The Retirement – Consumption Puzzle Downunder*

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Abstract
As increasing numbers of workers approach retirement, an issue of growing importance for policy makers is whether households have sufficient savings to maintain their standard of living in retirement. A substantial body of international research has shown that household expenditure systematically decreases at the time of retirement – a finding that is inconsistent with the standard life-cycle model of income and saving if retirement is an anticipated event. This fall in expenditure has become known as the 'retirement-consumption puzzle.' We analyse HILDA Survey data from waves 1 to 6 to assess the Australian evidence on the retirement-consumption puzzle.

We find strong evidence of a significant fall in expenditures on groceries, food at home and outside meals at retirement comparable to that found in international studies. The fall in expenditure is evident from a comparison by retirement status based on all households aged 45 years and over, and for the set of mature households attached to the labour market at the start of the observation period. The fall in non-durable expenditures at retirement is robust to conditioning on a rich set of control variables, including changes in health status and an indicator of involuntary retirement, and to the treatment of retirement as a choice variable. We extend the analysis by examining the effect of retirement on a series of indicators of severe financial hardship. For these outcome measures the evidence is much more mixed. There appears to be some increase in the difficulty households experience paying utility bills on time, and in seeking support from welfare or community organisations, at retirement. However, the incidence of financial hardships appears to be less among households who have been retired longer, suggesting households adapt over time to their economic circumstances.
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1 INTRODUCTION

As increasing numbers of workers approach retirement, an issue of growing importance for policy makers is whether households have sufficient savings to maintain their standard of living in retirement. A growing body of research, based on data from a variety of countries and time periods, has demonstrated that household expenditure systematically decreases at the time of retirement. This finding is inconsistent with the simplified life-cycle model of income and saving if retirement is an anticipated event. The sensitivity of expenditures to the timing of retirement has become known as the 'retirement-consumption puzzle.'

In this paper we assess the Australian evidence on the retirement-consumption puzzle using HILDA Survey data from waves 1 to 6. The cross-sectional richness of the HILDA survey, combined with the surveys longitudinal structure, allow us to consider several dimensions of the 'puzzle' while attempting to reconcile disparate finding in the literature. The main findings from the analysis include that there is clear evidence of a fall in consumption upon retirement. We also find retirement is associated with negative effects on individual household's self-reported ability to'make ends meet' as measured by their ability to pay bills or their need to ask for financial help from welfare or community institutions. We assess the performance of alternative instrumental variables for retirement. We find that the estimated impact of retirement on changes in household expenditure is somewhat sensitive to choice of subjective retirement expectations, or desired retirement age, relative to a series of age indicator variables as instrumental variables.

The structure of the paper is as follows. In the following section the international literature on the retirement-consumption puzzle is reviewed and used to place this study in context. In section 3 key aspects of the HILDA Survey data are outlined, and in Section 4 the estimation framework is briefly described. In Section 5 the empirical results are presented. Section 6 concludes by drawing out policy implications of the results and highlighting useful avenues for further research.

2 LITERATURE REVIEW

Standard life cycle theory of consumption predicts that a household's consumption profile should not be affected by predictable changes in income. One important, and substantial change, in income is retirement. According to the simple one-good life-cycle model households will smooth their consumption over retirement through borrowing and saving activities. This prediction has been contradicted by many empirical studies that observed excess sensitivity of consumption to retirement; examples include the studies by Hamermesh (1984), Mariger (1987), Banks et al. (1998), Attanasio (1999), and Bernheim et al (2001). The fall of consumption coinciding with retirement is widely referred to as the "retirement consumption puzzle."

That total expenditure falls with retirement is not a contentious assertion. Whether this fall reflects a fall in consumption, and possibly reflects a failure to "plan ached" on the part of the household, is much more contentious. The literature on this topic is rich,

as illustrated in the recent survey by Hurst (2008). According to Hurst, a consensus is building that several aspects of the puzzles can be reconciled with intertemporal optimising behaviour. He argues that while certain types of expenditure fall with retirement, these are primarily work related expenditures and food. A decline in food expenditure may not reflect a decline in actual food consumption. The fall in expenditure tends to be most pronounced among the households with least wealth accumulated, and further, the fall in expenditure upon retirement is most drastic when the retirement is unexpected. The themes underlying this list of points serves as a useful way to organise the current state of the research literature.

2.1 Non-durable and Food Expenditures

Laitner and Silverman (2005) estimate that the fall in total expenditure upon retirement at 16%. The magnitude of the decline is high relative to most other studies. Laitner and Silverman use the repeated cross-sections of the United States Consumer Expenditure Survey (CEX) and adopt a specification that includes both age and retirement effects. These, as discussed below, tend to be highly correlated and offset one another. Hurst (2008) suggests that the magnitude of the negative retirement effect is exaggerated by households with higher expenditures retiring later, causing the regression coefficient estimate to reflect a positive age effect among non-retired households. Fisher et al (2006) also use the CEX but find much less evidence of decline in total expenditure. They observe that most of the decline in total non-durable expenditure (between about 1 and 3%) is predominately accounted for by expenditure on food at home and away from home (about 8% and 16% respectively).

Aguiar and Hurst (2007) take a more detailed look at changes in expenditure components upon retirement. They extend the analysis beyond the typically examined 'total' and 'food' expenditure categories. In addition, they look at other non-durable expenditures including entertainment, transportation personal clothing and most notably charitable donations. They observe that while the fall in expenditure at retirement is evident at the mean total non-durable expenditures, the changes to individual components range widely. The expenditures that can be thought of as complementary to working life style such as clothing, transportation fall, while expenditures on purely leisure related commodities, for example entertainment and charitable giving, actually increase over the peak retirement age. Taken together their findings suggest minimal changes in living standards or well being over retirement. These changes in expenditures may reflect substitutions to a more leisure filled life style.

