

LIFE CYCLE CONSUMPTION AND THE GREAT RECESSION

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Abstract: Using Italian Household Budget Survey data for the period 1997-2013, this paper estimates the life cycle profiles of consumption and cross-sectional variance in the Great Recession. The study examines age profiles for total and durable expenditure, and four subcomponents of non-durable expenditure. We document significant heterogeneity in the way the recession affects consumption and the variance within-cohorts. The crisis has entailed a fall in expenditure for the youngest cohorts, and a notable reduction of inequalities for the middle and oldest cohorts with some differences between high and low income elastic expenditure. We also found that socio-demographic factors account for a substantial heterogeneity in consumption behaviour during the recession across households and expenditure subcomponents.

Keyword: Consumption, Inequality, Life cycle, Cohort approach, Recession

JEL codes: D15, D91, C33

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1. Introduction

The Great Recession of 2008-2009 and the subsequent recession of the Sovereign debt (2011-2013), have been the deepest and longest recessions in Italy since the Second World War. In 2008, the real disposable income went down by 3.7% year-over-year, and during the sovereign debt crisis (2011-2013), recorded a drop of 6.7%. The overall fall from 2007 to 2013 was 15%.⁴

Expenditure on both durable and non-durable goods was affected, and was more pronounced for durables as one would expect.

From 2008 to 2009 real total expenditure decreased by 1.8%, with expenditure on durable and semi-durable goods declining by 2.0% and 5.5% respectively, and non-durables by 3.1%. As far as the latter are concerned, it is worth noting that food expenditure declined by 2% whereas in the semi-durable goods category there was a sizeable reduction in clothing expenditure of 5.5%.

In 2012, the annual drop of 3.8% in total real consumption expenditure was more than twice that of the first year of the Great Recession. The decline was across all consumption categories, but was felt more by durable and semi-durable goods which decreased by 10.2% and 9.2%, respectively. Consumption of non-durables also recorded a sizeable decline of 4.4%.

These figures suggest a worsening of living standards of Italian households during the Great Recession that has been exacerbated by the Sovereign debt crisis, albeit its roots are mainly to be found in an economy that had been stagnating in the past decade (Brandolini 2014, Jenkins et al. 2013).⁵

During the Great Recession Italian households reduced their consumption less than real disposable income, Rodano and Rondinelli (2014) evidenced that households smoothed the repercussion of the negative effect on consumption expenditure by eroding savings and wealth.

The subsequent crisis of the Sovereign debt and the implementation of austerity measures caused a further reduction of disposable income, that had been exacerbated by

⁴ Elaboration on data from Italian Office of Statistics, National Accounts, <http://dati.istat.it/> (accessed on 30 August 2017).

⁵ See also Busetti and Cova (2013) for a deeper description of macro factors characterizing the sovereign debt crisis.

substantial wealth losses, and caused an almost equal reduction of consumption (Brandolini 2014; Rondano and Rondinelli 2014).

In comparing the demand elasticity of some subcategories of expenditure in 2009 with 2012, Rondinelli (2014) argued that the Sovereign debt crisis entailed a structural change in consumption of Italian people. Empirical evidence documented that wealth shocks and the perception of the persistent decrease of income of Italian households did play a relevant role on the drop of consumption in the last few years (Bottazzi et al. 2015, Rodano and Rondinelli 2014).

Similar evidence was detected in other developed countries. Precisely, empirical analyses on the Great Recession link the fall in household consumption to factors such as changes in consumer wealth – especially housing and equity – a rise in the uncertainty associated with future income, and credit constraints due to the credit crunch.

De Nardi et al. (2012) documented that reductions in wealth and income expectations were crucial factors in the drop in consumption during the Great Recession. Similar results were found by Christelis et al. (2015), who found a positive relationship between the loss of housing and financial wealth and the drop in household expenditure, and argued that wealth loss may force households to cut consumption and increase saving to restore their buffer stock (see also Petev et al. 2011, Moore and Palumbo 2010). Alan et al. (2011) showed that the increase in the aggregate saving ratio was driven by increases in uncertainty, rather than by the credit crunch. They found that only young people were saving more in response to tightened credit.

Additionally, in times of economic crisis it is natural for levels of confidence to go down in the wake of increasing uncertainty about future income due both to worries about job loss and the reorganization of production. As a consequence, according to economic theory, risk-averse households will respond to increased uncertainty by delaying consumption expenditure, especially for durable goods (generally purchased by borrowing), and by saving for precautionary reasons and/or to rebuild their balance sheets (Alan et al. 2011, Arrondel et al. 2014, Bertola et al. 2004, Petev et al. 2011).

Of course, the extent to which all of this affects household consumption depends on choices the household has made as regards risky assets and the uncertainty of future income, factors that may be age related (see e.g. Deaton and Paxson 1994, Zhang and

Xiang 2014). Thus, a feature of the Great Recession and the subsequent recession is not only the drop in consumption, but also the significant heterogeneity in the way it affected household consumption including marked changes in intergenerational consumption inequality (see Jenkins et al. 2013, Petev et al. 2011).

In this paper, we consider two prominent facts of recessions. The first is the structural change in consumption of households. The second fact is that the crises affected the households in a different way. As regards the first fact, we investigate whether the structural changes in consumption observed after 2008 imply a scattered decline of consumption inequality among households over lifetime. As far as the second fact is concerned, we aim at identify which groups and categories of expenditure were the hardest hit. We examine these issues using quantitative models to explore the life cycle consumption profile and the expenditure variance in order to see how households responded to the Great Recession and the subsequent recession.

The study uses data from the Italian Household Budget Survey (HBS) for the period 1997-2013 to estimate life cycle profiles of consumption, controlling for demographic, socio-economic, geographical, cohort, age, and time effects.

There are three reasons for our study. Firstly, we aim to explore empirically the life cycle expenditure profile of different consumption categories to see if there was substantial heterogeneity across consumption goods. Thus, we disaggregate the total consumption expenditure into durables and non-durables, separating the latter into more detailed consumption subcomponents.

Secondly, as regards the life cycle profile of mean expenditure, adapting Miniaci and Weber (1999), we decompose changes in expenditure profiles into two parts: observable and unobservable. In other words, we discriminate the extent to which changes in expenditure profiles are due to individual characteristics (i.e. observable change) from that to which they are due to alterations in the economic environment during a recession (unobservable change) leading to a reduction in wealth, an uncertain future income, a dramatic worsening of labor market conditions, and so on.

