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CONSUMPTION RESPONSE TO OFFSPRING'S INCOME RISK

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Abstract

In this paper we study whether the response of consumption to income risk has an intergenerational component, namely whether and to what extent income uncertainty of young generations affects consumption of their parents. For this purpose, we exploit a cross-country European longitudinal dataset collecting information about parents and offspring, augmented with indicators for children's income risk. Consumption turns out to significantly respond to changes in income risk, also across generations. This finding is robust to several checks and it displays heterogeneity across countries.

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1 Introduction

A deep understanding of the determinants of individual and aggregate consumption is a key issue for policy makers in designing and implementing actions aimed at increasing individual welfare and overall income and wealth. Indeed, the dynamics of consumption and saving affect the aggregate demand for goods and services and the amount of investment, determining the trends of the main macroeconomic variables. Consumption is also a key determinant of individuals' welfare and, from a microeconomic perspective, it contributes to the general level of well-being, as much as to its distribution in the population.

In this paper we study the the link between consumption and income risk from an intergenerational perspective. In particular, we investigate whether and to what extent income uncertainty of young generations impacts consumption choices of their parents through their altruistic attitudes. Theories of intertemporal choice posit an incentive for intertemporal smoothing of expected income changes. When the strong assumptions that lead to certainty equivalence are relaxed, theory also predicts that people respond to higher moments of the distribution of future income, namely on their income uncertainty (Kimball, 1990; Caballero, 1991). We extend this channel by considering the intergenerational transmission of income risk. Do parents modify their consumption choices if offspring's income becomes more uncertain?

The reason why we believe this topic deserves attention is twofold: on the one side, in the last decades the European labor markets became overall more uncertain. Indeed, successive waves of reforms reduced the employment protection across Europe (see for instance Boeri, 2011; Barbieri and Cutuli, 2015), and even more so for young workers (Cazes and Tonin, 2010), making expectations on future income more uncertain. Moreover, the financial and economic crises contributed to worsen the labor market for younger individuals relative to elderly cohorts. On the other side, the literature on the potential interplay between precautionary saving and altruistic reasons for saving is rather scant, and this study contributes to two main strands of literature.[1] First, it relates to research focusing on role of the extended family as insurance. Rather than focusing on insurance *ex-post*, namely on the effect of the realization of income shocks, as in Attanasio, Meghir, and Mommaerts (2018) and Kaplan (2012), we investigate the *ex-ante* response of parents' behavior to a change in offspring's income risk. Second, we contribute to the literature analyzing the determinants of consumption and savings. We test whether a change in offspring's income risk affects consumption choices of parents. By doing this, we relax the "warm glow" assumption about altruism, and we allow parents' consumption to be affected by a change in the riskiness of children's income.

We use a cross-country European panel dataset targeted to people older than 50 years to investigate their consumption behavior, making it possible to identify a causal relationship between income uncertainty of young individ-

[1] See Section 2 for a review of the related literature.

uals and consumption decisions of their parents' households. The Survey of Health, Ageing and Retirement in Europe (SHARE) collects information on individuals and their behaviour along with characteristics of their offspring. The longitudinal dimension of the dataset makes it possible to control for unobservable time-invariant characteristics, including country and family fixed effect, along with time fixed effect. We take advantage of two exogenous measures for income uncertainty, which measure, respectively, income risk and unemployment risk. To capture offspring's income risk, we augment this dataset with measures of uncertainty based on a rich cross-country dataset on individual income: the European Union Statistics on Income and Living Conditions (EU-SILC).

The main results of our analysis show that if the income uncertainty of the first child increases by one standard deviation, the food consumption of the parents' declines by about 1%, which is expected to be a lower bound of the effect on overall consumption. The size of the decline in consumption doubles if we consider the risk of becoming unemployed in the future. We also find evidence suggesting that this channel may be more relevant in Southern and Eastern European countries. These findings add to the literature on consumption and saving, and to the research on the role of the extended family as an insurance tool against adverse events. Indeed, we document a new channel for saving, namely the effect of uncertainty in offspring's income on parental consumption.

From a policy perspective, our results suggest the relevance of policy instruments aimed at reducing the market income shocks among young workers or insuring against it: not only would they directly support the income of the beneficiaries, but they would also reduce uncertainty, and therefore increase consumption of previous generations, which has positive spill-overs, both in terms of individual welfare and in terms of aggregate consumption.

The paper is organized as follows: Section 2 presents the theoretical framework (developed in more detail in Appendix A) and the contribution of this work. We discuss the data and measurement issues in Section 3 and we illustrate the estimation strategy in Section 4. We provide the main results in Section 5, and Section 6 documents their robustness to different specifications and measures. Section 7 concludes.

2 Theoretical framework and contribution

Standard theories of intertemporal consumption choices predict that consumption depends on expectations about future income. In the more general case of incomplete markets and prudent individuals, the optimal consumption profile depends on income uncertainty along with its expected value. If prudent parents are also altruistic, namely they derive utility from their offspring's well-being, they may reduce their consumption in response to an increase in income uncertainty of children. We illustrate more formally this relationship in a simple two-periods and two-generations setting, whose details are reported in Appendix A. More precisely, we analyze optimal consumption of parents who are prudent (exponential utility function) and altruistic, namely value future resources of children facing income risk (equations A.1 and A.5). The optimal consumption profile of parents is summarized by equations A.11a-A.11c. The first two determinants of consumption are the smoothing and precautionary saving motives. In addition, we show that consumption responds to future income uncertainty of the offspring: The higher is the income risk faced by children, the lower is current consumption of parents. Notice that lower consumption does not imply a contemporaneous transfer of resources across generations, but reflects into intergenerational precautionary savings. The magnitude of this effect depends on both the income risk faced by offspring and by the strength of the altruistic motive. We bring this theoretical prediction to the data, by analyzing to which extent parent's s consumption respond to offspring's income risk.

The role of the family as an insurance tool, particularly between extended family members, has been analyzed by previous literature.[2] A series of papers investigate whether extended families can be viewed as collective units sharing resources and risk efficiently in the U.S., and reject this hypothesis (Altonji, Hayashi, and Kotlikoff, 1997; Hayashi, Altonji, and Kotlikoff, 1996; Choi, McGarry, and Schoeni, 2016). The recent contribution by Attanasio, Meghir, and Mommaerts (2018) extends these works and shows that, despite a relevant fraction of income uncertainty is potentially insurable within the extended family, there is little evidence that the extended family provides insurance for such idiosyncratic shocks.

All these studies examine whether the extended family provides *ex-post* insurance to smooth consumption after the realization of income shocks. We depart from this approach by investigating the *ex-ante* response of parental

[2]Other studies examine insurance within a couple. For instance, the recent contribution by Blundell, Pistaferri, and Saporta-Eksten (2016) examines insurance in two-earner households, and highlights the role of family labor supply as a smoothing device against income shocks.

behavior to a change in offspring's income risk. Indeed, our analysis abstracts from observing income shocks, as it illustrates how an increase in the actual uncertainty about the expected children's income reflects into lower consumption expenditure by parents. The literature identifies different tools to provide insurance across generations: in-kind transfers, cash transfers and labor supply. Kaplan (2012) illustrates how the option to move in and out of the parental home is a valuable insurance channel against labor market risks: labor market shocks affect the timing of youths moving in and out of their parents' homes. Two studies by McGarry (1999, 2016) examine intergenerational transfers, showing that the probability of receiving monetary transfers from parents correlates with changes in a child's income, permanent income and life events. Finally, Baldini, Torricelli, and Brancati (2018) find evidence of labor responses of members of the extended family to a negative employment shock suffered by another household member. In our paper, we remain agnostic about which tool is used to provide insurance, since we focus on parents' behavior *before* the shock realizations. Therefore, we do not focus on any specific insurance mechanism: In principle, indeed, if the negative shock does not realize rational parents should not transfer any resources to their offspring, even if they had saved part of their income in the previous periods. This makes our analysis more robust to possible endogeneity, since we do not need to observe the actual realization of the shock in order to observe the behavior of altruistic parents. Another innovative aspect of our analysis derives from its cross-country approach. By investigating cross-country heterogeneity in the strength of this channel, we are able to comment on how the insurance within extended family members varies across different institutional and cultural frameworks.

This paper also contributes to the literature analyzing the determinants of consumption and saving over the life-cycle, by focusing on a new channel: The intergenerational response of consumption to income risk. Starting from the seminal papers by Kimball (1990) and Caballero (1991), several studies illustrate the effect of income risk on saving and consumption (e.g., Lusardi, 1997; Carroll and Samwick, 1998; Meghir and Pistaferri, 2004; Low, Meghir, and Pistaferri, 2010; Mastrogiacomo and Alessie, 2014). We contribute by allowing consumers to respond to their offspring's uncertainty, and not only to their own income risk. Another reason for saving is altruism, notably the bequest motive, which as been shown to be a relevant driver of consumption, especially for the wealthiest. De Nardi (2004) and De Nardi and Yang (2014) consider a framework characterized by uncertain income and overlapping generations, and model voluntary bequest in the form of 'warm glow'. Therefore, both altruism and precautionary savings affect optimal consumption. However, we depart from these works by relaxing the assumption of altruism in the form of warm glow, and by allowing the optimal consumption of parents to depend on offspring's income risk. We posit that there is an interaction between altruism and the precautionary motive for saving: if income uncertainty changes, across child's characteristics and over time, parents revise their consumption and saving choices in response to it.

The paper closest to our work is the unpublished study by Boar (2018). We depart from her approach along several dimensions. First, she relies on permanent income uncertainty, defined as the standard deviation of the forecast error of lifetime earnings, which hinges on strong assumptions about the way individuals form their expectations about future income. Moreover, identification in Boar (2018) is based on the differences in uncertainty across age and sector (notably, the latter is a choice variable potentially related to other individual characteristics), and does not allow for unobserved heterogeneity. Our approach and identification strategy exploit variations in income risk within groups identified by less problematic variables, and, more importantly, it does not impose any restriction between unobserved individual characteristics and the explanatory variables.

3 Data and measurement issues

The empirical analysis aims to test the main theoretical prediction, namely, whether parents' consumption behavior responds to the offspring's income risk. For this purpose, we exploit the SHARE dataset, which collects detailed information on the parental generation and – key to out purpose – on children's characteristics. More precisely, SHARE is a cross-national longitudinal survey using a representative sample of the non-institutionalized European population aged 50 or more. We focus on 15 European countries and we use five waves of the survey: wave 1 (interview years 2004-2005), wave 2 (2006-2007), wave 4 (2011-2012), wave 5 (2013), and wave 6 (2015).[3] Table 1 summarizes the distribution of our sample over time and across countries.

The survey gathers information about several socio-economic variables,

[3] We select 15 European countries that participated in SHARE and EU-SILC in at least two consecutive waves. Due to the first-difference methodology, we cannot include households from Croatia (wave 6 only), Greece (waves 2 and 6), and Portugal (waves 4 and 6) in our sample. We exclude data from wave 3 (SHARELIFE), which collects information that is not comparable to that in the other waves.

employment status, income, and household composition, either at the personal or household level. In our analysis, we measure family characteristics by covariates of the *household respondent*, namely, the person who answers questions on household composition. A key set of variables in our analysis refers to the characteristics of the offspring, whether they reside with the respondent or not. More precisely, for every single child, SHARE provides socio-demographic information such as gender, education level, marital status, household size and composition, job status, and living distance from parental residence. Table 2 reports the descriptive statistics of all variables included in the baseline model and in all robustness checks.