However Aguiar and Hurst (2007) also find a fall in food expenditure that at the aggregate that exceeds the amount that could be attributed to a change in lifestyle. Food is the most basic necessity and changes in actual food consumption likely reflect changes in well being. Research on expenditure patterns during retirement conducted on data from other countries reveals similar conclusions. Banks et al. (1998) working with UK family expenditure survey (FES) data, and Miniaci et al (2003) and Battistin et al (2006)

working with Italian data, document that the fall in total expenditure over the retirement peak retirement age occurs primarily among food and work related expenditures

There are however two studies that show no fall in expenditure on food upon retirement, these are Haider and Stephens (2007) and Brzozowski and Lu (2009). These are discussed in more detail below. In the context of total food expenditure, it is worth noting here that, both papers introduce new methodological aspects to the analysis that may drive their results.

Further disaggregation of food expenditure provides a much needed clarification. When expenditure on all food is disaggregated into finer categories the typical pattern that emerges shows a fall in expenditures on food consumed away from home and little changes (sometimes increases) in food consumed at home; see, for example, Bernheim et al (2001), Aguiar and Hurst (2005) and Brzozowski and Lu (2009).

2.2 Distinction between Consumption and Expenditure

Food consumption and food expenditure are not synonymous. Further disaggregation of food expenditure or even of actual consumption into individual food categories explains away the puzzle. Aguiar and Hurst (2005) look at actual consumption data. They observe that average caloric and nutritional intakes are not adversely affected by retirement and thus the fall in expenditure on food does not render a fall in quality of consumed food. This happens because retired households can afford higher preparation efforts. Retired household do face trade-offs between work and home production. They can thus spend more time on food preparation and on shopping for bargains.

Within data limitations Brzozowski and Lu (2009) replicate Aguiar and Hurst (2005) on Canadian data. While they lack exact consumption information they have access to expenditure information on 200 food categories. Their conclusions regarding nutrition, food production and eating out habits are in line with those of Aguiar and Hurst (2005). The data used in this study also possesses one unique advantage of containing food expenditure information obtained by a diary method and not as it usually is the case through recall. Perhaps due to this feature, to our knowledge, this is only one of two recent studies that documents no fall in total food expenditure upon retirement.

2.3 Population Heterogeneity

Bernheim et al (2001) examine the heterogeneity in changes in expenditure upon retirement. They divide households into four quartiles based on accumulated wealth prior to retirement. Their main result is that wealth plays an extremely important role in determining the severity a fall in expenditure upon retirement. Households in the wealthiest quartile face a fall of about 9% in total expenditure. That figure increases to just under 14% for the two middle quartiles and to more than 30% for the least wealthy quartile. Hurd and Rohwedder (2003) and Hurst (2006) observe similar patterns. These results suggest the intuitively obvious conclusion that those households which accumulated a

large amount of wealth prior to retirement are well, while households with little or no accumulated wealth do not have the facility to smooth their consumption over the retirement threshold.

2.4 The Role of Expectations

Whether retirement is anticipated or not also plays a role in determining the changes in expenditure. Hurd and Rohwedder (2003) Smith (2006) and Haider and Stephens (2007) all find that households forced to take early retirement due to an unforeseen shock, typically illness or job loss, experience substantially greater falls in expenditure than households which retired according to a long term plan. The importance of unforeseen shocks triggering retirement is further confirmed by Hurst (2008) who examined the 1992 wave of the United States Health and Retirement Survey. When respondents are asked about changes in their standards of living after retirement, individuals who retired involuntarily are overrepresented among those who report a decrease in well being.

Haider and Stephens (2007) also bring an important methodological innovation – they modify the typical functional framework of the expenditure regressions. Typically in these regressions (such as in Banks et al 1998 and Aguiar and Hurst 2005) the coefficient of interest on the retirement indicator variable, is instrumented by age of the individual.[1] Haider and Stephens argue this is far from optimal, and when subjective retirement expectations are used as an instrumental variable, some results suggest minimal changes in food expenditure with retirement.[2]

The research presented in this paper addresses the main themes in the literature. With the HILDA survey data we to construct several bundles of non-durable expenditures. Specifically, we examine household expenditures on groceries, and the sub-category of food purchased for consumption at home (when available), and expenditure on food purchased for consumption outside of home. In addition, we examine indicators of financial hardship which measure the difficulty families experience in 'making ends meet.' The HILDA survey data include the main variables that have been used as identify instruments in IV models of the causal effect of retirement status on well-being, allowing us to compare the empirical performance of alternative identifying instruments. We exploit the richness of the HILDA survey data to control for important sources of heterogeneity across households - including health status, changes in health status over time, and indicators of 'involuntary retirement' - in order to isolate the impact of retirement on households. Further, the panel structure of the HILDA survey data allow us to control for additional forms of unobserved heterogeneity that may confound the observed impact of retirement on the economic well-being of households.

[1] This procedure recognizes that the timing of retirement can be correlated with unaccounted for events that affect the household's expenditure decisions.

[2] This result holds for one of the two surveys they use – results based on the other survey still show a fall in food expenditure.

3 DATA AND SAMPLE CONSTRUCTION

The analysis focuses on the household expenditure items which are recorded in waves 1, 3, 4-6 which were collected between 2001 and 2006.[3] The HILDA Survey has tracked approximately 7,000 Australian households, composed of 13,000 individuals, through time since the first wave collected in 2001. The survey data consists of a number of separate household and persons files. Individuals within the same household are linked within a wave, and individuals are tracked across waves.