As far as variance of expenditure is concerned, using the within-cohort inequality method proposed by Aguiar and Hurst (2013), we model expenditure dispersion over the life cycle and suggest how the method for identifying the effects of the Recession within cohorts

might be improved. Examining differences in the pattern of consumption inequality before and after the start of the Great Recession is particularly interesting given its severity and considering recent empirical evidence, which documents changes in consumption inequality during the period of the Recession (Brandolini 2014, Meyer and Sullivan 2013, Petev et al. 2011). To the best of our knowledge, this analysis is the first attempt to exploit HBS data to construct a life cycle profile of expenditure variance with specific reference to the Great Recession⁶ and taking disaggregated categories of consumption into account.

Finally, our aim is to identify the main socio-demographic factors of those households hit by the recession, paying particular attention to the different consumption categories.

Our study builds on the abundant literature documenting the empirical life cycle consumption expenditure profile, examples of which are, among others, Aguiar and Hurst (2013), Browning et al. (2014), Deaton (1992), Fernández-Villaverde and Hrueger (2007). Our empirical model is also defined on the basis of recent literature on consumption and the Great Recession (see e.g. Alan et al. 2011, Arrondel et al. 2014, Brandolini 2014, Christelis et al. 2015, Crossley et al. 2013, De Nardi et al. 2012, Meyer and Sullivan 2013, Petev et al. 2011, Rondinelli 2014, Rodano and Rondinelli 2014). However, the study offers the following new contributions. Firstly, we examine how households have responded to the recent recessions, providing age and cohort expenditure patterns for durables and different categories of non-durables. Secondly, we investigate changes in the life cycle profile of mean expenditure and cross-sectional consumption inequality during the recession. Finally, we decompose the impact of recession on consumption expenditures into economic, environment effects and individual socio-demographic effects. Regarding the latter, we explore the effects of some important determinants of consumption such as job status and the employment sector the householder works in, and whether the householder is a tenant or a homeowner.

The rest of the paper is structured as follows. Section II describes the HBS data and household consumption behavior before and after the start of the Great Recession. Section III presents the specification of the estimated model of life cycle consumption. It also explains in detail how we assess changes in the life cycle profile of mean and variance of

⁶ The term 'Great Recession' refers hereinafter to the two recessions of 2008-2009 and 2011-2013

expenditure. Section IV illustrates our empirical results on the life cycle profile of mean and variance of expenditure. Section V offers some concluding remarks.

2. Data and some descriptive statistics

2.1 The HBS Data

The empirical analysis has been performed on data from the Household Budget Survey (HBS), carried out by the Italian Office of Statistics (ISTAT). A sample of 394,893 households was collected over the period 1997 to 2013⁷. The data set contains different categories of expenditures distinguishing between non-durable and durable goods. As regards non-durables, following Aguiar and Hurst (2013), we have aggregated them in four groups: (a) *food at home* (which we shall call food); (b) *work-related* (namely clothing, personal care, food away from home and non-durable transportation); (c) *core* (that is housing, utilities, health and education expenditure, life, health and home insurance and all other minor non-durable expenditures); and (d) *leisure* (all expenditures on cultural activities and recreation). We have also considered the total expenditure. All expenditure components have been deflated by the 2010 general index of consumer prices.

All of the above was done in order to investigate whether expenditure categories react differently to crisis and to what extent they reflect changes in total expenditure. In the next sub-Section some evidence of the life cycle consumption profiles of the different consumption categories will be illustrated.

2.2 Consumption Behavior pre- and post-Crisis

In harmony with the life cycle theory, Figure 1 demonstrates that all non-durable categories of consumption as well as the total expenditure show an inverted U-shaped age profile, where the highest values are found in middle-aged households.⁸ The only

⁷ The choice of the analysed period has been imposed by the availability of homogenous data.

⁸ In Figures 1 and 2, to better represent the age-cohort-time effects, the average values of the total expenditure and the different subcomponents, obtained as the mean and variance expenditure of each cohort from 1997 to 2013 against the age of the head of the household, are plotted. In each chart, a connected line represents the expenditure behaviour of a cohort over the 17 years of the analysed period, which has a five-year overlap with the next cohort. The distance between lines indicates the difference between

exception is the core category, where the highest values are slightly shifted to the right of the x-axis, when retirement is imminent. Conversely, durables do not show a clear inverted U-shaped profile, the mean consumption being rather stable over lifetime with slightly higher values around the middle-aged classes.

<<Insert Figure 1 about here>>

Looking at the profile of expenditure variance over the life cycle, we detect an increase of the variability over lifetime for all categories, with the exception of durables and food expenditure (Figure 2). According to the permanent income hypothesis, the increase of within-cohorts inequality reflects differences in the effects unexpected events have on lifetime income with consequences on consumption. To be more specific, if uninsured idiosyncratic shocks impacting on individual income are accumulated over lifetime the cross-sectional dispersion of income within a fixed cohort will grow with age, implying an increase of consumption inequality too (Aguiar and Hurst 2013, Deaton and Paxson 1994, Ohtake and Saito 1998, Zhang and Xiang 2014). However, as argued by Deaton and Paxson (1994), this increase over lifetime is not an automatic process, but rather depends on intergenerational transfers of assets, the age structure of the population and on what insurance has been taken out to deal with an unpredictable future.

As shown in Figure 2, expenditures generally display a U-shaped age profile, where the lowest values are found in middle-aged classes. However, noteworthy differences exist in the life cycle profile of variance among the various categories of non-durables. The variance of food, for example, decreases monotonically over lifetime, the lowest values being in the older-aged households. Food is the quintessential basic good, and it is to be expected that, from the beginning of retirement, when there is no longer uncertainty in income expectation, the share of food expenditure is likely to be rather similar among households. The pattern for the work-related category, however, is quite different. The smallest variance is for mature age worker households, monotonically increasing for

expenditure levels for those households with the same age but different year of birth; i.e. it measures the cohort-time effect. It is also possible to track the behaviour of households with different ages within each cohort in order to evaluate the effect of population ageing. The differences along the same line measure the age-time effect.

retired householders. This pattern reflects the compulsory nature of some subcomponents of expenditure involved in work-related, like food away from home and clothing. Since the share of this kind of expenditure decreases after retirement the subsequent increase of variance likely reflects differences among households in lifestyle and income levels. As regards leisure, a luxury good, the variance is essentially stable from the age of 32 upwards, with a slight reduction for the oldest households.