Finally, respondents report their household's food consumption. The dependent variable we use in the empirical analysis is the change in the logarithm of (household-equivalent) food expenditure, either at home or out.[4] Despite the fact that food expenditure typically represents a large fraction of a household budget, food can be thought of as a necessity good, whose consumption is difficult to adjust. Therefore, we expect our estimates to be a lower bound for the impact of increasing uncertainty on total consumption. Indeed, there is evidence that the demand for durable goods is typically more elastic to income shocks than that of non-durable goods see (Browning and Crossley, 2009, on the effect of unemployment on small expenditures on durable goods). In addition, Bertola, Guiso, and Pistaferri (2005) show that the elasticity of demand is increasing with the "durability" of goods, meaning that the less durable the good is, the less elastic is its demand.

[4] Our measure of annual food consumption is based on self-reported expenditure in a typical month during the previous year.

Consequently, demand rigidity determines the response of food consumption to uncertainty, which we expect to be smaller than that of total consumption or consumption of non-durable goods. However, as a robustness check, we test whether the intergenerational precautionary saving channel is stronger when considering food consumed outside the home only, which we expect to be a less rigid expenditure.

Measuring income risk. To measure income risk we rely on a rich cross-country dataset on individual earnings: EU-SILC.[5] We construct two indicators measuring, respectively, income and unemployment risk, which are heterogeneous by type and year.[6] We combine each wave of SHARE with two waves of the EU-SILC; namely, the two years when SHARE is run. We then match children in the SHARE dataset with the indices measuring the uncertainty of the individual of the same type in the same year. We use the same method to compute income risk for parents.

More specifically, we estimate a Mincerian equation for income (y) separately for each country and wave. Income depends on age, gender, educational level, and their full set of interactions, and year, in a specific country

[5] EU-SILC is a European cross-country panel collected yearly and coordinated by Eurostat to provide comparability across countries and over time. We rely on cross-sectional waves for the 2004-2015 period.

[6] We define a type as the part of the sample that includes all respondents with the same gender, age (in 5 year brackets of 21-25 to 51-55), and education level (primary or less, secondary, or tertiary), surveyed in the same year and in the same country, so that the total number of partitions is 48 for each country-year.

and wave:

$$
\begin{aligned}
y = & \beta_0 + \beta_1 age + \beta_2 gend + \beta_3 educ + \\
& + \beta_4 age \cdot gend + \beta_5 age \cdot educ + \beta_6 gend \cdot educ + \\
& + \beta_7 age \cdot gend \cdot educ + \beta_8 year + \varepsilon.
\end{aligned} \tag{1}
$$

We compute offspring's income uncertainty as the standard deviation of the residuals, $sd\,(\hat{\varepsilon})$, among all individuals of the same type.[7] We then match the measure of income uncertainty to the children in SHARE according to their type. Notably, since income risk is measured by homogeneous groups (which is similar in spirit to the approach by Meghir and Pistaferri, 2004), using a complementary data source does not represent a limitation to our analysis. Moreover, this measure of risk does not suffer from the reverse causality issue that would arise even if an individual measure on income risk were available in the dataset for each respondent. This would be due to the selection of individuals into riskier jobs depending on parental saving choices. We postpone the discussion of income risk indicators after the description of the empirical analysis in Section 4.

We calculate the indicator for uncertainty described above using two alternative income variables. First, in line with Banks, Blundell, and Brugiavini (2001), we refer to a broad definition that includes all sources of non-asset income, including benefit income. By considering the dynamics of income rather than wages or earnings, we implicitly consider uncertainty at the level of earnings, as well as the unemployment risk. Therefore, we include benefits

[7] We exclude the types with less than 50 individuals from the analysis.

in our income definition to account for the income attached to the non-participation state, whatever its source. We base the second measure of risk on labor earnings only. The cross-country heterogeneity in welfare schemes mainly affects the difference between these two measures. Comparing the effect of income risk based on these two measures allows us to examine the role of the welfare state to explain cross-country heterogeneity in the response of parental choice to the offspring's income risk.

We designed the second indicator we use in the empirical analysis specifically to capture unemployment risk. It is the observed share of unemployed individuals by type. We expect that consumption will be particularly sensitive to this measure because unemployment is associated with zero earnings, and therefore, with a larger utility loss. Moreover, we expect the impact of unemployment risk of the children on parental consumption will be negatively correlated with the availability of other forms of insurance, for example, unemployment benefits. In addition, we compute this measure by type and then match it to children in SHARE.

The average predicted income in our sample for the second generation is about 23,000 Euros, while the average indicator for income risk is about 16,000 Euros (Table 3). We plot some examples of the estimated age profile of income and income risk in Figure 1. Both expected income and its uncertainty are higher for older, more educated, and male respondents. While this may seem counter-intuitive, it is in line with Meghir and Pistaferri (2004, p.10), who state that "the higher returns emanating from increased education come at the cost of higher income risk." Figure 2 displays the trends in unemployment for the same countries and years, showing the opposite result: expectedly, unemployment is higher for younger and less educated individuals, while there is no significant difference between women and men.

All measures of monetary variables are expressed in Euro 2005 in Germany, using PPP indices provided by SHARE, and made equivalent to account for household size[8] when appropriate.

4 Empirical strategy

To test whether parents respond to the offspring's income uncertainty, we estimate the following first-differenced equation

$$\Delta \log c_{pt} = \alpha + \gamma_o \Delta\sigma_{ot} + \gamma_p \sigma_{pt} + \zeta_o \Delta y_{ot} + \zeta_p \Delta y_{pt} + \Delta X'_{ot}\beta_o + \Delta X'_{pt}\beta_p + \delta_t d_t + \varepsilon_{pt}, \tag{2}$$

where the subscripts p and o denote the parent and offspring generations, respectively, and t is the time period. The dependent variable, $\Delta \log c_{pt}$, is the change over time of logarithm of the parents' food consumption. The main coefficient of interest is γ_o, which measures the effect of a variation in income risk ($\Delta\sigma_{ot}$) on consumption growth.

Other control variables are the change in parental risk, $\Delta\sigma_{pt}$, in parental family characteristics, $\Delta X'_{pt}$, and in child's socio-economic features, $\Delta X'_{ot}$.[9] We include time dummies (d_t) to allow changes in consumption to have

[8] We use the widespread squared-root equivalence scale.

[9] More precisely, in the baseline specification, X'_{pt} includes the following variables: a dummy capturing whether the respondent is married or cohabiting with a partner, and the respondent's job status, described by two dummy indicators for unemployment and retirement, respectively. The offspring's covariates (X'_{ot}) include the child's job status using three indicators to capture whether he or she is in full-time, part-time work, or unemployed.

some common time pattern.[10] Notably, equation 2 also includes, as control variables, the change in parent's and offspring's income: Δy_{pt} and Δy_{ot}, respectively.[11] In the baseline specification, we rely on information about the oldest child to measure the characteristics of the offspring.[12]

This allows to identify the effect of changes in income risk net of the variation in the mean of income distribution, which could be correlated to its variance if income shocks are not independent from the level of earnings (Arellano, Blundell, and Bonhomme, 2017).

An advantage of the first-differenced regression (2) is that it conditions out any household (parent-child pair) fixed effect which can affect consumption levels. It embeds time-invariant unobservables at different levels of aggregation: first, family fixed effect contains country features, such as the economic, cultural, and institutional differences that persist over time and influence consumption level. Moreover, it includes time-invariant child-parent characteristics, such as birth cohort, intertemporal preferences and the degree of the parents' altruism; the offspring's education, gender, ability and risk aversion. Finally, family fixed effect encompasses the time-invariant factors which identify the 'type' of child, namely gender, education, country of residence. On the other side, taking the variation over time could hamper the issue related to the measurement error of consumption.

Our identification strategy relies on heterogeneous dynamics in income

[10]The coefficients δ_t measure the joint effect of time and age, which are collinear in a first-difference framework.

[11]y_{pt} is household-equivalent parental income, while y_{ot} is the average predicted value for individuals of the same type (recovered from EU-SILC data; see section 3 for more details).

[12]The robustness checks show that the results are robust to the inclusion of more than one child.

risk according to the type of child, exploiting the changes in risk between types to estimate the impact of a child's risk net of individual and time fixed effects.

We turn to the discussion of the variable measuring income risk, σ_{ot}, which we illustrate in previous section. Is this a good measure of income uncertainty? As a preliminary, we should note that the first difference estimation method is such that we estimate the coefficient of interest through the impact of a change in the income risk on the growth rate of the parents' consumption. On this basis, the identification hinges on two main assumptions. First, the relevant reference group to evaluate income risk is denoted by gender, age, education level, and country.[13] One concern could relate to different sectors of employment of individuals belonging to the same type. Our implicit assumption in this context is that workers do not form their expectations based on workers in the same sector, but, instead, they are mobile across sectors. In addition, sector of employment is a choice variable, and including it in the Mincerian equation (1) would give rise to endogeneity. Second, in line with predictions of standard life-cycle and permanent income model, consumption respond only to risk variations, since previous perception of uncertainty were already incorporated into their planning for the future. Therefore, the change in the dispersion of the unexplained in-

[13] The geographical size of the labor market individuals consider when forming their expectations is not straightforward. We calculate the dispersion of the income residual at the *national* level for several reasons. First, within country migration may weaken the relevance of local labor market conditions, while language and institutional factors make the country's labor market the natural geographical unit. In addition, there are data limitations. Information about the region of residence (NUTS regions) is not available in the EU-SILC dataset for all years and countries we consider. Moreover, the sample size of the cells delimited by gender, age, education, *and* region is often too small to provide a reliable measure of income dispersion.

come component ($\Delta\sigma_{ot}$ in equation 2) is assumed to capture the revision in offspring's income uncertainty. As pointed out by Banks, Blundell, and Brugiavini (2001), what matters when assessing the precautionary motive for saving is the conditional variance of the income shock, namely the expected value of the variance of income innovation. We argue that a change in the dispersion of the unexplained component of income is a good proxy for the update in the information set used to make predictions about the variance of innovations. In other words, a change in the dispersion of the unexplained income component within the reference group determines a revision in the expected uncertainty on future income. This assumption hinges in turn on Meghir and Pistaferri (2004), who show strong evidence of state dependence in the conditional variance of income shocks.[14] It follows that a revision in expectations of future income risk, which is our measure of interest, reflects a change in the conditional variance of income innovation. Since the first and second moment of income distribution may be correlated, particularly in recession periods, we also control for the change in average income within the same type. Another regressor is the change in the job status of the child (unemployed/full-time or part-time worker). Therefore, the estimated impact of income risk is net major shocks to job conditions experienced by the child.

According to the simplest version of the permanent income hypothesis, only permanent income shocks should induce substantial changes in consumption, while temporary income shocks should not alter consumption sig-

[14]They estimate an ARCH process for the conditional variance of permanent and transitory shocks. The persistence parameter is up to 0.9 for the permanent shock of high school graduates.

nificantly. Unfortunately, limitation to the panel dimension of our data does not allow to disentangle permanent and transitory shocks (for instance using the method in Meghir and Pistaferri, 2004). Since the indicator for income risk is estimated from a Mincerian equation (1), we compute bootstrapped standard errors.