The analysis sample was constructed through a sequence of steps. First, a household 'reference' person was defined for each household in wave 1. The reference person was selected by applying the following criteria in order: (i) one partner of a couple with children, (ii) one partner of a couple without children, (iii) lone parent with children, (iv) the person with the lowest 'person number' on the HQ.[4] The household reference person from wave 1 was tracked across waves 3-6 of the HILDA Survey to create a longitudinal record for the household. Second, focus on retirement status and use information from the special module on retirement intentions in wave 3. A number of key questions on retirement expectations, and desired age of retirement, were only aged of persons aged 45 years and over. Consequently, we restrict the analysis to households were the reference person is aged 45 years. To minimise the impact of major demographic changes on expenditure patterns and well-being, we further restrict attention to the subset of stable households which remained intact over the first six waves of the HILDA Survey.

We consider households where the reference person is aged 45 years and older. Part of the analyse is performed using the subsample of households where the reference person was not retired in wave 1. This subsample represents the set of households 'at risk' of retirement during the observation period and provide a clearest picture of how expenditures change around the time of retirement. A comparison of spending patterns by retirement status based on the full sample may reflect differences between households at very distant points in their life cycles (for example, prime age workers in their late 40's relative to individuals in their late 70's who have been retired for over a decade). The at–risk sample allows us to track a more homogenous set of individuals as they make the retirement transition, which in turn may better highlight if there is a discontinuity in spending during this transition. We treat retirement as an 'absorbing state' and do not examine changes associated with re-entry into the labour market.

The key economic variable in the analysis is household expenditure on groceries, food at home (where available) and food purchased for consumption outside of the home. These items explicitly exclude spending on alcoholic beverages. The expenditure items correspond to usual spending over a week. Missing values for the expenditure items are imputed using regression methods. Usual weekly expenditures on groceries, food at

[3] Wave 2 (2002) of HILDA did not collect household expenditure information.

[4] In the large majority of cases this method also selected the person who supplied most of the information recorded on the Household Questionaire - which recoreded the expenditure information up to wave 5.

home and outside meals are regressed on a series of indicator variables for the age of the household reference person, family type, number of children by age category, number of family members with chronic health conditions, indicators for location (state and regional or remote area) and a quadratic in disposable income. The regressions are estimated using the sample of valid responses, and the estimates then used to generate predictions for observations with missing values. This imputation method is equivalent to assigning cell means to the missing values with the cells defined by the detailed set of explanatory variables in the regression.[5] Nominal expenditures (and income) were inflated to 2006 prices using the national consumer price index.

The grocery and food expenditure items measured across waves 1-6 in HILDA have potential limitations. The expenditure information in the HILDA Survey is collected through recall questions rather than using diary methods as applied in some specialised expenditure surveys such as the Australian Bureau of Statistics Household Expenditure Survey (HES). There is a concern that recall data may be less reliable than data collected through the diary method. This issue was considered in Browning et al. (2003) who provided a comparison of 'food at home' expenditure recorded using recall and diary methods across a variety of Canadian surveys. They found that the information collected through interview recall questions was closely aligned with the information obtained through diary methods and concluded (Browning et al. 2003: F551) that "respondents do a remarkably good job of reporting their household's expenditures on food at home." Another issue is that the set of grocery and food expenditures measured across waves 1-6 in HILDA is more narrow than the set of nondurable commodities usually employed in distributional studies based on specialised expenditure surveys. Such studies typically also includes expenditure on household utilities (such as fuel and telephone bills) and transport services. However, Browning et al. (2003: F548) found that 'food at home' expenditure proved to be very useful in inferring total household nondurable expenditures. Furthermore, as much on the retirement-consumption puzzle literature has focused on relatively narrow food or grocery bundles, it is instructive to work with comparable expenditure concepts for Australia.

A novel aspect of our analysis is our examination of the prevalence of financial hardship. The reference person's response to the following series of questions in the self-completion questionnaire are examined:

"*Since January 200y. did any of the following happen to you because of a shortage of money:*

a. Could not pay electricity, gas or telephone bills on time,

b. Could not pay the mortgage or rent on time,

c. Went without meals,

d. Was unable to heat home,

e. Asked for financial help from friends or family,

[5]The number of unique cells given by the set of discrete explanatory variables alone is 11,520, which allows for substantial variation in imputed values.

f. Asked for help from welfare / community organisations."

The information on retirement status is taken from the individual's response to the current labour market status. An indicator of involuntary retirement is constructed from the information on the reason for leaving the last job. Additional explanatory variables used include self-assessed health status, self-assessed change in health over the previous year, number of persons in the household with chronic health conditions, family structure, housing tenure and location .

Descriptive statistics for the major sample are presented in Table 1. The sample is a balanced panel with observations on 1351 households. The average age of the reference person in 2001 was 63.4 years, of who just over half were retired. The majority of households were single individual, a significant number were partnered and relatively few had dependent children. Average weekly grocery expenditures were $117, of which approximately three-quarters represented expenditures on food at home. Grocery expenditures accounted for approximately 15% of weekly disposable income, on average. The proportion of families reporting financial hardship varies across the alternative indicators, ranging from a low of 2.6% for seeking help from a welfare or community organisation, to a high of 10% reporting being late with payment of utility bills.

