The Composition Effect of Consumption around Retirement: Evidence from Singapore

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This paper examines how the composition of consumption expenditures changes in the years surrounding retirement and over the lifecycle. A familiar fact on lifecycle consumption is that expenditures are "hump" shaped over an individual's lifecycle, peaking in middle age and then declining in the years that follow.[1] In addition, numerous researchers have also documented significant decline in consumption upon retirement and the incongruence of these empirical patterns with a standard lifecycle model with consumption smoothing has led to the emergence of the "retirement-consumption" puzzle (e.g. Attanasio, 1999). Recent papers by Hurst (2008) and Aguiar and Hurst (2005, 2013) revisit both these facts and show that the decline in consumption at retirement and the overall "hump" shaped pattern of lifecycle expenditure masks important heterogeneity across different types of consumption goods. In particular, Hurst (2008) notes that a large part of the consumption decline at retirement is driven by declines in food and work-related expenses. Moreover, despite the decline in food expenditure upon retirement, actual food quality and quantity remains largely constant (Aguiar and Hurst, 2005, 2013). This behavior is consistent with consumers substituting away from market expenditures toward household production as the opportunity cost of time changes after retirement.

In this paper, we build on the insights of these papers and use two novel datasets to document the composition effects of post-retirement consumption. The first dataset contains consumer financial transactions data (credit card and debit card spending and checking account balance) of a large representative sample of Singaporean consumers over a 24-month period. As our data is drawn from records of actual transactions, relative to traditional household spending datasets typically used in the

[1] See for example, Gourinchas and Parker, 2002 and Fernandez-Villaverde and Krueger, 2006.

literature such as the Consumer Expenditure Survey (CEX), our data has the advantage that it is essentially free of measurement error[2] and permits analysis at the individual level.

Using the data on consumer financial transactions, we are able to replicate the basic hump-shaped pattern of expenditure over the lifecycle and expenditure declines in the years surrounding retirement. We also find evidence of heterogeneity in expenditure patterns around retirement – in particular, expenditure in categories such as apparel and durables as well as entertainment and services appears to exhibit larger falls relative to expenditure on groceries. Next, we exploit the variable on retirement status reported in our data to study the difference in consumption pre and post retirement. We match each retired individual in our dataset to a similar non-retired individual based on his or her observable characteristics and compare consumption behavior between the retired and non-retired individuals. We find that while retired individuals appear to spend significantly less on transportation and travel, spending in other categories (e.g. supermarket shopping, dining, entertainment and services) do not appear to exhibit any declines post-retirement.

[2] One potential source of measurement error in this data is that it does not capture cash purchases. We will discuss this limitation in greater detail in Section II.

One limitation of using consumer financial transactions to capture food expenditure is that card spending may not fully capture all the different margins of food expenditure, particularly for small food purchases and purchases in fresh markets that are likely to be made in cash. Therefore, we supplement our main spending data with a panel of detailed survey data from Nielson on consumer grocery spending from 2008 to 2010. We find that home food purchase also exhibits the familiar "hump-shaped" pattern. Strikingly, we find little evidence that consumers reduce the number of items purchased over the lifecycle. Instead, consumers appear to spend relatively more time shopping as they get older – they spend more on food at the fresh market and on store brand products, while decreasing their expenditure at high-end supermarkets and on non-store brand products. These results suggest that part of the decrease in home food purchase is due to consumers substituting higher price items with cheaper alternatives that require more time input. Overall, these findings support Aguiar and Hurst (2005, 2013)'s view that the lifecycle changes in food expenditure are largely consistent with a shift toward home production due to changes in the opportunity cost of time over the lifecycle.

I. Data

The first dataset contains consumer financial transactions of 180,000 customers from the leading bank in Singapore between April 2010 and March 2012.[3] For individuals in our sample, we have monthly statement information that includes the checking account balance, total debit and credit amount (for checking accounts) and spending (for credit and debit cards).[4] The data also contains disaggregated transaction-level information, allowing us to examine spending by separate consumption categories. We aggregate the data to the individual-month level. Credit card spending is computed by adding monthly spending over all credit card accounts for each individual.[5] Summary statistics for this sample are reported in Online Appendix Table 1.

We supplement our main spending data with detailed panel survey data from Nielson on consumer grocery spending from January 2008 to December 2010 for 371 Singaporeans. Despite the sample size, this survey captures rich information on grocery spending, including shopping venue, the number of items purchased in each shopping trip, and detailed product-level purchase information (e.g. prices and brand information).

[3] The bank has more than 4 million customers, or 80% of the entire population of Singapore. Our sample is a random, representative sample of the bank's customers.

[4] See Agrawal and Qian (2014) for an in-depth discussion of the role of consumer credit in Singapore. This dataset is also used in Agarwal, Pan and Qian (2015) to study the effects of pension savings access on consumption and savings behavior in Singapore.

[5] We require individuals to hold all accounts with this bank (bank account, credit card, and debit card) as these individuals are more likely to have an exclusive relationship with the bank. For these consumers, the patterns of expenditure can be better identified. Nevertheless, our main results are robust to our sample selection criteria.