5 Results

The baseline results from the first-difference model are reported in Table 4,[15] which includes all three measures of risk described in the Section 3: the standard deviation of the residuals of disposable income (Panel a), the same measure excluding transfers from the notion of income (Panel b), and the risk of unemployment (Panel c). In all panels, the most parsimonious specification (Column 1) includes only the logarithm of the self-reported equivalent income of parents, predicted income of the offspring (from EU-SILC), and the standard deviation of the residuals of parental income as controls. Parental consumption responds significantly to a change in the offspring's income risk, as the theoretical model predicts, as well as to a change in the income of both generations. A one standard deviation increase in income risk reflects in a contraction by about 0.9% in parental consumption, while a one standard deviation increase in unemployment risk lowers parental consumption by about 1.9%.[16] We also find a positive effect of the children's income on parental

[15] Tables B.1, B.2, and B.3 in the appendix report all of the coefficients relative to the control variables.

[16] More precisely, $-.00064 \times 14 = -.00896$ in the model with overall income and $-.00060 \times 14.066 = -.00844$ when excluding transfers. For unemployment risk, $-0.28444 \times .066 = -.01877$

consumption: a one percent increase in parental income fosters consumption by .05% to .096%, depending on the model. These key findings support the implications of the theoretical model in Section 2. First, we find evidence of altruism among parents, who care about their offspring's income. Moreover, intergenerational response to uncertainty is relevant in our sample: we find a significant link between the income risk of the offspring and parents' consumption choices.

The estimation results for the main coefficients of interest are robust to the addition of controls. Columns (2) and (3) report the results when controlling for additional child and parent covariates. As expected, parents' consumption is increasing with their own family income, while it does not react to increasing uncertainty. This is possibly due to respondents older than 50, who are close to retirement or are retired, and by the negligible impact of labor income risk in the late stage of the life-cycle, when human capital represents a minor component of permanent income. In this line, the estimated coefficients are almost identical when excluding parental income risk (Column 4). This specification also controls for the potential high correlation between the parents' and children's income risk, which may hamper the correct estimation of both coefficients and standard errors. However, once we drop parental income risk, the coefficient for offspring risk is virtually unchanged, confirming the absence of collinearity.

Finally, a possible threat to the causal interpretation of our results is related to reverse causality: respondents who consume more could be more willing to work more, which a higher income could reflect. This reverse causality, along with the presence of unobserved shocks that can affect both consumption and labor supply, may determine endogeneity in equation (2). To address this issue, we substitute self-reported parental household income from SHARE with predicted household income from EU-SILC. Being determined only by age, gender, and educational status, this predicted income should be significantly less affected, if at all, by reverse causality. We report the results in Column (5) and corroborate the hypothesis of no reverse causality: the coefficient for the offspring's uncertainty is almost unchanged, while the effect of parental income remains positive and significant.

6 Robustness checks

Omitted variables. One threat to the causal interpretation of our results is related to omitted variables, which could be correlated with the parents' consumption and some of the regressors, thus biasing our results. In this regard, a powerful advantage of the first-difference regression is that it conditions out any unobserved household heterogeneity which can affect consumption levels. To further mitigate the omitted variable issue, we extend the baseline specification to include additional controls for parents and offspring, which could determine a revision in parental consumption choices. Results are reported in tables 5 and 6, respectively.[17] First, the consumption choices could depend on the job status of not only the household head, but also the spouse. For this reason, in Column (2) of Table 5, we control for changes in retirement and unemployment status of the two spouses, and the results are confirmed. Second, we add a the variation in self-reported

[17]Column (1) of both tables reports the full set of regressors in the baseline model, as in Column (3), Panel a of Table 4.

measure for poor health status to the vector of regressors, as it is possibly associated with an increase in out-of-pocket expenditure (Column 3). We also include changes in the number of children and grandchildren, which could drive an increase in the childcare expenditure of the offspring (Column 4), and in turn, a larger saving for the grandparents. These two variables do not significantly affect consumption, and their inclusion does not alter the estimate of the main coefficient of interest. Finally, the children of wealthier households may choose riskier education and career paths *because* they can rely on parental resources to face income risk or shocks. The first-difference estimation allows to tackle this issue inasmuch as the position in the wealth distribution of the parents is persistent over time. However, we also test the robustness of our findings to the inclusion of the change in net financial assets among the controls (Column 5). The coefficient is positive and significant, but the effect of income uncertainty remains unchanged, suggesting that its role does not depend on the parents' net financial assets. Given the drop in sample size, however, we choose not to include this control variable in the baseline model.

Table 6 shows the estimation results when extending the set of child variables. We control for changes in child's marital status (Column 2), since married children could rely more on sources of income from a partner and parents-in-law in case of a negative shock; for a cohabiting child (Column 3), assuming that co-residence with parents itself is a way to self-insure against income shocks; for changes in the frequency of contact with parents (Column 4) to control for time-varying relations between a child and parents; and for disability (Column 5), which may affect the parents' reaction to the possible income shocks of the child. None of these variables significantly affect our findings. Finally, in Column (6) we control for children other than the first who are unemployed or disabled. In this case as well, the results are confirmed.

Food consumption as a lower bound. In Section 3, we discuss how the results emerging from the empirical analysis could be considered as a lower bound, since the demand for food is likely to be more rigid, and thus less sensitive to shocks, than total or non-durable consumption. To support this hypothesis, we estimate the baseline model by distinguishing between food consumed at home and food consumed outside of the home as the outcome variable. We expect the demand for the latter to be more elastic, and thus to respond more to the offspring's risk. The results in Tables 7 and 8 support our predictions: in the former case, the effect is more than 20% smaller than in the baseline model, while the latter is almost double. We can then conclude that intergenerational response of consumption to uncertainty seems to be increasing in the elasticity of demand, and therefore, our result is likely to represent a lower bound of the effect on total consumption.

Placebo test. Even if we control for a wide set of individual and family covariates, the first-difference approach allows us to rule out any time-invariant personal and household characteristics, while the time fixed effects do the same for time trends common to all individuals, one may suspect that the source of variability we identify is correlated to some other (unobservable and time-varying) feature that may affect parental consumption. We verify that this is not the case by using a falsification test that randomizes child risk across households. The comparison between the baseline results (Table 9, Col.(1)) and the modified model (Col.2) shows that the random measure of the offspring's income risk is not significantly associated with parental consumption, while the effect of the main control variables is robust. These results support the interpretation of our main coefficient of interest as the intergenerational precautionary motive for saving.

Household composition. In the baseline model, we consider the income of the first child only to maintain consistency across households and to maximize the sample size. However, the parents might be also affected by the income risk of other children according to the uncertainty of their income. We address this issue by replicating the analysis in the baseline model with two modifications: first, we include only households with more than one child; and second, we replace the income risk of the first child with the same measure for the riskiest child, the less risky child, and for an average of all children (up to the fifth).[18] In this specification, we include the change in log of the average of all children's incomes instead of the income of the first child. Table 10 compares the baseline results for the first child (Column 1) in this subsample with those of the less risky child (Column 2), the average risk of all children (Column 3), and the riskiest child (Column 4), and results seem to corroborate our main hypotheses: parental consumption is unaffected by the risk of the less risky child, while it is negatively influenced by the pooled risk of all children and by the risk of the riskiest child. Unsurprisingly, the

[18]Note that the child considered need not to be the same over time.

coefficient relative to the average risk is higher, since it considers all children, whose risk could be highly correlated, instead of the riskiest child only, as in Column 4.

Another relevant aspect is the geographical distance between the parents and child. Even if we control for the frequency of contact between the parents and child in Table 6, we replicate the baseline model for different samples according to the geographical distance between the child and parents (Table 11).[19] Restricting the sample to non-cohabiting children only (Column 2) allows us to isolate the intergenerational precautionary saving channel, as opposed to a more "traditional" precautionary savings motive. Indeed, the effect in Column 1 is the decline in consumption following an increase in the risk of a member of the household, namely the first child, while the effect in Column 2 is due only to the uncertainty of the child living outside the household, regardless of the distance. Not surprisingly, the former effect is three times as large as the latter, suggesting that intra-household precautionary saving is much stronger.[20] The estimated coefficient in Column 2, however, is significant at conventional levels and has a magnitude that is comparable to the baseline specification in Table 4. Finally, the results in Columns 3 and 4 show how the effect of the child's income risk is decreasing with the geographical distance between the child and parents.

Cross-country comparison. Cross-country differences in the strength of the intergenerational precautionary motive for saving could be related to dif-

[19]Since this sample selection is not completely exogenous, we must be cautious when interpreting the results.

[20]The lower significance is likely due to the smaller sample size.

ferent degrees of generosity among the welfare systems, and by heterogeneity in culture and family ties. We investigate the extent to which the average effect is heterogeneous across European countries in Table 12, in which we *exclude* groups of countries from the general sample and compare the results to the baseline model.[21]

Results seem to suggest some degree of cross-country heterogeneity in the effect of the offspring's uncertainty, which is stronger in Southern and Eastern European countries. More clear-cut results refer to unemployment risk (bottom panel): the impact of unemployment risk on consumption is significantly greater in Southern and Eastern European countries than it is in Central and Scandinavian countries.[22] We can draw similar conclusions when looking at the coefficients on income uncertainty. Indeed, for both definitions of income, the coefficients are about 10% lower than the baseline when excluding Southern, Eastern, and Central European countries, while they are higher when excluding Scandinavian countries. Even if the coefficients do not differ statistically, the trends are consistent with the results for unemployment risk.

The reasons for these findings might be either that in Scandinavian countries, and, to a lesser extent, Central European countries, children's income and unemployment risks are not a major determinant of the parental consumption and saving decision, or that the welfare state in these countries is a good substitute for informal parental and family support. The different

[21]Our choice is due to the fact that considering single groups of countries would decrease the sample size by about 80%. Moreover, since the measure of risk is computed at 'type' level, this would substantially lower the variability of the interest variable.

[22]Indeed, excluding Southern countries or Eastern European countries makes the coefficient lower (in absolute value) and less significant, if any.

effect of income uncertainty and the risk of unemployment in Central European countries may suggest that households in the latter are perceived as worrying less than those in the former, likely due to the higher efficacy of unemployment benefits and the welfare state. Finally, these results can be driven by weaker family ties in Scandinavian and Central European countries, such that the weaker link is driven by the lower degree of altruism among parents in these countries. However, family ties and the features of the welfare system are strictly intertwined (see, e.g., Ferrera, 1996; Alesina et al., 2015), and it is therefore difficult to identify the role of these two channels separately.

Heterogeneity by income class. In this section, we showed that the results are consistent after including net financial assets. However, one may wonder whether the effect of uncertainty on precautionary saving is constant across the income distribution, or whether it is stronger among the poorest (perhaps due to the larger coefficient on prudence) or the richest (perhaps because their demand for consumption is more elastic). Table 13 reports the baseline specification for households above and below the median,[23] and for two risk measures. We find different results for the two measures of risk: income uncertainty seems to affect only the poorer individuals, while unemployment risk affects both groups significantly, but the effect for the rich is twice as large as for the poor. One possible explanation is that richer households can afford to compensate for relatively moderate income shocks, even

[23]Given the panel structure of the data, we computed the medians by country and wave; that is, we split the sample for every country and every wave in the final sample. Due to the relatively low sample size, we did not disaggregate at a lower level, nor did we split the sample into quartiles.

without saving in advance, while the opposite is true for poorer households. In contrast, when facing a higher unemployment risk, richer households can react and increase their saving more than poorer households can.