It is instructive to compare summary statistics by retirement status. Table 2 presents sample means by retirement status and year. Not surprisingly, at a point in time, the set of retirees is significantly older - 13 years on average - than those still attached to the labour market. Health status is also not as highly assessed among the retirees, and the set of retirees are more likely somewhat more likely to report a decline in their health over the previous year. On average, net income is a substantial 44% lower among retirees compared to non-retirees in 2001 . However, grocery expenditures are approximately 12% lower among retirees compared to non–retirees in 2001.

The sample sizes also indicate a significant number of transitions into retirement over the sample period. Of the subsample of 656 non-retirees in 2001, 211 made the transition to retirement by 2006. The models will be estimated with both the full balanced panel and the at-risk or flow-sample subsample of non-retirees from 2001.

4 METHODS

4.1 Continuous Dependent Variables

Panel regression are estimated for the natural log of expenditures based on the specification

$$\log(consumption_{it}) = \delta Retired_{it} + x'_{it}\beta + \alpha_i + e_{it}, \qquad i = 1, .., N; \;\; t = 1, ..., T \qquad (1)$$

where x_{it} are observed explanatory variables, c_i is an individual specific variable and e_{it} is an idiosyncratic error term assumed to be independent of x_{it} and α_i. It is assumed that the unobserved individual specific variable α_i is independent of the included covariates, $E[x_{it}|\alpha_i] = 0$, and is distributed $N(\alpha, \sigma^2_\alpha)$. This corresponds to the random effects panel regression model. The coefficient on the *Retired* indicator, δ, measures the approximate proportional difference in mean consumption expenditures for retired household relative to working households, other things equal.

An important theme in the retirement-consumption literature is the potential endogeneity of the *Retired* indicator variable. One technique to address this problem is to use an instrumental variable (IV) estimator. We consider the random effects panel IV estimator, and consider reference person age, expected retirement age and desired age of retirement as identifying instruments.

4.2 Discrete Dependent Variable

The panel random effect regression model is also used for analysing the effect of retirement on the various measures of financial hardship. Given the binary nature of the outcome variable this corresponds to the linear probability model.

$$\Pr(Hardship_{it} = 1) = \delta Retired_{it} + x'_{it}\beta + \alpha_i + e_{it}, \;\; i = 1, .., N; \;\; t = 1, ..., T \qquad (2)$$

The observed covariates used in the estimation are all dummy variables as well apart from variables measuring household size, which are effectively discrete across in the sample. In this context the panel regression model has the desirable property of corresponding to a semi-parameter estimator of cell means with the inclusion of the individual (unobserved) random effect.

5 EMPIRICAL RESULTS

5.1 Expenditure

5.1.1 Groceries

Table 3 presents the panel regression results for the expenditure measures. The top panel is for log-grocery expenditures. Model (1) is based on the full sample of households where the reference person is aged 45+ years in 2001, using wave 1, 3-6 information. The

model includes only the retirement indicator variable as an observed explanatory variable. The coefficient estimate implies that retired households on average spend approximately 7% less on groceries than households where the reference person is not retired. The estimates of σ_α and σ_ε shows that the individual-specific component of the error term (random effect) is comparable to the idiosyncratic error, and the intra-household correlation $\rho = .659$ implies that, on average, there is relatively high autocorrelation in grocery expenditures.

Model (2) uses the same specification restricted to expenditures reported in waves 3-6. Grocery expenditures are on average 8% lower for retired households. These estimates are also consistent with lower average levels of consumption, and hence well-being, in retirement. These estimates are in part influenced by comparing working middle-aged families with other families that may have been retired for well over a decade. Differences in mean grocery expenditures between households in the initial phase of retirement compared to those attached to the labour markets are revealed by estimating the model with the 'at risk of retirement' sample. As shown for model (3), with this sample the difference in average grocery expenditure between retired and working households is approximately 9%, which is marginally larger (though not significantly so) than that found for the full sample. The specification was expanded to include controls for the location (state of residence and whether residing in a capital city), sex of the reference person, educational attainment of the reference person, family type (couple or single) and family size, health status and change in self-reported change in health status over the previous 12 months. This set of control variables capture various aspects of family needs, permanent income, regional differences in market conditions and recent health shocks. Inclusion of these controls lead to a reduction in the estimated difference in grocery expenditures between retired and working households to 7%. The added controls also lead to a substantial reduction in the estimated variance of the individual random effect (σ_α) and in the intra-household correlation ρ. Inclusion of the covariates significantly reduce the latent heterogeneity in household grocery expenditures, and reduces the estimated drop in grocery consumption at retirement by approximately one-fifth. The estimated effect of retirement on grocery expenditures is similar to that found in studies for other countries, and may suggest that households are surprised by their lack of resources in retirement and endure an significant reduction in consumption of non-durables.

The covariate set was expanded in estimating model (5) by including an indicator of whether the household reference person retired involuntarily. Smith (2006) used an indicator of involuntary retirement to control for unexpected health and labour demand shocks which caused unanticipated retirement. The coefficient on retirement then captures the effect of anticipated retirement on household expenditures. Smith found that including this variable in the model accounted for much of the apparent substantial decline in grocery expenditures on retirement. For the HILDA sample, the coefficient on the involuntary retirement indicator is large and negative, though statistically insignificant. However, the inclusion of this additional dummy variable had a negligible effect on

the estimated effect of (anticipated) retirement on grocery expenditures.