<<Insert Figure 2 about here>>

A comparison of the age expenditure profiles in pre- and post-crisis periods (i.e. 1997-2007 control period vs 2008-2013 treatment period), has revealed several points of interest (Figure 3).

<<Insert Figure 3 about here>>

Firstly, the total expenditure and all the consumption categories show, both in the control and in the recession period, a bell shaped profile with a hump at the middle-aged classes. However, this profile is less clear for durables, where there is an increase for the youngest households, a decrease for the oldest and with the other age classes remaining rather stable. A second point worth mentioning concerns the different levels of the expenditure profiles in the two periods. Those of the recession period are, for all consumption categories, below those of the control period; this difference indicates the fact that all age groups have decreased mean spending considerably. Predictably, the difference in expenditure profiles between the control and the treatment period is larger for leisure and durables. A final point is the closeness between the control and treatment curves for food and work-related expenditure in the oldest-aged households: it seems that during the recession they have only slightly diminished their average spending on these items.

When we compare the variance of the expenditure profile pre- and post-crisis, we generally observe it decreasing among households of all age classes. However, in Figure 4 noteworthy differences between total expenditure, durables and non-durables can be seen.

As regards total expenditure, in the two analyzed periods the variance is equal for middle-aged households, but smaller for the youngest and the oldest in the recession period.

Regarding durables, the variance is lower for all age classes but with the highest significant decreases being found among those of mature working age (namely the 45-64 age class). As one would expect, during the Recession the variance of durable expenditure is lower among younger and older households than it is pre-crisis.

Looking at non-durables, there are no notable differences in the variance profile of core pre- and post-crisis; however, a significant decrease of variance during the recession can be detected in older-aged households. As far as food is concerned, the variability among households, as expected, decreases monotonically in both periods as age increases. It should be noted, though, that the variance values in the 30-64 age classes are higher than the equivalent age classes in the pre-crisis period. Since food is a basic good, this is worrying: higher values of variance indicate a rise in food expenditure inequality. As regards work-related expenditure, the variance increases monotonically with age in both periods, but during the recession the variance curve is above the corresponding curve in the control period for the working age classes, whereas lower values than in the pre-crisis period are detected from early retirement age onwards. Finally, as expected, for leisure the variance curve during the recession is above its pre-crisis equivalent for all ages, except the older age classes.

In sum, the descriptive analysis, performed on raw data, indicates that pre- and post-crisis, total expenditure, as well as durables and non-durables display a significant hump shape over the life cycle, peaking generally in middle age and declining thereafter. We have also seen that cross-sectional consumption inequality - with the exception of durables and food - increases with age. Thus, it is highly relevant to estimate life cycle profiles of consumption for the mean and variance profiles, controlling for demographic, cohort and age effects. Since our comparison of life cycle expenditure patterns, pre- and post-crisis, for total expenditure and its subcomponents has revealed significant differences, an investigation into the effects of the crisis should also include looking into the extent to which the crisis has affected expenditure patterns and increased inequality across households.

To analyze consumption behavior over lifetime in greater depth, taking the effect of the crisis into account, we will now estimate different consumption models for the mean and the variance profiles of total expenditure, durables and different subcomponents of non-durables.

3. The Method

To investigate the effects of the Great Recession on consumption we follow Attanasio and Weber (1994), Miniaci and Weber (1999) and specify a life cycle consumption model including a *control period* of relative stability (1997-2007) and a *treatment period* (2008-2013) affected by the crisis. Our aim is to explore changes in both expenditure levels and variability during the treatment period; these changes may be different within cohorts due to idiosyncratic shocks specific to a household and related to demographic factors, labor market conditions, and so on; and to unobservable changes in the economic environment (expected future income, perceived uncertainty, etc.).

The baseline model is specified as follows:

$$C_{ht} = \beta + \delta_{ht}^c + \beta_{family} \pi_{ht} + \gamma_t D_t + \sum_{j=1}^c \beta_j^{rec} d_j^{2008/2013} + \varepsilon_{ht} \quad (1)$$

$$\text{with } \delta_{ht}^c = \beta_c Cohort_{ht} + \beta_{age} Age_{ht} + \beta_{age2} Age_{ht}^2 + \beta_{age3} Age_{ht}^3$$

where C_{ht} is the observed consumption of household h , whose householder is a years old at time t and belongs to cohort c ; δ_{ht}^c represents the age expenditure profile obtained by the sum of a polynomial in age and cohort dummies. To isolate age profiles, we follow standard practice in the consumption literature by attributing consumption growth to age and cohort effects and use year dummies to capture cyclical fluctuations (Deaton 1997, Aguiar and Hurst 2013). In particular, we follow Deaton and Paxson (1994) by restricting the year effects to average zero over the sample period: these effects are orthogonal to a time trend. These normalized year dummy variables D_t are thus included for the control period. π_{ht} is a vector which includes variables related to householder characteristics. At this stage of the analysis, we suggest controlling expenditure only for family composition effects (size and percentage of children). In line with Aguiar and Hurst (2013) and

Fernández-Villaverde and Krueger (2007), expenditures are measured at household level, and are thus affected by household size and composition. Furthermore, in order to take into account the relevant regional differences in the Italian context, we also control for the household's place of residence (distinguishing between the North and Center-South of Italy).

To measure the aggregate effect of the recession which is common to all individuals, the Model (1) is augmented by specific cohort-dummies for the period 2008-2013 whose coefficients β_c^{rec} can be interpreted as the deviations of cohort h consumption in the recession period from the pre-crisis predictions. In other words, β_c^{rec} indirectly assesses aggregate effects that occur following a crisis like expected future income, perceived uncertainty, wealth loss and so on.