7 Conclusion

Many studies in the economics literature determinants of consumption choices extensively. This paper contributes to the literature by examining the intergenerational response on consumption to income risk from an intergenerational perspective. We illustrate the effect of a change in income uncertainty of young generations on consumption of their parents. We examine parents' behavior using individual panel data augmented by exogenous measures of offspring's income risk, and we find a sizeable significant negative effect of income uncertainty in the offspring's generation on parents' consumption choices.

This channel may have been particularly relevant in the last decade, when the financial crisis worsened labor market conditions and increased income uncertainty, especially among the young. For the 2006-2015 period, total unemployment in the Euro area according to Eurostat increased from 8.4% to 10.9%. Youth unemployment rose in the same period from 17.2% to 22.4%, with dramatic figures for Greece (from 25.0% to 49.8%), Spain (from 17.9% to 48.3%), and Italy (from 21.8% to 40.3%).

The study conveys two main messages from a policy perspective. On the one hand, future income uncertainty lowers consumption not only of the individuals affected by it, but also of their parents, or other people supporting their income. On the other hand, public welfare policies (as unemployment benefits and income support) may substitute for family ties and informal networks, generating a positive spill-over beyond the target of the policies. Unfortunately, the data do not allow us to analyze the differences across European countries, but this channel seems to be particularly relevant in Mediterranean and Eastern European countries, which are characterized by a less-developed welfare state.

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This study uses data from SHARE Waves 1, 2, 4, 5, and 6,[24] see Börsch-Supan et al. (2013) for methodological details. The SHARE data collection

[24]DOIs: 10.6103/SHARE.w1.611, 10.6103/SHARE.w2.611, 10.6103/SHARE.w4.611, 10.6103/SHARE.w5.611, 10.6103/SHARE.w6.611.

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[25]In detail, through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), and FP7 (SHARE-PREP: N.211909, SHARE-LEAP: N.227822, SHARE M4: N.261982).

[26]U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025-169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN 271201300071C.

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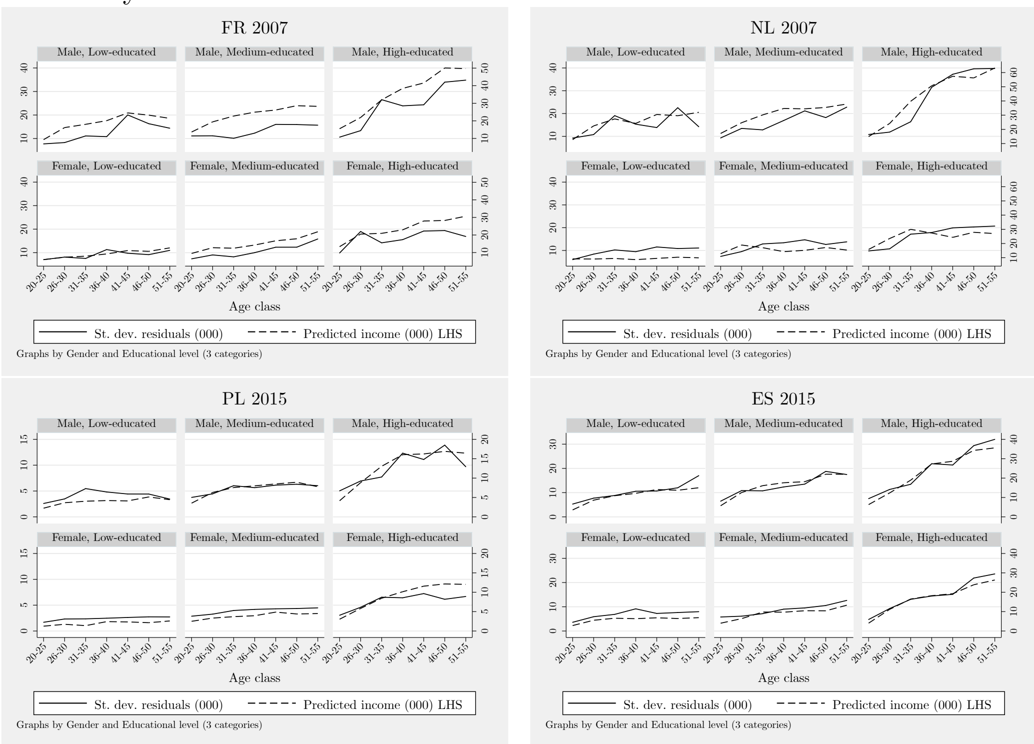
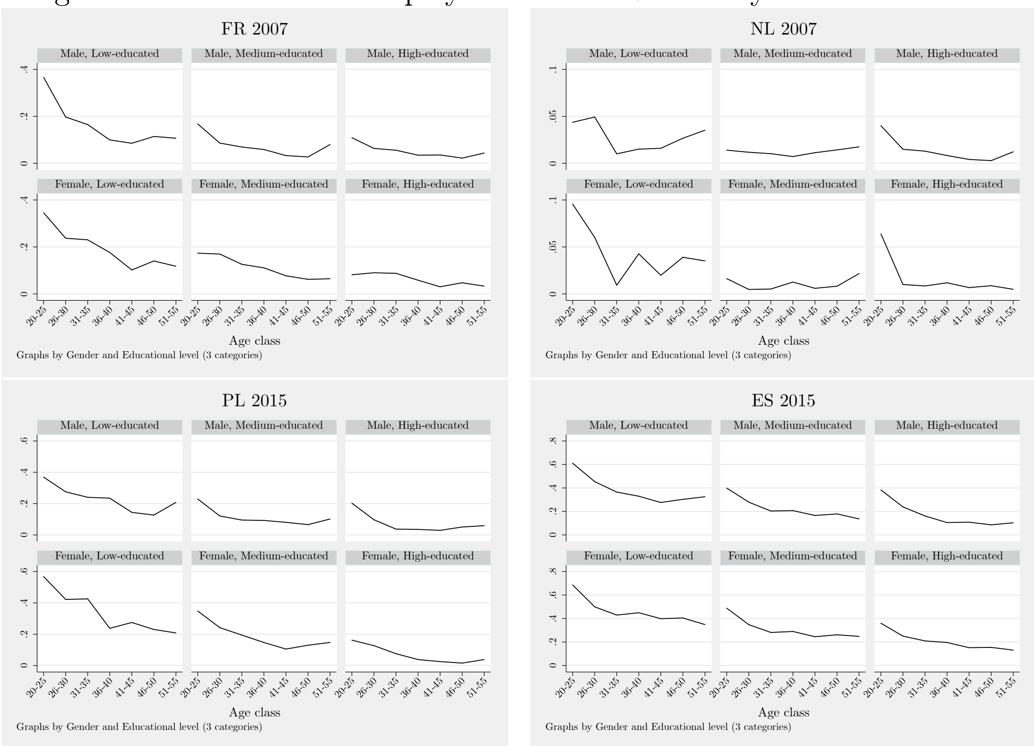
Figures and Tables

Figure 1: Estimate of predicted income and standard deviation of residuals: Selected years and countries



Source: EU-SILC, PPP real values (thousand Euros, Germany, 2005).

Figure 2: Estimate of unemployment rates: Selected years and countries



Source: EU-SILC.

Table 1: Distribution of SHARE and EU-SILC observations across countries and over time.

	Year				
Country	2004	2007	2011	2013	2015
AT	Yes	Yes	Yes	Yes	Yes
BE	Yes	Yes	Yes	Yes	Yes
CH	.	Yes	Yes	Yes	Yes
CZ	.	Yes	Yes	Yes	Yes
DE	Yes	Yes	Yes	Yes	Yes
DK	Yes	Yes	Yes	Yes	Yes
EE	.	.	Yes	Yes	Yes
ES	.	Yes	Yes	Yes	Yes
FR	Yes	Yes	Yes	Yes	Yes
IT	.	Yes	Yes	Yes	Yes
LU	.	.	.	Yes	Yes
NL	Yes	Yes	Yes	Yes	.
PL	.	Yes	Yes	.	.
SE	Yes	Yes	Yes	Yes	Yes
SI	.	.	Yes	Yes	Yes

Each country-year includes 42 cells defined by 7 age classes, 3 education classes, and 2 genders.

Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.
Dependent variable			
Parental household equiv. food consumption (in log)	43193	8.125	.477
Measures of risk			
Parental household st. dev. residual income	43193	16.59	22.433
Child sd. dev. residual income	43193	18.915	14
Child sd. dev. residual income, net of transfers	43193	19.482	14.066
Child unemployment risk	43193	.071	.066
Measures of income			
Child income (predicted, 000)	43193	27.995	17.572
Child income (predicted, in log)	43193	10.025	.7
Child income (predicted, 000), net of transfers	43193	26.805	17.322
Parental household equivalent income (000)	43193	23	106.63
Parental household equivalent income (in log)	43193	9.616	.964
Parental household equivalent income (predicted, 000)	43193	23.72	17.525
Parental household equivalent income (predicted, in log)	43193	9.78	.815
Control variables			
Household head in a couple	43193	.692	.462
Household head retired	43193	.607	.488
Household head unemployed	43193	.023	.149
Child in full-time work	43193	.763	.425
Child in part-time work	43193	.088	.283
Child unemployed	43193	.05	.217

Table 3: Summary statistics: Offspring's imputed income and income risk.

Variable	Mean	Std. Dev.
Predicted income	22757.535	16648.28
St. dev. residuals	16164.387	14224.797

Monetary values are expressed in PPP real values (thousand Euros, Germany, 2005). Observations are the 2.666 country-year cells.

Table 4: First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
Child sd. dev. residual income	-0.00064**	-0.00064**	-0.00064**	-0.00064**	-0.00060**
	(0.00027)	(0.00027)	(0.00027)	(0.00028)	(0.00027)
Child income (predicted, in log)	0.09563***	0.09621***	0.09596***	0.09604***	0.08466***
	(0.01362)	(0.01404)	(0.01503)	(0.01368)	(0.01448)
HH st. dev. residual income	0.00003	0.00003	0.00003	.	-0.00005
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02229***	0.02252***	0.02251***	0.02251***	.
	(0.00239)	(0.00239)	(0.00244)	(0.00243)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08127***
	.	.	.	.	(0.00837)
Obs.	43193	43193	43193	43193	43193
Child sd. dev. residual income, net of transfers	-0.00060**	-0.00060**	-0.00060**	-0.00060**	-0.00057**
	(0.00027)	(0.00028)	(0.00028)	(0.00029)	(0.00028)
Child income (predicted, in log), net of transfers	0.07991***	0.08038***	0.08014***	0.08021***	0.07136***
	(0.01274)	(0.01239)	(0.01283)	(0.01238)	(0.01283)
HH st. dev. residual income	0.00003	0.00003	0.00003	.	-0.00006
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02230***	0.02254***	0.02253***	0.02253***	.
	(0.00240)	(0.00237)	(0.00239)	(0.00240)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08199***
	.	.	.	.	(0.00883)
Obs.	43193	43193	43193	43193	43193
Child unempl. risk (SILC)	-0.28500***	-0.28332***	-0.28444***	-0.28456***	-0.30102***
	(0.07086)	(0.06992)	(0.06932)	(0.06551)	(0.06910)
Child income (predicted, in log)	0.05338***	0.05421***	0.05387***	0.05392***	0.04108***
	(0.01583)	(0.01545)	(0.01588)	(0.01564)	(0.01582)
HH st. dev. residual income	0.00003	0.00002	0.00002	.	-0.00006
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02223***	0.02246***	0.02246***	0.02246***	.
	(0.00233)	(0.00247)	(0.00232)	(0.00234)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08203***
	.	.	.	.	(0.00879)
Obs.	43193	43193	43193	43193	43193
Control variables (in all panels above)					
Household head[a]	No	Yes	Yes	Yes	Yes
Child[b]	No	No	Yes	Yes	Yes
Time dummies[c]	Yes	Yes	Yes	Yes	Yes

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

[a] Household head in a couple, household head retired, household head unemployed.