The next sequence of models addressed the potential endogeneity retirement. The first IV for retirement status considered was the reference person's expected age of retirement. With this IV, the variation in retirement that is predicted from an individual's expected or anticipated age is regressed on the log of grocery expenditures. The IV point estimate of the impact of retirement, as shown in Model (6) of Table 3, is substantially larger and more negative than that found in models which treated retirement as exogenous. As is common with the IV estimator, the coefficient on the endogenous explanatory retirement variable is not precisely estimated and the point estimate from model (5) falls within the 90% confidence interval for the IV estimate. The second IV considered is the individual's desired retirement age. As shown in model (7), this IV estimate is slightly less in magnitude, though more precise, than the IV estimate based on expected retirement age. The use of these IVs imply an economically important decline in grocery expenditures on retirement.

A third IV was also considered. Following Banks et al. (1998) and Aguiar and Hurst (2005), retirement status is instrumented by the age of the reference person. With this IV, the coefficient on retirement was slightly larger in magnitude than that found for model (5) where retirement is treated as exogenous however the coefficient is statistically insignificant due to the imprecision of the estimate. Given the value of the point estimate, the imprecision of the estimator should not be relied on to explain away or invalidate the retirement-consumption puzzle evident in the HILDA data. The set of IV estimates together suggest there is an apparent significant decline in household grocery expenditures coinciding with retirement. A range of explanation presented in the literature are unable to account the decline found among Australian households.

5.1.2 Food (At Home)

The sequence of models where then estimated with log-food expenditures as the dependent variable. As shown in the second panel of Table 4, retirement is found to be associated approximately 9% lower food expenditures on average for retirees based on the full sample, and a substantial 13% lower food consumption on average based on the flow sample. Controlling for the broad set of covariates resulted in an estimated decline of 9% in food expenditures on the retirement. The estimated proportional drop in food expenditure at retirement is slightly larger in magnitude, though broadly comparable, to that found for grocery expenditures. The use of the expected age of retirement, and desired age of retirement, as instrumental variables accentuated the estimated effect of retirement on food consumption. However, these IV estimates are imprecisely estimated and the 90% confidence intervals for these IV estimates include the value of the point estimates exogenous retirement.

5.1.3 Outside Meals

The lower panel of Table 4 presents the estimated effect of retirement on food expenditures for consumption outside the home. There is a substantial difference in expenditures on outside meals by retirement status. For the full sample, the difference is 14-19%, and for the flow sample, with the inclusion of the set of explanatory variables, the difference is 14%. All the IV estimators imply a substantially larger decline in spending on outside meals on retirement - of the order of 40% - which is significantly larger in magnitude than estimated when treating retirement as exogenous. This commodity group

The evidence across the three expenditure bundles is consistent with the international findings on the 'retirement-consumption' puzzle. The decline in non-durable expenditures with retirement is not an artefact from comparing households at disparate points in their lifecycle. The decline in expenditures with retirement is robust across a variety of model specification plus a range of estimators (including IV estimators which addressed the potential endogeneity of retirement status). .

5.2 Financial Stress

The indicators of financial stress where then examined. The panel random effects linear probability model estimates are presented in Table 5. Similar specifications to that used for analysing the effects of retirement on non-durable expenditures are implemented for the hardship measures. The first measure of financial hardship considered is 'Being Late in Paying Utilities.' As shown in the top panel, among the set of mature households the retired have a marginally lower incidence of difficulty in paying electricity, gas and phone bills on time. For the flow sample, among who retirement occurs during the observation period, there is no apparent difference in the incidence of this financial hardship by retirement status. However, when instrumenting retirement status with expected age of retirement, the coefficient on retirement is significantly positive. This implies that households who withdraw from the labour market at a time consistent with their plans, there is a greater incidence of financial difficulty in making payments on utility bills on time. This finding is surprising, those it may indicate that even though households may retire at a time consistent with their plans, their level of resources may be low and are prone to difficulties in paying utility bills on time. Even so, this positive impact of retirement distress in paying utilities is not robust across the other instrumental variables considered.

The pattern of results for the other indicators of financial hardship in making ends meet are similar to those found for paying utilities on time. Treating retirement as exogenous, lateness in paying rent or mortgage repayments on time, missing meals and seeking financial help from friends and family members tends to be lower for the retired based on the broad or stock sample. For the flow sample, there is small and insignificant difference between working and retired households. The results for the set of models which treat retirement as endogenous are based on the IV estimator, the results are

sensitive and mixed, and no reliable pattern is apparent.

The remaining two measures of financial hardship, lack heating and whether the household sought help from welfare or community organisations show a higher incidence of financial distress among those retired (1.8% for lack of heating, 1.3% for seeking help from a welfare organisation). The difference is somewhat more pronounced with the IV estimate based on retirement expectations.

Overall, the measures of financial hardship are mixed, and do not generally show that the non-durable consumption expenditure fall at retirement translates into greater hardship in making ends meet. The exception is that there is some evidence that recent retirees may experiences a marginal increase in relative incidence of being able to afford heating or seeking assistance from a welfare agency. This may be seen as a positive result, suggesting that retirement does not coincide with the onset of severe financial distress. At the same time, as shown in the descriptive statistics, these separate measures of financial hardship have a low incidence among the sample of matures households, and the analysis is considering an extreme and severe event. Further work is needed to investigate alternative measures of well-being, in order to better understand the implications of the significant fall in household non-durable expenditures with retirement.

6 CONCLUSION

From the analysis of expenditures among mature Australian households using HILDA survey data for waves 1-6, it is clear that there is an economically significant decline in non-durable expenditures with retirement. There is approximately a 7% fall in spending on groceries, and 8-9% fall in spending on food following the transition to retirement. The decline in expenditures among Australian households is comparable to that found for other countries including the US, UK and Italy. The apparent fall in expenditures is a robust finding - and is not sensitive to choice of a stock or flow samples, and is not eliminated by the using a rich set of control variables (including indicators of involuntary retirement) or the use of instrumental variable methods with address the endogeneity of Retirement status.