In a departure from previous literature, our study evaluates not only whether the Great Recession has affected the life cycle of mean expenditure, but also whether it has affected expenditure inequality. In this regard, we estimate the life cycle profile of the cross-sectional expenditure dispersion using the within-cohort inequality method proposed by Aguiar and Hurst (2013). In addition, by inserting cohort dummies for the recession period, we propose an improvement of the model to take into account the effects of the crisis. With this strategy we are able to compare lifetime profiles of the variance between the control and treatment period for any cohort, and also to separate the effects of the Great Recession from other aggregate shocks during lifetime and which are enclosed in the cohort effects (i.e. the β_c parameters). As underlined by Deaton and Paxson (1994) '*a model of autarkic intertemporal allocation with isoelastic preferences predicts that the variance of log consumption will be constant in the absence of idiosyncratic shocks, and this is a natural baseline from which to look for the dispersion that should occur under individual uncertainty*' (p.443). Our approach enables us to detect inequality in consumption behavior over lifetime and to measure to what extent the Great Recession has modified the spread in inequality. In detail, we compute σ_{ac}^2 , the variance of the residuals from Model (1) for each age and cohort over the control and treatment periods and include cohort-dummies for the period 2008-2013. We then estimate the following equation:

$$\sigma^2_{ac} = \alpha + \alpha_{age}Age_a + \alpha_c Cohort_c + \sum_{j=1}^c \beta^{var_rec} d_j^{2008/2013} + \eta_{ac} \quad (2)$$

where the vector of cohort coefficients during the crisis $\beta_c^{var_rec}$ enables us to estimate the effects of the recession on the variance in expenditures within cohorts.

The role of demographic variables in the expenditure model under uncertainty have largely been investigated by Attanasio et al. (1999), who show that the hump-shaped age profile of consumption is partly driven by demographics, and partly by precautionary saving. In order to evaluate the profile of the households most affected by the crisis, we propose to extend the Model (1) by introducing a set of socio-demographic variables⁹ related to the householders for both the two periods:

$$C_{ht} = \delta_{ht}^c + \beta_{demo}\pi_{ht} + \gamma_t D_t + \sum_{j=1}^c \beta_j^{rec} d_j^{2008/2013} + \beta_{demo}^{rec} z_{ht}^{2008/2013} + \varepsilon_{ht} \quad (3)$$

where β_{demo}^{rec} evaluates how households with different socio-demographic characteristics, such as education, household composition, and employment status, respond to the recession.

By means of cohort techniques, we model the different categories of expenditures and the total expenditure over the household life cycle disentangling age and cohort effects. To identify the cohorts, the sample has been divided according to the year of birth of the householder. Following Attanasio and Weber (1994), Browning et al. (1985), and Deaton (1985), we group households on the basis of the age of the head of the household, using five-year age band cohorts, and track the cohorts over time. The age of each household head (i.e., “*a*”) is defined as the midrange age of the age-class which the household head belongs to, while cohort “*c*” is defined as $c = t - a$, where “*t*” is the year in which the household was interviewed. Thus, cohort 2 includes all households whose head was born after 1985 up to and including 1990, cohort 3 those born after 1980 to the end of 1985 and so on.

⁹ The selection of the socio-demographic variables has been driven by preliminary empirical evidence on Italian context (see Brandolini 2104, Jenkins et al. 2013, Rodano and Rondinelli 2014).

4. Results

4.1 The Mean of Expenditures over the Recession Period

We estimate Equation (1) for the logarithm of total expenditure, durables, non-durables and subcomponents of non-durables such as food at home, work-related, core and leisure.

<<Insert Table 1 about here>>

As far as the life cycle profile of the mean is concerned (see Table 1), the coefficients of cohort dummies in the recession period are highly significant for both total expenditure and its subcomponents. It is immediately apparent that all cohorts reduce their purchases of durables to a greater extent than their purchases of non-durables. This might be explained by the rise in uncertainty as households delay the purchase of more costly goods, as well as by the tightening of consumer credit, which in pre-crisis times had strongly supported the consumption of durables like household appliances and consumer electronics. Similar explanations have been suggested by Petev et al. (2012) in the US context and Rodano and Rondinelli (2014) in the Italian context.

Similar to previous empirical analysis (Brandolini 2014, Jenkins et al. 2013, Rodano and Rondinelli 2014), the greatest change in consumption behavior for all categories of expenditure can be seen in younger cohorts, and is particularly dramatic for work-related expenditure which falls on average by 17.3%. Those in the 28-39 age classes are probably more vulnerable to uncertainty associated with future income, labor market conditions and so on. This result is consistent with the structure of the labor market in Italy where satisfactory work is difficult to find for those in their mid to late thirties, and also it is worth noting that the levels of employment in Italy fell caused mainly by a decrease in transition into employment (see Jenkins et al. 2013). Additionally, younger households have likely less cash on hand and are unable to borrow to smooth their consumption. These credit constraints force them to cut consumption (Alan et al. 2011, Petev et al. 2011). Conversely, the oldest cohorts, with a relatively stable and assured income, reduced their consumption less, although a likely uncertainty effect may be detected for work-related and durable expenditures. Even with this group the increased probable uncertainty of an

economic recovery induces increases in saving and consequent decreases in consumption (Alan et al. 2011). The crisis has also likely intensified the liquidity constraints effect which – on the basis of empirical evidence – probably explains the hump and downward-slope in the age profile of durable expenditures (Alessie et al. 1997, Fernandez-Villaverde and Krueger 2007). Regarding the fall of work-related expenditure towards the end of a household's lifetime, as highlighted by Aguiar and Hurst (2013), the opportunity cost of time falls over lifetime because households have a weaker attachment to the labor force regardless of changes in resources: this is even more so in recession where uncertainty as to the future leads to an increase in saving and a reduction of resources.

Reductions in spending on leisure of middle-cohort households are noteworthy. These households have likely accumulated a significant amount of wealth; thus it is intuitive to hold that the fall of consumption is due to the wealth effect (see Christelis et al. 2015). During a recession, wealthy households may at first be prepared to accept a large loss of wealth to smooth their consumption (Rodano and Rondinelli 2014), but later on increase their saving to restore their balance sheets with a consequent reduction in their consumption (Wolff et al. 2011). Such changes in wealth have a stronger effect on highly income-elastic expenses like leisure (Arrondel et al. 2014).

Lastly, the crisis also affected food, the quintessential basic need. It could be that cuts in spending on food across all age classes reflect a worsening of living standards, although the reduction is less pronounced among the oldest cohorts. On the other hand, the decline in food spending may be because, in times of recession, consumers are looking for better deals or switching to discount stores.