[b] Child in full-time work, child in part-time work, child unemployed.

[c] Year dummies (2007, 2011, 2013, 2015).

Table 5: Robustness. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Additional parental controls.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
Child sd. dev. residual income	-0.00064**	-0.00064**	-0.00064**	-0.00064**	-0.00067**
	(0.00028)	(0.00028)	(0.00027)	(0.00027)	(0.00029)
Child income (predicted, in log)	0.09596***	0.09560***	0.09602***	0.09581***	0.09311***
	(0.01469)	(0.01506)	(0.01398)	(0.01388)	(0.01596)
HH st. dev. residual income	0.00003	0.00003	0.00003	0.00003	0.00007
	(0.00010)	(0.00010)	(0.00010)	(0.00010)	(0.00011)
HH equiv. income (in log)	0.02251***	0.02253***	0.02251***	0.02250***	0.02321***
	(0.00239)	(0.00235)	(0.00241)	(0.00235)	(0.00255)
HH head in a couple	-0.02595*	-0.02358	-0.02597*	-0.02653*	-0.03018*
	(0.01519)	(0.01480)	(0.01462)	(0.01525)	(0.01659)
HH head retired	-0.01948***	.	-0.01943***	-0.01961***	-0.02344***
	(0.00677)	.	(0.00679)	(0.00714)	(0.00750)
HH head unemployed	-0.06187***	.	-0.06195***	-0.06185***	-0.06759***
	(0.01389)	.	(0.01389)	(0.01483)	(0.01568)
Child in full-time work	0.00211	0.00216	0.00213	0.00235	0.00560
	(0.00776)	(0.00821)	(0.00804)	(0.00810)	(0.00898)
Child in part-time work	0.01229	0.01241	0.01230	0.01243	0.01328
	(0.00981)	(0.00980)	(0.00997)	(0.01013)	(0.01082)
Child unemployed	0.00682	0.00715	0.00682	0.00691	0.01403
	(0.01059)	(0.01092)	(0.01068)	(0.01084)	(0.01271)
HH head or partner retired	.	-0.01903***	.	.	.
	.	(0.00651)	.	.	.
HH head or partner unemployed	.	-0.05250***	.	.	.
	.	(0.01151)	.	.	.
HH head in poor health conditions	.	.	0.00203	.	.
	.	.	(0.00533)	.	.
HH head children	.	.	.	0.00414	.
	.	.	.	(0.00597)	.
HH head grand-children	.	.	.	0.00223	.
	.	.	.	(0.00255)	.
Net financial assets (in log)	.	.	.	.	0.00352***
	.	.	.	.	(0.00068)
Constant	-0.04658***	-0.04583***	-0.04675***	-0.04723***	-0.04385***
	(0.00832)	(0.00835)	(0.00823)	(0.00845)	(0.00957)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	43193	43193	43193	43193	34514

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 6: Robustness. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Additional children controls.

	(1)	(2)	(3)	(4)	(5)	(6)
Change in:	b/se	b/se	b/se	b/se	b/se	b/se
Child sd. dev. residual income	-0.00064**	-0.00063**	-0.00061**	-0.00069**	-0.00064**	-0.00064**
	(0.00028)	(0.00028)	(0.00030)	(0.00030)	(0.00028)	(0.00028)
Child income (predicted, in log)	0.09596***	0.09902***	0.11342***	0.12365***	0.09611***	0.09647***
	(0.01498)	(0.01430)	(0.01665)	(0.01689)	(0.01417)	(0.01439)
HH st. dev. residual income	0.00003	-0.00000	0.00012	0.00015	0.00003	0.00003
	(0.00010)	(0.00010)	(0.00011)	(0.00011)	(0.00010)	(0.00010)
HH equiv. income (in log)	0.02251***	0.02197***	0.02173***	0.02254***	0.02250***	0.02248***
	(0.00243)	(0.00248)	(0.00256)	(0.00264)	(0.00233)	(0.00236)
HH head in a couple	-0.02595*	-0.02824*	-0.02011	-0.02649	-0.02595*	-0.02581*
	(0.01491)	(0.01529)	(0.01607)	(0.01658)	(0.01505)	(0.01497)
HH head retired	-0.01948***	-0.02012***	-0.01710**	-0.01923**	-0.01947***	-0.01945***
	(0.00687)	(0.00708)	(0.00771)	(0.00751)	(0.00696)	(0.00686)
HH head unemployed	-0.06187***	-0.06387***	-0.06349***	-0.07166***	-0.06185***	-0.06172***
	(0.01381)	(0.01445)	(0.01551)	(0.01520)	(0.01410)	(0.01412)
Child in full-time work	0.00211	0.00352	0.00093	0.00117	0.00026	-0.00447
	(0.00812)	(0.00802)	(0.00844)	(0.00861)	(0.00797)	(0.00721)
Child in part-time work	0.01229	0.01314	0.01140	0.01026	0.01043	0.00614
	(0.00970)	(0.00982)	(0.01100)	(0.01093)	(0.00981)	(0.00898)
Child unemployed	0.00682	0.00823	0.00964	0.01297	0.00452	.
	(0.01074)	(0.01061)	(0.01168)	(0.01222)	(0.01097)	.
At least one child unemployed	.	.	.	.	.	-0.01205
	.	.	.	.	.	(0.00767)
Child married	.	-0.00490	.	.	.	.
	.	(0.00811)	.	.	.	.
Child cohabiting with parents	.	.	-0.03146**	.	.	.
	.	.	(0.01424)	.	.	.
Many contacts (at least once a week)	.	.	.	0.00260	.	.
	.	.	.	(0.00673)	.	.
Child disable	.	.	.	.	-0.02331	.
	.	.	.	.	(0.02442)	.
At least one child disable	.	.	.	.	.	-0.00196
	.	.	.	.	.	(0.01702)
Constant	-0.04658***	-0.04743***	-0.04927***	-0.04140***	-0.04653***	-0.04666***
	(0.00829)	(0.00836)	(0.00825)	(0.00905)	(0.00834)	(0.00831)
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	43193	42202	37814	36865	43193	43193

$^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 7: First-differences regressions with the logarithm of household-equivalent food consumption at home as the dependent variable.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
Child sd. dev. residual income	-0.00050*	-0.00050*	-0.00050*	-0.00050*	-0.00046*
	(0.00027)	(0.00027)	(0.00026)	(0.00027)	(0.00028)
Child income (predicted, in log)	0.08805***	0.08841***	0.08839***	0.08835***	0.07693***
	(0.01401)	(0.01368)	(0.01383)	(0.01445)	(0.01417)
HH st. dev. residual income	-0.00001	-0.00001	-0.00001	.	-0.00010
	(0.00011)	(0.00011)	(0.00011)	.	(0.00011)
HH equiv. income (in log)	0.02078***	0.02051***	0.02052***	0.02051***	.
	(0.00239)	(0.00243)	(0.00232)	(0.00229)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08200***
	.	.	.	.	(0.00830)
HH head in a couple	.	0.01138	0.01142	0.01142	0.00762
	.	(0.01467)	(0.01389)	(0.01503)	(0.01497)
HH head retired	.	-0.01029	-0.01033	-0.01032	-0.00791
	.	(0.00694)	(0.00686)	(0.00692)	(0.00695)
HH head unemployed	.	-0.04122***	-0.04130***	-0.04130***	-0.04402***
	.	(0.01350)	(0.01356)	(0.01326)	(0.01319)
Child in full-time work	.	.	0.00101	0.00100	0.00150
	.	.	(0.00780)	(0.00780)	(0.00771)
Child in part-time work	.	.	0.00500	0.00500	0.00594
	.	.	(0.00956)	(0.00939)	(0.00983)
Child unemployed	.	.	0.00782	0.00783	0.00800
	.	.	(0.01069)	(0.01074)	(0.01058)
Constant	-0.04564***	-0.04521***	-0.04521***	-0.04521***	-0.05092***
	(0.00855)	(0.00822)	(0.00852)	(0.00842)	(0.00830)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	43193	43193	43193	43193	43193

$^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 8: First-differences regressions with the logarithm of household-equivalent food consumption out of home as the dependent variable.

Change in:	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Child sd. dev. residual income	-0.00122*	-0.00121*	-0.00118	-0.00118*	-0.00115
	(0.00069)	(0.00072)	(0.00072)	(0.00068)	(0.00072)
Child income (predicted, in log)	0.09575**	0.10000**	0.09507**	0.09572**	0.08408**
	(0.03955)	(0.04096)	(0.03850)	(0.03880)	(0.04018)
HH st. dev. residual income	0.00030	0.00028	0.00027	.	0.00020
	(0.00023)	(0.00024)	(0.00022)	.	(0.00023)
HH equiv. income (in log)	0.01095*	0.01348**	0.01344**	0.01346**	.
	(0.00604)	(0.00646)	(0.00641)	(0.00634)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08147***
	.	.	.	.	(0.02347)
HH head in a couple	.	-0.18558***	-0.18549***	-0.18568***	-0.18741***
	.	(0.04316)	(0.04345)	(0.04321)	(0.04318)
HH head retired	.	-0.07922***	-0.07934***	-0.07963***	-0.07697***
	.	(0.02058)	(0.02068)	(0.01973)	(0.02175)
HH head unemployed	.	-0.12044**	-0.12014**	-0.12005***	-0.12090***
	.	(0.04735)	(0.04754)	(0.04430)	(0.04561)
Child in full-time work	.	.	0.02204	0.02217	0.02185
	.	.	(0.02243)	(0.02193)	(0.02155)
Child in part-time work	.	.	0.04811*	0.04829*	0.04821*
	.	.	(0.02698)	(0.02696)	(0.02552)
Child unemployed	.	.	0.02246	0.02235	0.02291
	.	.	(0.03545)	(0.03599)	(0.03754)
Constant	-0.02161	-0.01822	-0.01862	-0.01870	-0.02272
	(0.02011)	(0.01972)	(0.02038)	(0.01941)	(0.01922)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	21771	21771	21771	21771	21771

$^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 9: Robustness. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Random child risk.

Change in:	(1) b/se	(2) b/se
	label	label
Child sd. dev. residual income	-0.00064**	.
	(0.00027)	.
Child sd. dev. residual income (random)	.	-0.00016
	.	(0.00025)
Child income (predicted, in log)	0.09596***	0.08647***
	(0.01402)	(0.01321)
HH st. dev. residual income	0.00003	0.00003
	(0.00010)	(0.00010)
HH equiv. income (in log)	0.02251***	0.02255***
	(0.00239)	(0.00248)
HH head in a couple	-0.02595*	-0.02596*
	(0.01455)	(0.01519)
HH head retired	-0.01948***	-0.01950***
	(0.00710)	(0.00691)
HH head unemployed	-0.06187***	-0.06192***
	(0.01467)	(0.01358)
Child in full-time work	0.00211	0.00248
	(0.00794)	(0.00802)
Child in part-time work	0.01229	0.01257
	(0.01010)	(0.01005)
Child unemployed	0.00682	0.00710
	(0.01091)	(0.01126)
Constant	-0.04658***	-0.04667***
	(0.00812)	(0.00815)
Wave FE	Yes	Yes
Obs.	43193	43193

$^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 10: Robustness. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Pooled children risk. Only households with more than one child.