Although the evidence is somewhat mixed, it is not apparent that the consumption fall at retirement translates into severe financial hardship. This may reflect that the effect of the consumption fall on household well-being is muted - perhaps due to substitution toward home production. At the same time, the measures of financial distress capture relatively extreme events. In order to better understand the factors driving the retirement-consumption puzzle in Australia - our plan is to expand the analysis of the HILDA survey data by considering other economics resources (specifically home production based on the time-use information, and household wealth) and alternative measures of household well-being (including life satisfaction).

References

[1] Ahmed, Naeem, Matthew Brzozowski and Thomas F. Crossley (2006). "Measurement Error in Recall Food Expenditure Data," Institute for Fiscal Studies Working Paper W06/21.

[2] Aguiar, Mark and Erik Hurst (2005). "Consumption vs Expenditure," *Journal of Political Economy,* 113(5), 919 -948.

[3] Aguiar, Mark and Erik Hurst (2007). "Re-examining Lifecycle Consumption", University of Chicago working paper.

[4] Attanasio, Orazio (1999). "Consumption," *Handbook of Macroeconomics*, chapter 11, North Holland, Elsevier.

[5] Banks, James, Richard Blundell, and Sarah Tanner (1998). "Is There a Retirement Savings Puzzle?" *American Economic Review*, 88(4), 769 – 788.

[6] Battistin, Erich, Agar Brugiavini, Enrico Rettore, and Guglielmo Weber (2006). "How Large is the Retirement Consumption Drop in Italy?", Working Paper.

[7] Bernheim, Douglas, Jonathan Skinner, and Steven Weinberg (2001). "What Accounts for the Variation in Retirement Wealth Among U.S. Households?" *American Economic Review*, 91(4), 832 – 857.

[8] Brzozowski, Matthew and Yuqian Lu "Home Cooking, Food Consumption and Food Production among Unemployed and Retired Households," McMaster University SEDAP Research Paper No. 151

[9] Fisher, Jonathan, David Johnson, Joseph Marchand, Timothy Smeeding, and Barbara Boyle Torrey (2006). "The Retirement Consumption Conundrum: Evidence From a Consumption Survey," Center for Retirement Research Working Paper 109.

[10] Haider, Steven and Melvin Stephens (2007). "Is There A Retirement Consumption Puzzle? Evidence Using Subjective Retirement Expectations", Review of Economics and Statistics, forthcoming.

[11] Hamermesh, Daniel (1984). "Consumption During Retirement: The Missing Link in the Life Cycle" *Review of Economics and Statistics*, 66(1), 1 – 7.

[12] Hurd, Michael and Susann Rohwedder (2003) "The Retirement Consumption Puzzle: Anticipated and Actual Declines in Retirement Spending," NBER Working Paper 9586.

[13] Hurd, Michael and Susann Rohwedder (2006) "Some Answers to the Retirement Consumption Puzzle," NBER Working Paper 9586.

[14] Hurst, Erik (2006). "Grasshoppers, Ants and Pre-Retirement Wealth: A Test of Permanent Income Consumers," NBER Working Paper 10098.

[15] Hurst, Erik (2008) "The Retirement of a Consumption Puzzle," NBER Working Paper no. 13789

[16] Laitner, John and Dan Silverman (2005). "Estimating Life-Cycle Parameters from Consumption Behavior at Retirement," NBER Working Paper 11163.

[17] Mariger, Randall P (1987). "A Life-Cycle Consumption Model with Liquidity Constraints: Theory and Empirical Results," *Econometrica,* 55 , 533–557.

[18] Miniaci, Raffaele, Chiara Monfardini, and Guglielmo Weber (2003). "Is There a Retirement Consumption Puzzle in Italy?" Institute for Fiscal Studies Working Paper WP03/14

[19] Smith, Sarah (2006). "The Retirement Consumption Puzzle and Involuntary Early Retirement: Evidence from the British Household Panel Survey," *The Economic Journal*, 116 (March), C130 – C148.

Table 1. Summary Statistics - Balanced Panel

	Broad Sample	Flow Sample
Age	63.440	56.706
Birth Cohort		
Born 1952-56	0.107	0.218
Born 1947-51	0.130	0.244
Born 1942-46	0.145	0.236
Born 1937-41	0.155	0.130
Born 1932-36	0.138	0.079
Born 1927-31	0.153	0.047
Born 1922-26	0.113	0.030
Born 1917-21	0.032	0.006
Born 1912-16	0.028	0.009
Female	0.454	0.428
Retired	0.514	0.000
Retirement intentions		
Age Expect to Retire[1]	58.411	60.639
non response	0.213	0.200
not know	0.090	0.172
never	0.042	0.079
Desired Retirement		
Age Desire to Retire[2]	61.589	61.357
non response	0.631	0.279
not know	0.018	0.029
never	0.047	0.084
Family type		
Single	0.543	0.492
Couple, no kids	0.385	0.384
Couple, kids	0.038	0.075
Lone Parent	0.007	0.014
Other	0.027	0.035
Housing Tenure		
Own / buying	0.781	0.780
Rent	0.180	0.192
Free	0.039	0.027
Persons with chronic health	0.551	0.442
Self assessed health:		
excellent	0.101	0.125
very good	0.277	0.338
good	0.326	0.323
fair	0.208	0.151
poor	0.051	0.038
missing	0.037	0.024
Change in health over past yr		
Much better	0.054	0.067
Somewhat better	0.080	0.090
Same	0.657	0.681
Somewhat worse	0.151	0.120
Much worse	0.016	0.009
missing	0.042	0.032