4.2 Cross-Sectional Variances of Expenditures over the Recession Period

Looking at the cross-sectional variance of expenditure, we find significant cohort effects during the Great Recession (Table 2). The dispersion of total expenditure decreases noticeably for all cohorts, even if the extent of the fall is, on average, slightly more marked for the oldest than the youngest and the middle cohorts, at 4.7% and 3.6% respectively. Total expenditure masks substantial heterogeneity among the less aggregated consumption categories. It is worthy of note that variability for food increases among the oldest cohorts (the 67-74 age group), but decreases among the younger cohorts (the 28-38

age group). The roughly 3.5% reduction of the core expenditure dispersion for the younger and middle cohorts is somewhat lower than that for cohorts aged 63-74 (at about 4.1%). These figures, along with the negative cohort effects of the mean expenditure, are quite alarming since the core category includes expenditure on such necessary goods as health and education. For the oldest cohorts this is particularly serious since they are more likely to need medical care.

<<Insert Table 2 about here>>

There is a significant increase of variance in the life cycle profile of work-related expenditure for pensioners or those about to retire, highlighting differences between rich and poor. This might be reflecting differences in life style and income levels between households with a stable income at retirement and those where the householder is an independent contractor, for example, and may have an uncertain income. On the other hand, since work-related includes expenses like clothing and food away from home, the absence of adequate welfare policies may lead the poor and less well-off to reduce consumption of unnecessary goods for precautionary reasons.

Conversely, the reduction of consumption inequalities for work-related expenditure seen in the young and middle-aged cohorts likely reflects a fall of consumption by the highly educated. Young highly educated people, on a low current income, may experience a tightening of credit leading to a reduction in consumption. Middle-aged highly educated people are more likely to invest in the stock market than those with low levels of education or the young, so their reduction in consumption may be due to losses in this area (see Petev et al. 2012, Christelis et al. 2015, Petev et al. 2011, Wolff et al. 2011).

As far as leisure is concerned, we see an increase of variability among all cohorts, which might be due to a change in the consumption behavior of those with unstable jobs cutting down on luxuries like leisure. However, this result must be treated with caution because the effects are not statistically significant. In the durables category a significant decrease of variability is seen among the oldest cohorts.

Summing up, the recession has led to reductions in household consumption especially among the youngest cohorts. A striking reduction of inequalities was detected for middle

cohorts in the subcategory of work-related with its highly income-elastic expenditure such as clothing and food away from home. Furthermore, among the younger and older cohorts we have seen a decrease of variability for core expenditure which includes less elastic expenses like health and education.

4.3 The Mean of Expenditures controlling for socio-economic effects

The previous empirical models of expenditure, in which the control variables are simply family composition and region, enable us to assess to what extent the crisis has changed both the consumption behavior of households over the life cycle and the profile of variance of expenditures. However, to analyze in greater depth the cut-backs in total expenditure and its subcomponents controlling for heterogeneity among households, we estimate a richer empirical model, to include the economic activity sectors which have suffered the most (i.e. construction, trade and accommodation and restaurant) where the householder works, the most vulnerable types of job status (i.e. term-contract worker, self-employed and job seeker) and home-ownership. To this end, Equation (3) has been estimated for the logarithm of total expenditure and its subcomponents.

As shown in Table 3, we find significant differences in the effects of the crisis on different typologies of households and across goods. As far as the regional dummy is concerned, we find that households living in the South of Italy have cut down total expenditure by about 4% more than those in the North ; a large percentage of this reduction is accounted for by durables (26%) and leisure (9%), with less by work-related (3%), core and food (both 2%).

<<Insert Table 3 about here>>

Regarding family composition, the number of adults did affect total consumption positively during the Recession, while the percentage of children acted negatively on all subcomponent expenditures. The magnitude of this effect is, of course, greater for unnecessary goods such as leisure.

Job status significantly affects consumption behavior across the board. Job insecurity is particularly felt by temporary employees or occasional workers. The negative effect on

these groups is marked for work-related (27%) and leisure (12%), but also sizeable for food (6%).

When we looked at employees, we found noticeable differences in expenditure patterns depending on the economic sector where the householder works. We could take the construction sector as an example where there are marked changes in work-related and leisure expenditure. For those in the accommodation and restaurant sector, only food and leisure expenditure show significant reductions (3% and 5% respectively).

Finally, it is worth noting the significant effect the crisis has had on tenants. They reduced expenditure across the board but especially on work-related, leisure and durables.

5. Conclusions

In this article we have documented the life cycle profiles of expenditure and cross-sectional variance in the Great Recession, separating the cohort effects related to the recession from those related to all the aggregate shocks occurring over the lifetime of households. We have also distinguished between total expenditure, durables and different categories of non-durables. Further, we have noted changes in age profiles during the recession by comparing expenditure profiles before and after the crisis.

We have used the cohort effects to highlight some key aggregate determinants of the cut-backs in total expenditure and its subcomponents, such as uncertainty associated with future income, unstable jobs, the wealth effect, credit constraints and so on, as well as observed determinants related to the socio-demographic characteristics of households such as family size, residence place, job status and the economic sector of workers.

We defined a life cycle consumption model including a *control period* of relative stability (1997-2007), a *treatment period* (2008-2013) affected by the crisis, and socio-demographic determinants in both periods. In addition, we estimated the life cycle of cross-sectional variance of expenditure in order to explore inequality in consumption.

The most important insight that emerges from our analysis is the fact that total expenditure and its sub categories have been greatly affected by uncertainty about future conditions and likely wealth effects. The estimated expenditure models demonstrate that

the crisis did not affect households and consumption categories homogeneously. In fact during this period there was substantial heterogeneity across expenditure categories with regards to both the life cycle profile of expenditure and the evolution of the cross-household variance in expenditures.

As far as the life cycle of consumption is concerned, we found that, in Italy, it was in the youngest households where expenditure fell the most. This is in accordance with the findings of others, such as Celidoni et al. (2015), Rodano and Rondinelli (2014) and Rondinelli (2014). In these households, the decline in total expenditure is mainly due to core, work-related and leisure. The fall in food consumption expenditure across all cohorts, especially the youngest is an interesting phenomenon and indicates a worsening of living standards, due either to an actual reduction of the volume of food consumed or to the purchase of lower quality food.

