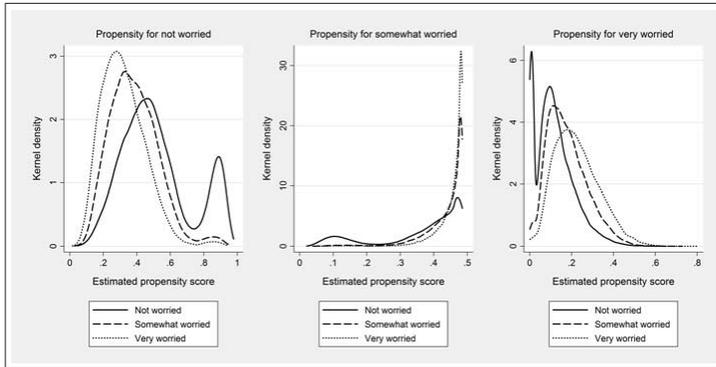
Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

TABLE E: Saving rate regressions – By household type and worries about financial situation
(Coefficients from linear fixed effects regressions)

	Single households	1-income households	2-income households
Sample: Not worried about financial situation			
Worried about job security	-1.161 (0.856)	-0.262 (0.524)	0.083 (0.569)
Very worried about job security	4.483 (2.990)	-0.882 (1.690)	-0.931 (2.310)
Observations	3,382	6,667	6,440
Households	1,406	2,629	2,743
Sample: Somewhat worried about financial situation			
Worried about job security	0.462 (0.395)	0.388 (0.263)	0.069 (0.246)
Very worried about job security	0.513 (0.662)	0.892** (0.441)	-0.016 (0.394)
Observations	6,828	14,437	16,185
Households	2,501	5,120	5,249
Sample: Very worried about financial situation			
Worried about job security	-0.046 (0.716)	-0.091 (0.527)	-0.489 (0.523)
Very worried about job security	-0.490 (0.784)	0.289 (0.541)	-0.504 (0.518)
Observations	2,670	5,328	5,628
Households	1,264	2,543	2,563

Notes: Table reports coefficients from linear fixed effects regressions, std. errors in parentheses are adjusted for clustering on households. The dependent variable is the change in the self-reported household saving rate (in %-points). All regressions include the same control variables as the regressions in Table 4. Significance levels: *10% **5% ***1%
Source: GSOEP, own calculations

FIGURE A: Propensity scores for being worried about job security



Notes: Figures plot predicted probabilities for being not, somewhat or very worried about job security based on an ordered logit regression of job worries on the other explanatory variables from Table 4. GSOEP sample, see Section 3.3.
Source: GSOEP, own calculations