Net Income	709.29	916.65
Expenditure		
Groceries	117.25	123.31
Food at home	88.38	92.87
Food outside home	31.23	38.09
Financial Hardship		
Late utilities	0.102	0.125
Late rent / mortgage	0.044	0.061
Miss meals	0.033	0.041
Lack heating	0.037	0.035
Fin help from family	0.070	0.087
Help from welfare org	0.026	0.035
Observations	1351	656

Table 2. Summary Statistics - Balanced Panel, Broad Sample

	2001		2003		2004		2005		2006	
	Not Retired	Retired	Not Retired	Retired	Not Retired	Retired	Not Retired	Retired	Not Retired	Retired
Age	56.706	69.796	55.503	68.708	55.671	68.486	55.281	68.418	55.369	68.033
Birth Cohort										
Born 1952-56	0.218	0.001	0.254	0.009	0.252	0.012	0.262	0.012	0.269	0.014
Born 1947-51	0.244	0.022	0.262	0.042	0.261	0.044	0.271	0.043	0.269	0.050
Born 1942-46	0.236	0.059	0.228	0.090	0.231	0.089	0.238	0.088	0.218	0.103
Born 1937-41	0.130	0.178	0.126	0.174	0.120	0.177	0.107	0.184	0.102	0.185
Born 1932-36	0.079	0.194	0.063	0.188	0.060	0.189	0.049	0.193	0.063	0.181
Born 1927-31	0.047	0.253	0.039	0.229	0.041	0.226	0.043	0.221	0.045	0.215
Born 1922-26	0.030	0.190	0.019	0.175	0.019	0.173	0.018	0.170	0.022	0.164
Born 1917-21	0.006	0.056	0.006	0.049	0.004	0.050	0.004	0.049	0.006	0.046
Born 1912-16	0.009	0.046	0.004	0.044	0.011	0.039	0.008	0.041	0.004	0.042
Female	0.428	0.478	0.416	0.479	0.434	0.466	0.428	0.470	0.437	0.463
Retired	0.000	1.000								
Retirement intentions										
Age Expect to Retire[1]	60.639	56.859	63.561	57.200	63.255	57.555	63.037	57.850	63.178	57.900
non response	0.200	0.226	0.058	0.240	0.075	0.227	0.086	0.217	0.082	0.216
not know	0.172		0.028		0.026		0.031		0.029	
never	0.079		0.124		0.120		0.119		0.118	
Desired Retirement										
Age Desire to Retire[2]	61.357		61.224		61.261		61.056		61.072	
non response	0.279		0.128		0.175		0.168		0.186	
not know	0.029		0.041		0.032		0.035		0.027	
never	0.084		0.100		0.096		0.094		0.092	
Household Size	1.718	1.432	1.763	1.443	1.754	1.452	1.756	1.458	1.776	1.454
Persons with chronic h	0.442	0.653	0.432	0.793	0.491	0.758	0.451	0.776	0.486	0.783
Self assessed health:										
excellent	0.125	0.078	0.083	0.037	0.086	0.046	0.063	0.026	0.065	0.033
very good	0.338	0.219	0.332	0.192	0.318	0.195	0.328	0.194	0.337	0.178
good	0.323	0.329	0.354	0.340	0.376	0.361	0.340	0.346	0.329	0.340
fair	0.151	0.262	0.163	0.276	0.154	0.265	0.180	0.302	0.171	0.271
poor	0.038	0.063	0.032	0.067	0.032	0.070	0.025	0.067	0.031	0.078
missing	0.024	0.049	0.035	0.089	0.034	0.062	0.064	0.066	0.067	0.101

Change in health over past yr										
Much better	0.067	0.052	0.020	0.021	0.026	0.022	0.031	0.027	0.035	0.016
Somewhat better	0.090	0.042	0.069	0.052	0.086	0.057	0.082	0.049	0.082	0.060
Same	0.681	0.071	0.761	0.610	0.699	0.629	0.695	0.613	0.718	0.576
Somewhat worse	0.120	0.633	0.106	0.200	0.137	0.201	0.121	0.225	0.106	0.226
Much worse	0.009	0.180	0.009	0.031	0.019	0.024	0.008	0.025	0.004	0.034
missing	0.032	0.023	0.035	0.087	0.032	0.066	0.063	0.061	0.055	0.087
Net Income	916.65	513.57	1004.10	509.28	971.04	519.11	985.63	549.26	966.85	538.43
Expenditure										
Groceries	123.31	108.75	122.57	102.98	127.10	104.65	125.26	104.36	137.85	113.13
Food at home	92.87	81.50	91.76	79.48	97.38	82.89	96.29	82.14		
Food outside home	38.09	22.12	38.70	23.24	37.50	24.89	39.32	25.43	40.95	33.05
Financial Hardship										
Late utilities	0.125	0.081	0.082	0.065	0.086	0.054	0.074	0.067	0.076	0.058
Late rent / mortgage	0.061	0.029	0.032	0.018	0.030	0.022	0.035	0.031	0.031	0.017
Miss meals	0.041	0.024	0.024	0.025	0.041	0.020	0.031	0.011	0.027	0.012
Lack heating	0.035	0.039	0.022	0.033	0.028	0.037	0.020	0.023	0.014	0.020
Fin help from family	0.087	0.053	0.074	0.050	0.066	0.031	0.068	0.027	0.057	0.029
Help from welfare org	0.035	0.017	0.015	0.026	0.017	0.022	0.018	0.017	0.012	0.024
Observations	656	695	539	812	532	819	512	839	490	861