As regards the cross-sectional variance of expenditure, we document a significant reduction of consumption inequalities for all cohorts, although the inequality profile for total expenditure masks significant differences across subcategories of expenditure. The substantial reduction of variability across cohorts sheds light on how liquidity constraints and wealth effects have negatively affected consumption growth. For the oldest households the Recession has also heightened differences in living conditions between the wealthy and the less well-off.

Finally, socio-economic factors account for a substantial heterogeneity in the change of consumption during the recession across households and expenditure categories. Households living in the South of Italy with a high percentage of children, for example, with the householder working in the construction or accommodation sectors have been severely affected by the crisis. Tenants and precarious workers are especially likely to reduce consumption, particularly in the work-related and leisure categories.

The study also documents significant changes in the life cycle profile of the mean and variance of consumption, and points towards possible key factors behind the trends in consumer spending over the Great Recession. However, the unavailability of a combined database on subcategories of expenditure, housing and financial wealth and current income makes it challenging to reach a definite conclusion as to the causes of the fall in consumption in Italy during the Great Recession.

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Table 1 Life cycle profile of mean expenditure in the recession period (percentage values)

Dummy treatment period	Total Expenditure	Durables	Non Durables	Food	Core	Work-related	Leisure
d ₁ ²⁰⁰⁸⁻²⁰¹³	-15.8***	-3.4	-17.5***	-4.6	-16.2***	-19.0***	-12.1
d ₂ ²⁰⁰⁸⁻²⁰¹³	-14.4***	-6.3	-20.0***	-8.2***	-13.5***	-19.0***	-21.0***
d ₃ ²⁰⁰⁸⁻²⁰¹³	-10.9***	-5.8	-11.0***	-7.4***	-10.1***	-13.8***	-9.7***
d ₄ ²⁰⁰⁸⁻²⁰¹³	-11.6***	-12.9***	-11.5***	-6.3***	-9.2***	-18.1***	-8.3***
d ₅ ²⁰⁰⁸⁻²⁰¹³	-10.0***	-12.8***	-8.0***	-4.9***	-7.3***	-16.4***	-8.1***
d ₆ ²⁰⁰⁸⁻²⁰¹³	-6.9***	-12.3***	-5.0***	-4.5***	-5.1***	-9.2***	-9.1***
d ₇ ²⁰⁰⁸⁻²⁰¹³	-6.0***	-7.7**	-4.1***	-5.7***	-3.4***	-8.6***	-14.3***
d ₈ ²⁰⁰⁸⁻²⁰¹³	-4.7***	-3.8	-5.2***	-3.5***	-3.3***	-7.1***	-10.4***
d ₉ ²⁰⁰⁸⁻²⁰¹³	-7.0***	-10.7***	-7.6***	-3.1***	-5.2***	-11.4***	-8.9***
d ₁₀ ²⁰⁰⁸⁻²⁰¹³	-7.6***	-7.8***	-9.0***	-2.5***	-6.1***	-12.7***	-6.7***
d ₁₁ ²⁰⁰⁸⁻²⁰¹³	-4.2***	-13.4***	-4.0***	-2.2***	-2.9***	-8.4***	-3.8***

Stars denote p-values as follows: * p<0.10; **p< 0.05; ***p < 0.01

Table 2 Life cycle profile of cross-sectional variance of expenditure in the recession period (percentage values)

Dummy treatment period	Total Expenditure	Durables	Non Durables	Food	Core	Work-related	Leisure
d ₁ ²⁰⁰⁸⁻²⁰¹³	-1.2%	3.3%	0.4%	1.2%	-0.5%	13.5%	1.5%
d ₂ ²⁰⁰⁸⁻²⁰¹³	-3.4%***	-6.8%	-1.9%**	-0.5%	-3.8%*	-4.5%	2.5%
d ₃ ²⁰⁰⁸⁻²⁰¹³	-4.0%***	12.0%	-2.7%***	-1.3%	-4.4%**	-10.8%	4.4%
d ₄ ²⁰⁰⁸⁻²⁰¹³	-4.9%***	-5.7%	-2.7%***	-1.6%	-4.5%**	-18.3%***	5.5%
d ₅ ²⁰⁰⁸⁻²⁰¹³	-4.3%***	-1.8%	-2.6%***	-1.3%	-3.1%*	-25.2%***	6.0%
d ₆ ²⁰⁰⁸⁻²⁰¹³	-3.1%***	5.3%	-1.6%**	0.1%	-1.8%	-27.8%***	4.9%
d ₇ ²⁰⁰⁸⁻²⁰¹³	-3.5%***	18.1%	-2.3%***	0.6%	-3.1%*	-27.2%***	2.5%
d ₈ ²⁰⁰⁸⁻²⁰¹³	-4.2%***	5.8%	-3.2%***	1.1%	-4.4%**	-21.5%***	1.9%
d ₉ ²⁰⁰⁸⁻²⁰¹³	-4.0%***	3.5%	-2.9%***	2.6%	-4.5%**	-8.9%	-1.5%
d ₁₀ ²⁰⁰⁸⁻²⁰¹³	-4.4%***	-25.3%	-2.0%***	4.7%	-3.7%	-2.6%	11.1%
d ₁₁ ²⁰⁰⁸⁻²⁰¹³	-4.7%***	-42.8%***	-3.4%***	6.5%*	-5.1%**	30.5%***	-6.0%
d ₁₂ ²⁰⁰⁸⁻²⁰¹³	-5.0%***	-20.4%	-1.1%	7.2%**	-3.4%	32.3%***	7.8%

Stars denote p-values as follows: * p<0.10; **p< 0.05; ***p < 0.01

Table 3 Effects of Socio-economic characteristics in the recession period

Variable	Total Expenditure	Durables	Non Durables	Food	Core	Work-related	Leisure
South	-0.04***	-0.26***	-0.032***	-0.02***	-0.02***	-0.03***	-0.09***
Number of adults	0.01***	0.00	0.01***	0.00	0.01***	0.01	0.00
% of Children	-0.01***	-0.01**	-0.01***	-0.01***	0.00	-0.01***	-0.02***
Construction Sector	-0.01**	-0.03	-0.01*	0.00	-0.01	-0.04***	-0.04**
Trade	0.00	-0.04	0.01**	0.00	0.02***	0.01	0.01
Accommodation and restaurant	-0.02*	-0.01	-0.01	-0.03**	0.01	0.00	-0.05*
Tenant	-0.04***	-0.06**	-0.04***	-0.02***	-0.01**	-0.09***	-0.08***
Occasional worker	-0.14***	-0.20	-0.13***	-0.06**	-0.09***	-0.27***	-0.12**
Job seeker	0.00	-0.01	-0.01	-0.03**	0.01	-0.05**	0.03
Self-employed	-0.01	-0.01	-0.01**	-0.01	-0.01**	0.00	-0.01