Change in:	(1) b/se	(2) b/se	(3) b/se	(4) b/se
Child sd. dev. residual income	-0.00066**	.	.	.
	(0.00030)	.	.	.
Min of children sd. dev. residual income	.	0.00053	.	.
	.	(0.00065)	.	.
Mean of children sd. dev. residual income	.	.	-0.00117**	.
	.	.	(0.00046)	.
Max of children sd. dev. residual income	.	.	.	-0.00068***
	.	.	.	(0.00025)
Mean of children income (predicted, in log)	0.09804***	0.08571***	0.10471***	0.10180***
	(0.01876)	(0.01904)	(0.01970)	(0.01862)
HH st. dev. residual income	0.00001	0.00001	0.00001	0.00001
	(0.00010)	(0.00011)	(0.00011)	(0.00011)
HH equiv. income (in log)	0.02450***	0.02457***	0.02448***	0.02449***
	(0.00261)	(0.00266)	(0.00258)	(0.00259)
HH head in a couple	-0.03188*	-0.03199*	-0.03187*	-0.03173*
	(0.01683)	(0.01751)	(0.01704)	(0.01662)
HH head retired	-0.01928**	-0.01934**	-0.01921**	-0.01924**
	(0.00769)	(0.00782)	(0.00785)	(0.00765)
HH head unemployed	-0.06590***	-0.06583***	-0.06572***	-0.06565***
	(0.01613)	(0.01531)	(0.01651)	(0.01583)
Constant	-0.04577***	-0.04685***	-0.04531***	-0.04547***
	(0.00865)	(0.00926)	(0.00931)	(0.00893)
Wave FE	Yes	Yes	Yes	Yes
Obs.	34985	34985	34985	34985

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 11: Robustness. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Distance from the child.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
	Cohabiting	Non-cohabiting	$<$ 25 km	$>=$ 25 km	All
Child sd. dev. residual income	-0.00177§	-0.00061**	-0.00062§	-0.00058	-0.00065**
	(0.00112)	(0.00031)	(0.00040)	(0.00046)	(0.00030)
Child income (predicted, in log)	0.12877***	0.11925***	0.12490***	0.10745***	0.11715***
	(0.03903)	(0.01749)	(0.02371)	(0.02699)	(0.01621)
HH st. dev. residual income	-0.00005	0.00011	0.00009	0.00011	0.00010
	(0.00051)	(0.00012)	(0.00018)	(0.00015)	(0.00011)
HH equiv. income (in log)	0.02131***	0.02174***	0.02033***	0.02393***	0.02183***
	(0.00715)	(0.00274)	(0.00346)	(0.00486)	(0.00246)
HH head in a couple	0.07024	-0.03181*	-0.01783	-0.05347*	-0.02372§
	(0.05690)	(0.01690)	(0.02234)	(0.02755)	(0.01599)
HH head retired	-0.03603	-0.01846**	-0.01857*	-0.01824§	-0.01949***
	(0.03158)	(0.00767)	(0.01031)	(0.01217)	(0.00739)
HH head unemployed	-0.00377	-0.07253***	-0.09423***	-0.04257*	-0.06363***
	(0.04321)	(0.01632)	(0.02220)	(0.02558)	(0.01537)
Child in full-time work	-0.03938§	0.00823	0.01145	0.00404	0.00159
	(0.02618)	(0.00959)	(0.01342)	(0.01374)	(0.00883)
Child in part-time work	0.00180	0.01421	0.01239	0.01804	0.01059
	(0.03196)	(0.01092)	(0.01533)	(0.01766)	(0.01065)
Child unemployed	-0.01806	0.01481	0.01607	0.01457	0.00924
	(0.03029)	(0.01356)	(0.01720)	(0.01950)	(0.01279)
Constant	-0.12011***	-0.04636***	-0.04927***	-0.04168***	-0.04932***
	(0.04017)	(0.00859)	(0.01107)	(0.01437)	(0.00836)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	3139	33376	19690	13686	36515

$p < 0.15,^{*} p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table 12: Heterogeneity by country group. First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
All countries *excluding*	Baseline	South	Scandinavia	Center	East
Child sd. dev. residual income	-0.00064**	-0.00059*	-0.00074**	-0.00057	-0.00052*
	(0.00028)	(0.00031)	(0.00035)	(0.00037)	(0.00028)
Child income (predicted, in log)	0.09596***	0.08875***	0.10755***	0.14369***	0.04235**
	(0.01406)	(0.01540)	(0.01549)	(0.01799)	(0.01707)
HH st. dev. residual income	0.00003	0.00007	0.00020	-0.00000	-0.00002
	(0.00010)	(0.00010)	(0.00024)	(0.00011)	(0.00010)
HH equiv. income (in log)	0.02251***	0.02227***	0.02231***	0.02702***	0.01920***
	(0.00233)	(0.00278)	(0.00252)	(0.00317)	(0.00253)
Obs.	43193	38561	36504	22318	32196
Child sd. dev. residual income, net of transfers	-0.00060**	-0.00055*	-0.00069**	-0.00050	-0.00052*
	(0.00027)	(0.00030)	(0.00033)	(0.00037)	(0.00028)
Child income (predicted, in log), net of transfers	0.08014***	0.07159***	0.09123***	0.11589***	0.03941***
	(0.01250)	(0.01329)	(0.01404)	(0.01587)	(0.01507)
HH st. dev. residual income	0.00003	0.00007	0.00021	-0.00001	-0.00002
	(0.00010)	(0.00010)	(0.00024)	(0.00011)	(0.00010)
HH equiv. income (in log)	0.02253***	0.02230***	0.02232***	0.02702***	0.01922***
	(0.00239)	(0.00277)	(0.00239)	(0.00312)	(0.00263)
Obs.	43193	38561	36504	22318	32196
Child unempl. risk (SILC)	-0.28444***	-0.14390*	-0.38552***	-0.39634***	-0.11777
	(0.06961)	(0.07860)	(0.07925)	(0.08400)	(0.08207)
Child income (predicted, in log)	0.05387***	0.06417***	0.05449***	0.07966***	0.02000
	(0.01550)	(0.01745)	(0.01708)	(0.02083)	(0.01879)
HH st. dev. residual income	0.00002	0.00006	0.00021	-0.00000	-0.00002
	(0.00010)	(0.00011)	(0.00023)	(0.00010)	(0.00010)
HH equiv. income (in log)	0.02246***	0.02227***	0.02219***	0.02667***	0.01928***
	(0.00227)	(0.00273)	(0.00246)	(0.00307)	(0.00270)
Obs.	43193	38561	36504	22318	32196
Control variables (in all panels above)					
Household head[a]	Yes	Yes	Yes	Yes	Yes
Child[b]	Yes	Yes	Yes	Yes	Yes
Time dummies[c]	Yes	Yes	Yes	Yes	Yes

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis. Southern countries: Italy, Spain; Scandinavian countries: Denmark, Sweden; Central European countries: Austria, Belgium, France, Germany, Luxembourg, Netherlands, Switzerland; Eastern countries: Czech Republic, Estonia, Poland, Slovenia.

[a] Household head in a couple, household head retired, household head unemployed.

[b] Child in full-time work, child in part-time work, child unemployed.

[c] Year dummies (2007, 2011, 2013, 2015).

Table 13: First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Sample split according to the median household income by country and wave.

Change in:	(1) b/se	(2) b/se	(3) b/se	(4) b/se
	Lower half	Upper half	Lower half	Upper half
Child sd. dev. residual income	-0.00081**	-0.00040	.	.
	(0.00037)	(0.00042)	.	.
Child unempl. risk (SILC)	.	.	-0.19085*	-0.37264***
	.	.	(0.10540)	(0.09496)
Child income (predicted, in log)	0.09677***	0.09219***	0.06198***	0.04390**
	(0.02139)	(0.01909)	(0.02290)	(0.02110)
HH st. dev. residual income	0.00008	0.00002	0.00008	0.00001
	(0.00024)	(0.00011)	(0.00025)	(0.00011)
HH equiv. income (in log)	0.01864***	0.02492***	0.01861***	0.02474***
	(0.00313)	(0.00388)	(0.00313)	(0.00392)
HH head in a couple	-0.02510	-0.02892	-0.02511	-0.02838
	(0.01934)	(0.02137)	(0.02017)	(0.02121)
HH head retired	-0.02912***	-0.01118	-0.02929***	-0.01147
	(0.01015)	(0.00914)	(0.01020)	(0.00930)
HH head unemployed	-0.07021***	-0.05245**	-0.07004***	-0.05248**
	(0.01892)	(0.02174)	(0.01785)	(0.02219)
Child in full-time work	0.00648	-0.00220	0.00678	-0.00240
	(0.01279)	(0.01060)	(0.01221)	(0.01013)
Child in part-time work	0.01052	0.01446	0.01069	0.01421
	(0.01482)	(0.01338)	(0.01489)	(0.01308)
Child unemployed	0.00969	0.00446	0.01087	0.00547
	(0.01625)	(0.01596)	(0.01515)	(0.01610)
Constant	-0.06472***	-0.03191***	-0.06678***	-0.03498***
	(0.01232)	(0.01188)	(0.01186)	(0.01150)
Wave FE	Yes	Yes	Yes	Yes
Obs.	21045	22148	21045	22148

$^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

A Theoretical framework

The present section illustrates the theoretical setting of our analysis and identifies the economic relationship between parental choices and the offspring's income uncertainty. We build a simple theoretical model with two generations (parents and offspring) living for two periods, and focus on the consumption/saving decision of the parents, who derive some utility from their own consumption and the cash-on-hand of their offspring.

Utility function. All of the individuals in the parent generation maximize the following utility function:

$$U_t^{1,y} = u\left(c_t^{1,y}\right) + \mathbb{E}_t\, u\left(c_{t+1}^{1,o}\right) + \alpha\, \mathbb{E}_t\, u\left(w_{t+1}^{2,y}\right), \tag{A.1}$$

where c is consumption and w is cash-on-hand, namely the sum of income and transfers received by the children in period 2. The subscripts t and $t+1$ represent the present and future periods, respectively. The superscripts 1 and 2 indicate parents and offspring, respectively. The superscripts y and o indicate whether the generation is young or old, respectively. According to this additively separable utility function, the total utility at present (time t) of the parents (generation 1) when they are young (y) is the sum of the utility from their own contemporary consumption $u\left(c_t^{1,y}\right)$, their expected utility from future consumption $\mathbb{E}_t\, u\left(c_{t+1}^{1,o}\right)$ (that is, the utility from consumption of the same generation 1 when old o in $t+1$), and the additional term, $\alpha\, \mathbb{E}_t\, u\left(w_{t+1}^{2,y}\right)$. The latter is the expected value at time t of the utility from the cash-on-hand of the offspring generation when young $(2, y)$ in the period

$t+1$ ($\mathbb{E}_t\, u\left(w^{2,y}_{t+1}\right)$), weighted by α, which represents the relative weight the parents give to the wealth of their offspring. For the sake of simplicity, we assume that the intertemporal rate of time preferences and the real interest rate on the only risk-free asset are both equal to zero.