Table 3. Family Expenditure and Retirement Status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Log(Grocery Expenditure)								
Retired	**-0.0696**	**-0.0788**	**-0.0916**	**-0.0718**	**-0.0707**	**-0.1941**	**-0.1653**	-0.0947
	(0.0139)	(0.0165)	(0.0256)	(0.0225)	(0.0228)	(0.0771)	(0.0431)	(0.0691)
Sample	Full	Full	Flow	Flow	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6
Covariates	no	no	no	yes	+ Invol.	yes	yes	yes
IV	-	-	-	-	-	YrsExp	YrsDes	Age
δ_α	0.4176	0.4258	0.4385	0.2855	0.2853	0.2889	0.2868	0.2869
δ_ε	0.3061	0.3063	0.2922	0.2922	0.2923	0.2925	0.2925	0.2925
ρ	0.6505	0.6591	0.6924	0.4883	0.4879	0.4939	0.4902	0.4903
R^2	0.0234	0.0248	0.0276	0.4276	0.4276	0.4239	0.4264	0.4283
t	5	4	4	4	4	4	4	4
i	1351	1351	656	656	656	656	656	656
Dependent Variable: Log(Food Expenditure)								
Retired	**-0.0886**	**-0.0872**	**-0.1325**	**-0.0900**	**-0.0796**	**-0.2458**	**-0.1553**	-0.0176
	(0.0183)	(0.0218)	(0.0349)	(0.0294)	(0.0298)	(0.0868)	(0.0478)	(0.0814)
Sample	Full	Full	Flow	Flow	Flow	Flow	Flow	Flow
Waves	W1-W5	W3-W5	W3-W5	W3-W5	W3-W5	W3-W5	W3-W5	W3-W5
Covariates	no	no	no	yes	+ Invol.	yes	yes	yes
IV	-	-	-	-	-	YrsExp	YrsDes	Age
δ_α	0.4390	0.4546	0.4669	0.2986	0.299057	0.3041	0.2992	0.3020
δ_ε	0.3773	0.3687	0.3595	0.3601	0.359452	0.3608	0.3608	0.3608
ρ	0.5752	0.6031	0.6278	0.4074	0.409051	0.4154	0.4074	0.4119
R^2	0.0145	0.0147	0.0237	0.4009	0.402	0.3925	0.4002	0.3966
t	4	3	3	3	3	3	3	3
i	1351	1351	656	656	656	656	656	656
Dependent Variable: Log(Food Outside Home)								
Retired	**-0.1397**	**-0.1864**	**-0.1783**	**-0.1409**	**-0.1300**	**-0.4247**	**-0.3883**	**-0.4990**
	(0.0250)	(0.0274)	(0.0441)	(0.0437)	(0.0446)	(0.1492)	(0.0837)	(0.1363)
Sample	Full	Full	Flow	Flow	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6	W3-W6
Covariates	no	no	no	yes	+ Invol.	yes	yes	yes
IV	-	-	-	-	-	YrsExp	YrsDes	Age
δ_α	0.5527	0.5327	0.5912	0.5385	0.5391	0.5510	0.5503	0.5556
δ_ε	0.6119	0.5936	0.5721	0.5700	0.5696	0.5711	0.5711	0.5711
ρ	0.4493	0.4460	0.5164	0.4716	0.4726	0.4821	0.4814	0.4862
R^2	0.0379	0.0372	0.0314	0.1163	0.1163	0.1140	0.1159	0.1096
t	5	4	4	4	4	4	4	4
i	1351	1351	656	656	656	656	656	656

Covariates include controls for state of residence, sex, educational attainment, family type, number of adults in the household, and change in health status over the previous year.

Table 4. Financial Hardship and Retirement

	(1)	(2)	(3)	(4)	(5)
	Late Paying Utilities				
Retired	**-0.0152**	0.0003	**0.0776**	-0.0077	**-0.2208**
	(0.0088)	(0.0148)	(0.0465)	(0.0253)	(0.0450)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0266	0.0422	0.0249	0.0424	0.0141
	Late Paying Rent / Mortgage				
Retired	**-0.0101**	0.0044	0.0058	-0.0049	**-0.0674**
	(0.0054)	(0.0095)	(0.0275)	(0.0152)	(0.0249)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0102	0.0141	0.0142	0.0144	0.0054
	Missed Meals				
Retired	**-0.0164**	0.0019	0.0476	0.0089	**-0.1216**
	(0.0052)	(0.0091)	(0.0321)	(0.0180)	(0.0314)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0214	0.0294	0.0191	0.0292	0.005
	Lack Heating				
Retired	0.0057	**0.0183**	0.0376	**0.0263**	**-0.0589**
	(0.0055)	(0.0089)	(0.0276)	(0.0155)	(0.0258)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0275	0.0373	0.0374	0.0387	0.0120
	Sought Financial Help from Friends / Family				
Retired	**-0.0280**	-0.0095	0.0247	-0.0217	**-0.2241**
	(0.0074)	(0.0135)	(0.0428)	(0.0239)	(0.0433)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0357	0.0533	0.0477	0.0545	0.0203
	Sought Help from Welfare / Community Organisation				
Retired	0.0054	**0.0128**	**0.0567**	0.0134	-0.0307
	(0.0048)	(0.0071)	(0.0216)	(0.0118)	(0.0193)
Sample	Full	Flow	Flow	Flow	Flow
Waves	W1-W6	W3-W6	W3-W6	W3-W6	W3-W6
IV	-	-	YrsExp	YrsDes	Age
R^2	0.0103	0.0302	0.0206	0.031	0.0178