Stars denote p-values as follows: * p<0.10; **p< 0.05; ***p < 0.01

Figure 1. Expenditure profile over the life cycle (in logarithm)

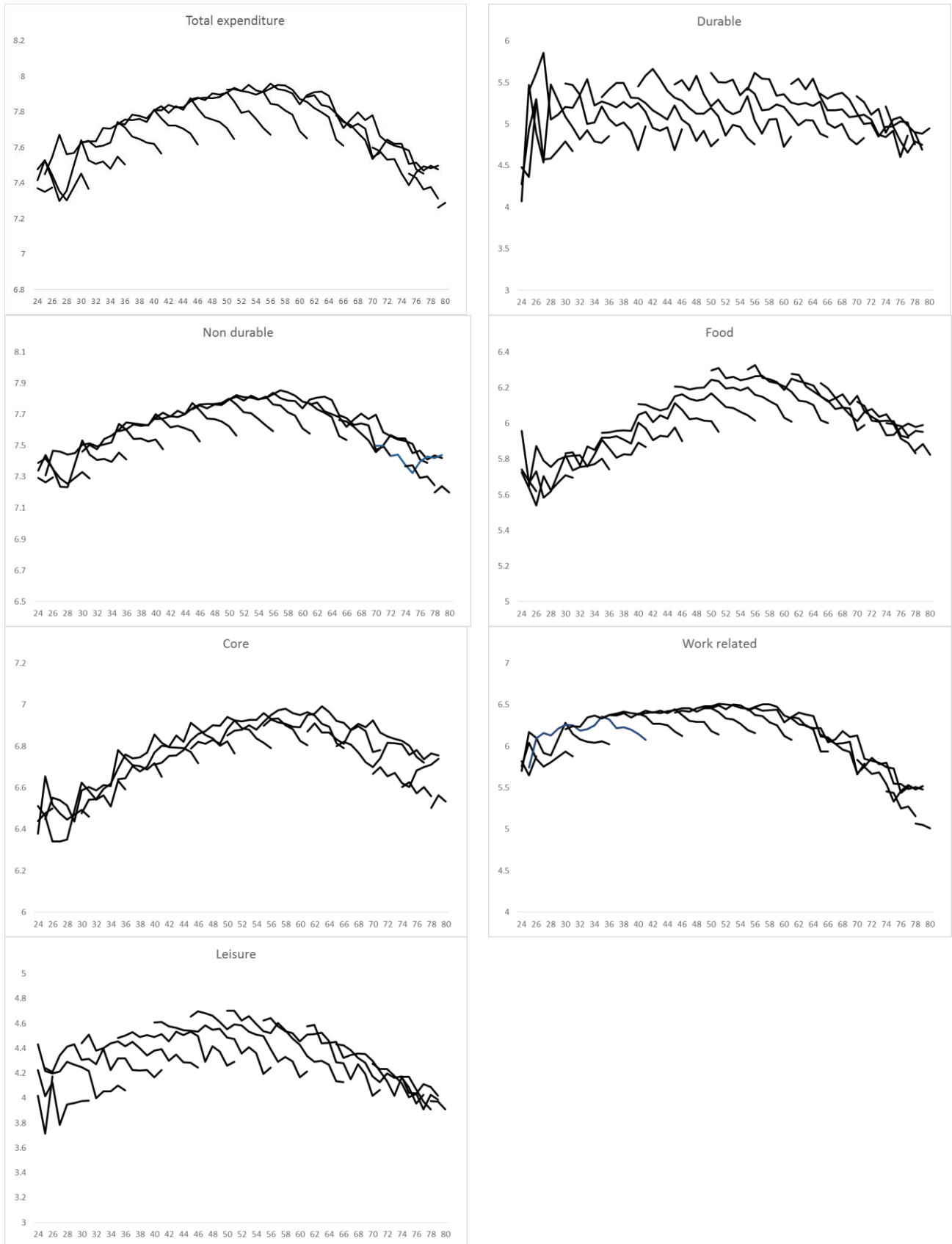


Figure 2. Variance of (ln) expenditure profile over the life cycle