The utility function in equation A.1 implies that the choice between consumption and the savings of the offspring generation does not affect the utility of the parents' generation. Stated differently, what matters for the parents is the amount of cash-on-hand of the offspring at the beginning of their life-cycle, while they are indifferent regarding their allocation of resources over time.

Constraints. In every period, each individual earns some income y, which they must devote either to consumption c or to savings s. The savings of the elderly (parents in period $t+1$) are transferred to the next generation.[27] Since we are interested in the choices of parents' generation, we do not model the consumption choices of the offspring here. In general, we can state the arguments of the utility function in equation (A.1) as

$$c^{1,y}_t = y^{1,y}_t - s^{1,y}_t \tag{A.2a}$$

$$c^{1,o}_{t+1} = y^{1,o}_{t+1} + s^{1,y}_t - s^{1,o}_{t+1} \tag{A.2b}$$

$$w^{2,y}_{t+1} = y^{2,y}_{t+1} + s^{1,o}_{t+1} \tag{A.2c}$$

[27] All conclusions of the model are independent of the fact that such transfers are *intra-vivos* or bequests, and the same is true for the empirical analysis. Indeed, we focus on the savings decision of the elderly, irrespective of whether they are actually transferred to offspring.

where $y_t^{1,y}$ also includes possible transfers from the previous generation.[28] The consumption of generation 1 when old in (A.2b) is equal to the current income and savings in the previous period ($s_t^{1,y}$) minus the transfers to the next generation ($s_{t+1}^{1,o}$). In the following, we assume that $s_{t+1}^{1,o}$ is non-negative, since parents cannot freely dispose of the offspring's income and cannot decide to increase their own consumption by means of the offspring's income.

Income process and utility function. Income realization in $t + 1$ is uncertain. For simplicity, we assume that the income of both generations follows a normal distribution:

$$y_{t+1}^{1,o} \sim \mathcal{N}\left(\bar{y}^{1,o}, \sigma^{2\,1,o}\right) \tag{A.3}$$

and

$$y_{t+1}^{2,y} \sim \mathcal{N}\left(\bar{y}^{2,y}, \sigma^{2\,2,y}\right), \tag{A.4}$$

where $\bar{y}$ are the means and σ^2 the variances. The correlation between the two income processes is not restricted: they can be either perfectly correlated (a "systemic" shock that affects all individuals), or perfectly uncorrelated (idiosyncratic shocks), or any intermediate case.

We assume that the utility of consumption is exponential; that is, $u(c) = \frac{1-\mathrm{e}^{-kc}}{k}$. The exponential utility function is quite tractable, and enjoys the property of a convex marginal utility function, which determines the precautionary motive for saving (Kimball, 1990). Absolute prudence is constant

[28] In principle, one could explicitly separate the two components in the proper income $y_t^{1,y}$ and the transfer received by the previous generation 0, $s_t^{0,o}$. However, since they are both exogenous, the present notation is equivalent, but simpler.

and equal to the parameter k.[29]

Maximization problem. Within the framework described above, in period t, the representative member of generation 1 chooses the levels of consumption that maximize the following utility function:

$$U_t^{1,y} = \frac{1 - \mathrm{e}^{-kc_t^{1,y}}}{k} + \mathbb{E}_t \frac{1 - \mathrm{e}^{-kc_{t+1}^{1,o}}}{k} + \alpha \, \mathbb{E}_t \frac{1 - \mathrm{e}^{-kw_{t+1}^{2,y}}}{k}, \tag{A.5}$$

subject to the constraints in (A.2a), (A.2b), and (A.2c). Substituting the constraints into (A.5), and exploiting the properties of exponential functions and of the log-normal distribution,[30] we obtain the first order conditions:

$$\frac{\partial U_t^{1,y}}{\partial s_t^{1,y}} = - \, \mathrm{e}^{-k\left(y_t^{1,y} - s_t^{1,y}\right)} + \mathrm{e}^{-k\left(\bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o}\right)} = 0 \tag{A.6a}$$

$$\frac{\partial U_t^{1,y}}{\partial s_{t+1}^{1,o}} = - \, \mathrm{e}^{-k\left(\bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o}\right)} + \alpha \mathrm{e}^{-k\left(\bar{y}^{2,y} - \frac{k}{2}\sigma^{2\,2,y} + s_{t+1}^{1,o}\right)} = 0 \tag{A.6b}$$

that we can summarize more effectively as

$$\mathrm{e}^{-k\left(y_t^{1,y} - s_t^{1,y}\right)} = \mathrm{e}^{-k\left(\bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o}\right)} = \alpha \mathrm{e}^{-k\left(\bar{y}^{2,y} - \frac{k}{2}\sigma^{2\,2,y} + s_{t+1}^{1,o}\right)} \tag{A.7}$$

and equivalent to the more general

$$u'\left(c_t^{1,y}\right) = \mathbb{E}_t \, u'\left(c_{t+1}^{1,o}\right) = \alpha \, \mathbb{E}_t \, u'\left(w_{t+1}^{2,y}\right) \; . \tag{A.8}$$

[29] We can draw the same qualitative conclusions of the model by assuming a logarithmic utility function of the form $u\,(c) = \ln\,(c)$ with decreasing prudence.

[30] According to which $\mathbb{E}\,\mathrm{e}^{-kx} = \mathrm{e}^{-k\bar{x} + k^2 \frac{\sigma^2}{2}}$ if $x \sim \mathcal{N}(\bar{x}, \sigma^2)$

Results. The Euler conditions in (A.7) and (A.8) imply that individuals fully smooth their expected consumption between t and $t+1$. Moreover, the marginal utility of parents' consumption optimally equalize the expected marginal utility from the cash-on-hand of the offspring, namely the young generation in $t+1$, discounted by α. In the special case of $\alpha = 0$ (parents do not derive any utility from the utility of their offspring), this leads to the very standard consumption smoothing solution in a two-period, one-generation framework.

Solving the Euler conditions (all details are in Appendix C) leads to the following optimal saving behavior at time t:

$$s_t^{1,y} = \frac{2}{3}y_t^{1,y} - \frac{1}{3}\bar{y}^{1,o} + \frac{k}{6}\sigma^{2\,1,o} - \frac{1}{3}\bar{y}^{2,y} + \frac{k}{6}\sigma^{2\,2,y} + \frac{1}{3}\frac{\ln\alpha}{k} \tag{A.9}$$

which shows some interesting features: i) saving is increasing with present known income and decreasing with the expected value of future uncertain incomes; ii) holding constant the expected incomes, it is increasing with the variance of future income; iii) the sensitivity of saving to income uncertainty increases with k; that is, the parameter of prudence; and iv) the saving depends positively on the relative weight given to the offspring's utility α.

Expected saving in $t+1$; that is, the final transfer from generation 1 to the next generation 2, is

$$s_{t+1}^{1,o} = \frac{1}{3}y_t^{1,y} + \frac{1}{3}\bar{y}^{1,o} - \frac{k}{6}\sigma^{2\,1,o} - \frac{2}{3}\bar{y}^{2,y} + \frac{k}{3}\sigma^{2\,2,y} + \frac{2}{3}\frac{\ln\alpha}{k} \tag{A.10}$$

which also gives interesting insights: i) the transfer is increasing with the income of generation 1 and decreasing with the income of generation 2; ii) it increases with the variance of the income of generation 2, but is decreasing with the variance of the income of generation 1; iii) the sensitivity of saving to the uncertainty of future incomes increases with the parameter of prudence k; and iv) the transfer depends positively on how altruistic the parents are; that is, α.

Finally, the consumption profile determined by the saving decisions of the parents is

$$c_t^{1,y} = \frac{1}{3}\left(y_t^{1,y} + \bar{y}^{1,o} + \bar{y}^{2,y}\right) - \frac{k}{6}\sigma^{2\,1,o} - \frac{k}{6}\sigma^{2\,2,y} - \frac{1}{3}\frac{\ln\alpha}{k} \tag{A.11a}$$

$$c_{t+1}^{1,o} = \frac{1}{3}\left(y_t^{1,y} + \bar{y}^{1,o} + \bar{y}^{2,y}\right) + \frac{k}{3}\sigma^{2\,1,o} - \frac{k}{6}\sigma^{2\,2,y} - \frac{1}{3}\frac{\ln\alpha}{k} \tag{A.11b}$$

$$w_{t+1}^{2,y} = \frac{1}{3}\left(y_t^{1,y} + \bar{y}^{1,o} + \bar{y}^{2,y}\right) - \frac{k}{6}\sigma^{2\,1,o} + \frac{k}{3}\sigma^{2\,2,y} + \frac{2}{3}\frac{\ln\alpha}{k}, \tag{A.11c}$$

which shows that the expected consumption of the parent and the offspring's cash-on-hand is equal to the average of the total incomes, corrected for the level of the uncertainty of income (which in turn depends on the coefficient of prudence k) and for the degree of altruism α. In detail, an increase in the uncertainty of future income leads the parents to consume less in period t, but to increase their own future consumption or transfers to the next generation in $t+1$. Indeed, in order to smooth the expected marginal utility from consumption/cash-on-hand, they need to lower their actual consumption and raise future expected consumption, even if the expected income is unchanged. For instance, holding constant the income profile, an increase in the uncertainty of future own income, $\sigma^{2\,1,o}$, leads to a proportional reduction of consumption in t and of transfers to the offspring $w_{t+1}^{2,y}$. Stated differently, since uncertainty affects the level of the expected utility, the consumption/transfer path reacts to a change in variance, even if the expected income does not change.

In the following empirical analysis, we test the main prediction of the model; that is, the negative correlation between income uncertainty and consumption in (A.11a).

B Additional Tables

Table B.1: First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable.

Change in:	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Child sd. dev. residual income	-0.00064**	-0.00064**	-0.00064**	-0.00064**	-0.00060**
	(0.00027)	(0.00027)	(0.00027)	(0.00028)	(0.00027)
Child income (predicted, in log)	0.09563***	0.09621***	0.09596***	0.09604***	0.08466***
	(0.01362)	(0.01404)	(0.01503)	(0.01368)	(0.01448)
HH st. dev. residual income	0.00003	0.00003	0.00003	.	-0.00005
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02229***	0.02252***	0.02251***	0.02251***	.
	(0.00239)	(0.00239)	(0.00244)	(0.00243)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08127***
	.	.	.	.	(0.00837)
HH head in a couple	.	-0.02595*	-0.02595*	-0.02595*	-0.02865**
	.	(0.01455)	(0.01488)	(0.01500)	(0.01434)
HH head retired	.	-0.01943***	-0.01948***	-0.01950***	-0.01697**
	.	(0.00710)	(0.00675)	(0.00671)	(0.00687)
HH head unemployed	.	-0.06189***	-0.06187***	-0.06187***	-0.06487***
	.	(0.01466)	(0.01446)	(0.01456)	(0.01406)
Child in full-time work	.	.	0.00211	0.00211	0.00266
	.	.	(0.00790)	(0.00805)	(0.00808)
Child in part-time work	.	.	0.01229	0.01230	0.01329
	.	.	(0.00977)	(0.00949)	(0.00975)
Child unemployed	.	.	0.00682	0.00681	0.00696
	.	.	(0.01095)	(0.01105)	(0.01102)
Constant	-0.04699***	-0.04655***	-0.04658***	-0.04660***	-0.05305***
	(0.00820)	(0.00811)	(0.00857)	(0.00827)	(0.00805)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	43193	43193	43193	43193	43193

$^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table B.2: First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Transfers not included in the measure of offspring's income.