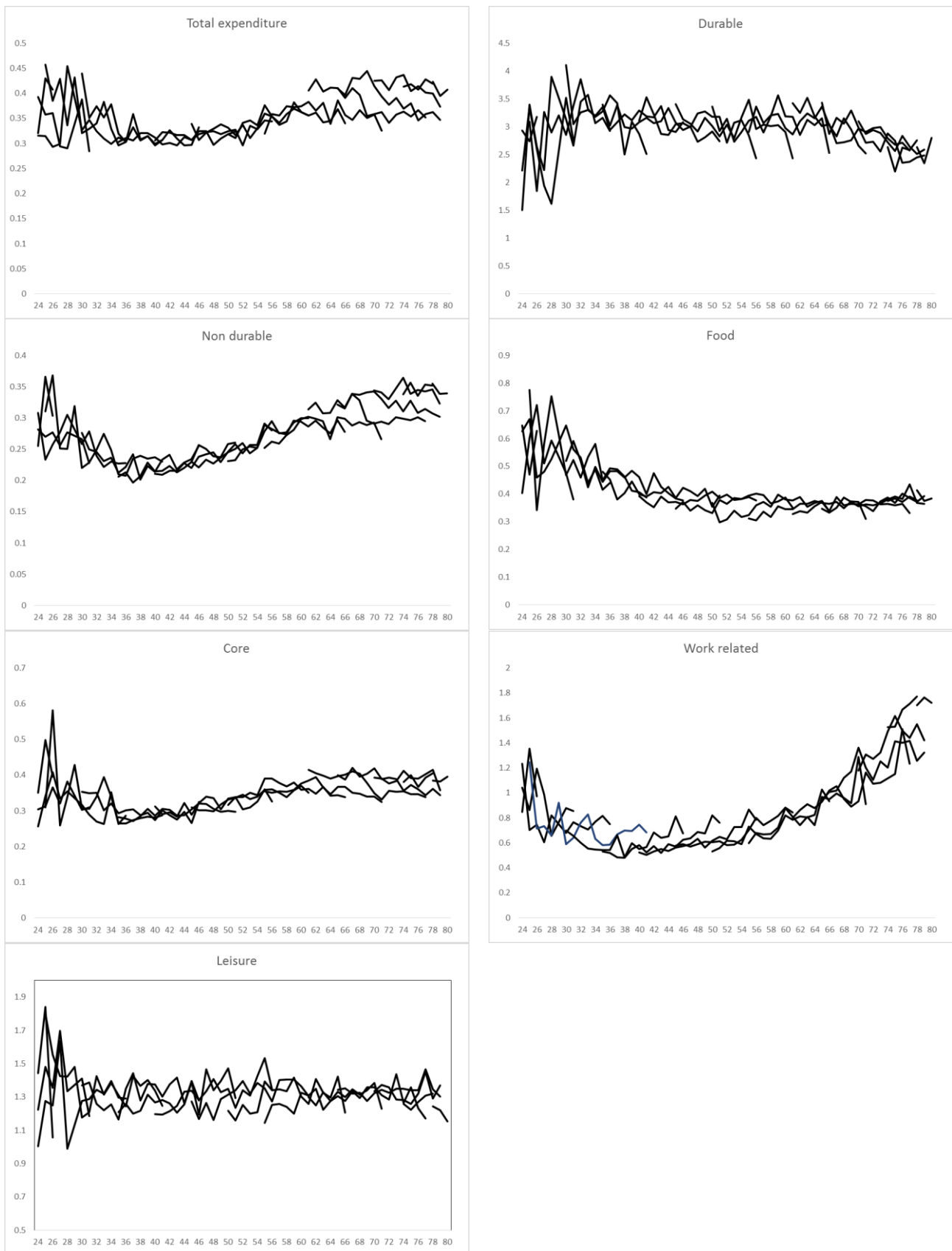


Figure 3. Comparing (ln) expenditure profile between control and crisis period

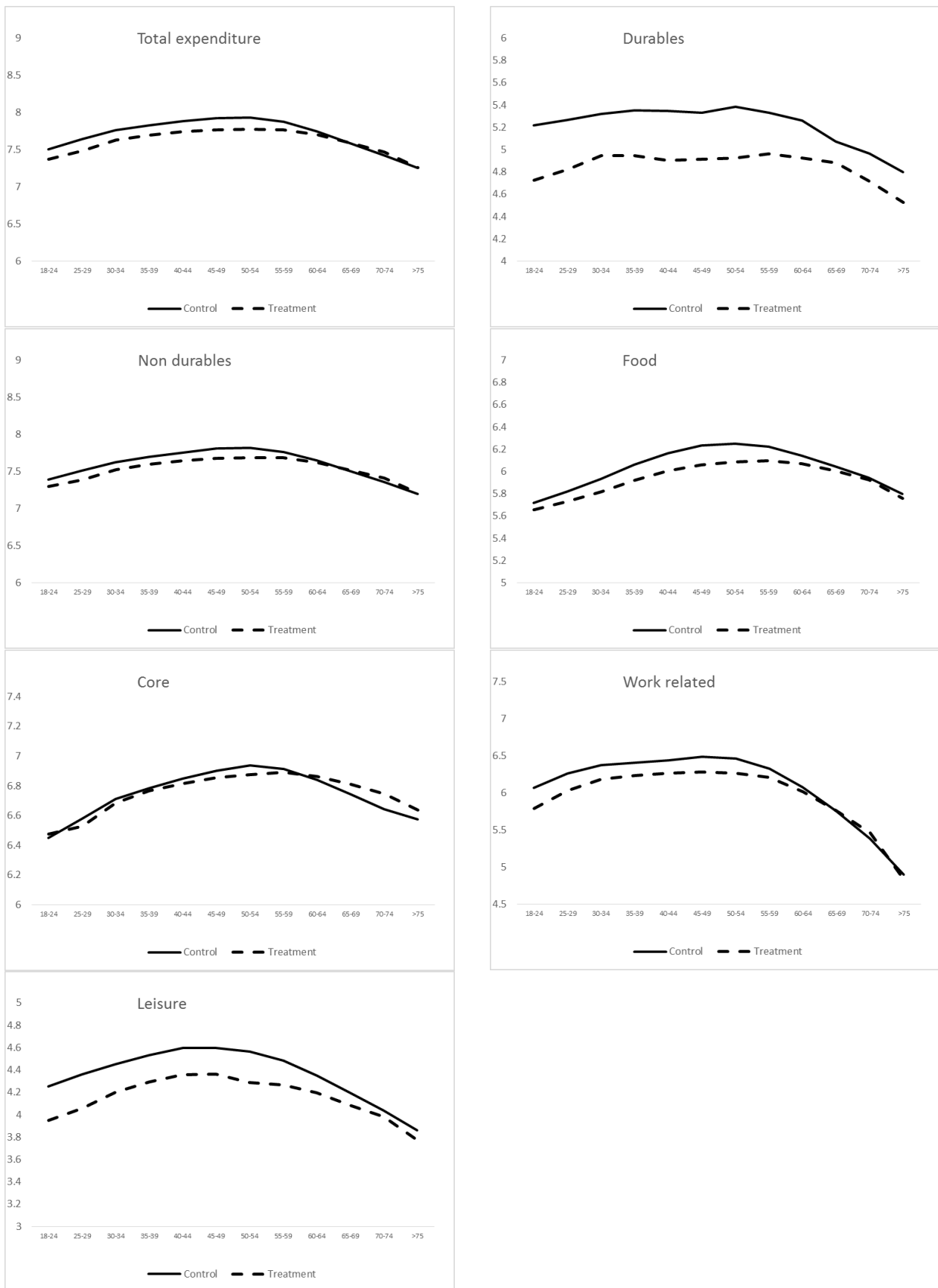


Figure 4. Comparing the variance of (ln) expenditure profile between control and crisis period