Change in:	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Child sd. dev. residual income, net of transfers	-0.00060**	-0.00060**	-0.00060**	-0.00060**	-0.00057**
	(0.00027)	(0.00028)	(0.00028)	(0.00029)	(0.00028)
Child income (predicted, in log), net of transfers	0.07991***	0.08038***	0.08014***	0.08021***	0.07136***
	(0.01274)	(0.01239)	(0.01283)	(0.01238)	(0.01283)
HH st. dev. residual income	0.00003	0.00003	0.00003	.	-0.00006
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02230***	0.02254***	0.02253***	0.02253***	.
	(0.00240)	(0.00237)	(0.00239)	(0.00240)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08199***
	.	.	.	.	(0.00883)
HH head in a couple	.	-0.02599*	-0.02599*	-0.02600*	-0.02880*
	.	(0.01495)	(0.01499)	(0.01543)	(0.01487)
HH head retired	.	-0.01943***	-0.01947***	-0.01949***	-0.01696**
	.	(0.00675)	(0.00671)	(0.00689)	(0.00695)
HH head unemployed	.	-0.06176***	-0.06173***	-0.06173***	-0.06475***
	.	(0.01401)	(0.01375)	(0.01388)	(0.01470)
Child in full-time work	.	.	0.00241	0.00241	0.00289
	.	.	(0.00812)	(0.00793)	(0.00826)
Child in part-time work	.	.	0.01251	0.01251	0.01346
	.	.	(0.00991)	(0.00942)	(0.00987)
Child unemployed	.	.	0.00709	0.00708	0.00718
	.	.	(0.01117)	(0.01122)	(0.01110)
Constant	-0.04595***	-0.04550***	-0.04554***	-0.04556***	-0.05219***
	(0.00824)	(0.00832)	(0.00822)	(0.00826)	(0.00783)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	43193	43193	43193	43193	43193

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

Table B.3: First-differences regressions with the logarithm of household-equivalent food consumption as the dependent variable. Share of unemployed individuals.

	(1)	(2)	(3)	(4)	(5)
Change in:	b/se	b/se	b/se	b/se	b/se
Child unempl. risk (SILC)	-0.28500***	-0.28332***	-0.28444***	-0.28456***	-0.30102***
	(0.07086)	(0.06992)	(0.06932)	(0.06551)	(0.06910)
Child income (predicted, in log)	0.05338***	0.05421***	0.05387***	0.05392***	0.04108***
	(0.01583)	(0.01545)	(0.01588)	(0.01564)	(0.01582)
HH st. dev. residual income	0.00003	0.00002	0.00002	.	-0.00006
	(0.00010)	(0.00010)	(0.00010)	.	(0.00010)
HH equiv. income (in log)	0.02223***	0.02246***	0.02246***	0.02246***	.
	(0.00233)	(0.00247)	(0.00232)	(0.00234)	.
HH equiv. income (predicted, in log)	.	.	.	.	0.08203***
	.	.	.	.	(0.00879)
HH head in a couple	.	-0.02555*	-0.02553*	-0.02553*	-0.02836*
	.	(0.01524)	(0.01474)	(0.01464)	(0.01525)
HH head retired	.	-0.01967***	-0.01972***	-0.01974***	-0.01721***
	.	(0.00708)	(0.00700)	(0.00648)	(0.00658)
HH head unemployed	.	-0.06167***	-0.06166***	-0.06167***	-0.06464***
	.	(0.01372)	(0.01431)	(0.01471)	(0.01377)
Child in full-time work	.	.	0.00223	0.00223	0.00274
	.	.	(0.00791)	(0.00787)	(0.00777)
Child in part-time work	.	.	0.01237	0.01238	0.01334
	.	.	(0.01020)	(0.00987)	(0.00983)
Child unemployed	.	.	0.00814	0.00813	0.00833
	.	.	(0.01073)	(0.01118)	(0.01080)
Constant	-0.04970***	-0.04922***	-0.04926***	-0.04927***	-0.05579***
	(0.00844)	(0.00849)	(0.00826)	(0.00840)	(0.00805)
Wave FE	Yes	Yes	Yes	Yes	Yes
Obs.	43193	43193	43193	43193	43193

$^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Monetary values expressed in PPP real values (thousand Euros, Germany, 2005). Bootstrapped standard errors in parenthesis.

C Proof of the solution

The log-normal utility function takes the form

$$U_t^{1,y} = \frac{1 - \mathrm{e}^{-kc_t^{1,y}}}{k} + \mathbb{E}_t \, \frac{1 - \mathrm{e}^{-kc_{t+1}^{1,o}}}{k} + \alpha \, \mathbb{E}_t \, \frac{1 - \mathrm{e}^{-kw_{t+1}^{2,y}}}{k},$$

which must be maximized over $s_t^{1,y}$ and $s_{t+1}^{1,o}$ subject to the following constraints:

$$\begin{aligned} c_t^{1,y} &= y_t^{1,y} - s_t^{1,y} \\ c_{t+1}^{1,o} &= y_{t+1}^{1,o} + s_t^{1,y} - s_{t+1}^{1,o} \\ w_{t+1}^{2,y} &= y_{t+1}^{2,y} + s_{t+1}^{1,o} \, . \end{aligned}$$

By substituting the constraints into the utility function, we express it in terms of savings:

$$U_t^{1,y} = \frac{1 - \mathrm{e}^{-k\left(y_t^{1,y} - s_t^{1,y}\right)}}{k} + \mathbb{E}_t \, \frac{1 - \mathrm{e}^{-k\left(y_{t+1}^{1,o} + s_t^{1,y} - s_{t+1}^{1,o}\right)}}{k} + \alpha \, \mathbb{E}_t \, \frac{1 - \mathrm{e}^{-k\left(y_{t+1}^{2,y} + s_{t+1}^{1,o}\right)}}{k} \, .$$

Since, in general, $\mathbb{E}_t \, \mathrm{e}^{ax} = \mathrm{e}^{a\mu - a^2 \frac{\sigma^2}{2}}$ if $x \sim \mathcal{N}\left(\mu, \sigma^2\right)$ and, in our case, $y_{t+1}^{1,o} \sim \mathcal{N}\left(\bar{y}^{1,o}, \sigma^{2\,1,o}\right)$ and $y_{t+1}^{2,y} \sim \mathcal{N}\left(\bar{y}^{2,y}, \sigma^{2\,2,y}\right)$, we can write the utility function as follows by exploiting the properties of exponentials:

$$U_t^{1,y} = \frac{1 - \mathrm{e}^{-k\left(y_t^{1,y} - s_t^{1,y}\right)}}{k} + \frac{1 - \mathrm{e}^{-k\left(\bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o}\right)}}{k} + \alpha \frac{1 - \mathrm{e}^{-k\left(\bar{y}^{2,y} - \frac{k}{2}\sigma^{2\,2,y} + s_{t+1}^{1,o}\right)}}{k} \, .$$

The first order conditions take the form

$$\frac{\partial U_t^{1,y}}{\partial s_t^{1,y}} = -\mathrm{e}^{-k\left(y_t^{1,y}-s_t^{1,y}\right)} + \mathrm{e}^{-k\left(\bar{y}^{1,o}-\frac{k}{2}\sigma^{2\,1,o}+s_t^{1,y}-s_{t+1}^{1,o}\right)} = 0$$

$$\frac{\partial U_t^{1,y}}{\partial s_{t+1}^{1,o}} = -\mathrm{e}^{-k\left(\bar{y}^{1,o}-\frac{k}{2}\sigma^{2\,1,o}+s_t^{1,y}-s_{t+1}^{1,o}\right)} + \alpha\mathrm{e}^{-k\left(\bar{y}^{2,y}-\frac{k}{2}\sigma^{2\,2,y}+s_{t+1}^{1,o}\right)} = 0,$$

which we can simplify easily by rearranging the terms, taking the logarithm, and dividing by $-k$:

$$y_t^{1,y} - s_t^{1,y} = \bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o}$$

$$\bar{y}^{1,o} - \frac{k}{2}\sigma^{2\,1,o} + s_t^{1,y} - s_{t+1}^{1,o} = -\frac{\ln\alpha}{k} + \bar{y}^{2,y} - \frac{k}{2}\sigma^{2\,2,y} + s_{t+1}^{1,o},$$

which we can solve by isolating $s_t^{1,y}$ in the former

$$s_t^{1,y} = \frac{1}{2}y_t^{1,y} - \frac{1}{2}\bar{y}^{1,o} + \frac{k}{4}\sigma^{2\,1,o} + \frac{1}{2}s_{t+1}^{1,o}$$

and replacing it in the latter to arrive at the solution for saving in $t+1$

$$s_{t+1}^{1,o} = \frac{1}{3}y_t^{1,y} + \frac{1}{3}\bar{y}^{1,o} - \frac{k}{6}\sigma^{2\,1,o} - \frac{2}{3}\bar{y}^{2,y} + \frac{k}{3}\sigma^{2\,2,y} + \frac{2}{3}\frac{\ln\alpha}{k}$$

and replacing back in the former

$$s_t^{1,y} = \frac{2}{3}y_t^{1,y} - \frac{1}{3}\bar{y}^{1,o} + \frac{k}{6}\sigma^{2\,1,o} - \frac{1}{3}\bar{y}^{2,y} + \frac{k}{6}\sigma^{2\,2,y} + \frac{1}{3}\frac{\ln\alpha}{k},$$

which is the optimal saving in t. Accordingly, the consumption profile is

$$c_t^{1,y} = y_t^{1,y} - s_t^{1,y} = \frac{1}{3}y_t^{1,y} + \frac{1}{3}\bar{y}^{1,o} - \frac{k}{6}\sigma^{2\,1,o} + \frac{1}{3}\bar{y}^{2,y} - \frac{k}{6}\sigma^{2\,2,y} - \frac{1}{3}\frac{\ln\alpha}{k}$$
$$c_{t+1}^{1,o} = \bar{y}^{1,o} + s_t^{1,y} - s_{t+1}^{1,o} = \frac{1}{3}y_t^{1,y} + \frac{1}{3}\bar{y}^{1,o} + \frac{k}{3}\sigma^{2\,1,o} + \frac{1}{3}\bar{y}^{2,y} - \frac{k}{6}\sigma^{2\,2,y} - \frac{1}{3}\frac{\ln\alpha}{k}$$
$$w_{t+1}^{2,y} = \bar{y}^{2,y} + s_{t+1}^{1,o} = \frac{1}{3}y_t^{1,y} + \frac{1}{3}\bar{y}^{1,o} - \frac{k}{6}\sigma^{2\,1,o} + \frac{1}{3}\bar{y}^{2,y} + \frac{k}{3}\sigma^{2\,2,y} + \frac{2}{3}\frac{\ln\alpha}{k},$$

which satisfies the constraints that

$$c_t^{1,y} + c_{t+1}^{1,o} + w_{t+1}^{2,y} = y_t^{1,y} + \bar{y}^{1,o} + \bar{y}^{2,y}$$

in expectations.

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