II. Results

A. Age Profile of Expenditure using Debit/Credit Card Data

We begin by examining the age profile of consumption for the individuals in our sample. Following Aguiar and Hurst (2013), we obtain the age profile of consumption by regressing log total spending (debit and credit) on separate age dummies (from 26 to 75), controlling for year-month fixed effects and individual fixed effects. We also estimate separate regresions for log spending in each of the following consumption categories: supermarket, dining, transportation and travel, entertainment and service and apparel and small durables.

Figure 1A plots the age coefficients for log total monthly spending. This figure replicates the basic hump-shaped profile of expenditure over the lifecycle, with monthly card spending peaking at around 90 log points higher than the level of 25-year old spending, and then declining by about the same amount by the time individuals are in their mid-60s. We find some heterogeneity in lifecycle patterns of spending across different categories (see Figure 1B) – in particular, the post-middle age decline in spending is most pronounced for Apparel/Small Durables, Dining and Entertainment/Services. In contrast, the post-middle age decline in supermarket spending and transportation/travel are more modest. The latter finding on supermarket spending is in contrast to the results on food expenditure documented in Aguair and Hurst (2013). Interestingly, examining credit card and debit card spending separately (see Figures 1C and 1D), we find that while monthly credit card spending exhibits the hump-shaped pattern, debit card spending is largely constant until about age 50 before rising for the remaining years until around age 70. That is, older consumers appear to be shifting their mode of spending from credit card spending in the earlier years to an increasing reliance on debit card spending in the later years.

[Insert Figure 1]

B. Effects of Retirement on the Composition of Expenditure

To examine how consumption patterns change post-retirement, we exploit the variable on retirement status in our dataset.[6] Specifically, for each retired individual in our sample, we find a similar non-retired individual based on observable characteristics available in the data (age, race, gender, nationality, marital status, income, account balance and housing type). We then compare how consumption differs between the retired and (matched) non-retired individuals by regressing log consumption on the retirement dummy, controlling for year-month fixed effects and individual demographic characteristics.[7]

The results are reported in Table 1. On average, a retired individual spends 12% (t-stat: -1.3) less each month compared to a matched non-retired individual in sample. The effect of retirement on consumption varies considerably across consumption categories, with the largest declines being recorded for travel and transportation, consistent with previous literature that finds declines in work-related expenditure post-retirement.

[Insert Table 1 here]

[6] The retirement status is based on an individual's reported occupation. The bank verifies this information; therefore, there is likely to be little measurement error.

[7] The demographic characteristics include log age, log income, log account balance, dummy variables for female, Chinese, public-housing, married and foreigner status and a full set of postal code fixed effects.

C. Age-Profile of Food Expenditure using Survey Data

A key limitation of our spending data is that card spending does not capture cash purchases that are common in establishments such as fresh markets and small grocery stores. If consumers substitute across different types of grocery stores over their lifecycle, the spending data would fail to capture some of the key expenditure patterns. The survey data allows us to examine various margins of substitution in food expenditure over the lifecycle.

Figure 2A depicts the age-profile of total monthly spending on groceries in the Nielson data.[8] We find that total monthly spending on groceries appears to peak for consumers around the mid-30s and gradually declines by about 50% over the lifecycle. Interestingly, the patterns in Figure 2B suggest that older consumers do not appear to reduce the total number of grocery spending items, suggesting that the age-profile of total grocery spending is largely driven by differences in the prices paid by older consumers.[9]

[Insert Figure 2 here]

To provide further evidence on these potential margins of substitution, we examine the age-profile of spending at fresh markets, high-end supermarkets and on store-brand and non-store brand products (see Online Appendix Figures 1A to 1D). We find considerable heterogeneity in the type of food spending among consumers around the retirement years (60 to 65). These consumers appear to reduce their spending at high-end supermarkets in favor of spending at fresh markets. Moreover, they are significantly more likely to purchase store-brand items later in the lifecycle. Overall, these findings provide support for the idea that some part of the decrease in food expenditure, even among home food purchases, is due to consumers substituting high price items with cheaper alternatives that require more time input (e.g. shopping at the fresh market). These results are consistent with Hurst's (2008) observation.

III. Conclusion

We document heterogeneity in the age-profile of expenditure across different consumption categories using a large proprietary dataset on consumer financial transactions. Exploiting the reported retirement status of individuals in our dataset, we show that the overall decline in spending

[8] We replace the one-year age dummies with a five-year age range due to the small sample size.

[9] Due to the small sample size of the survey, the confidence intervals for the estimates are quite large; therefore, we view the results using the survey data as suggestive.

post-retirement is largely attributable to changes in work-related spending such as travel and transportation. Finally, we document important composition effects in home food expenditure. Older consumers appear to substitute away from more expensive higher-end purchases toward relatively cheaper fresh market purchases and store-brand products.

Overall, our results offer strong support for the empirical patterns documented in Hurst (2008) and Aguiar and Hurst (2005, 2013) and highlight the importance of compositional effects in understanding consumption changes at retirement and over the lifecycle.

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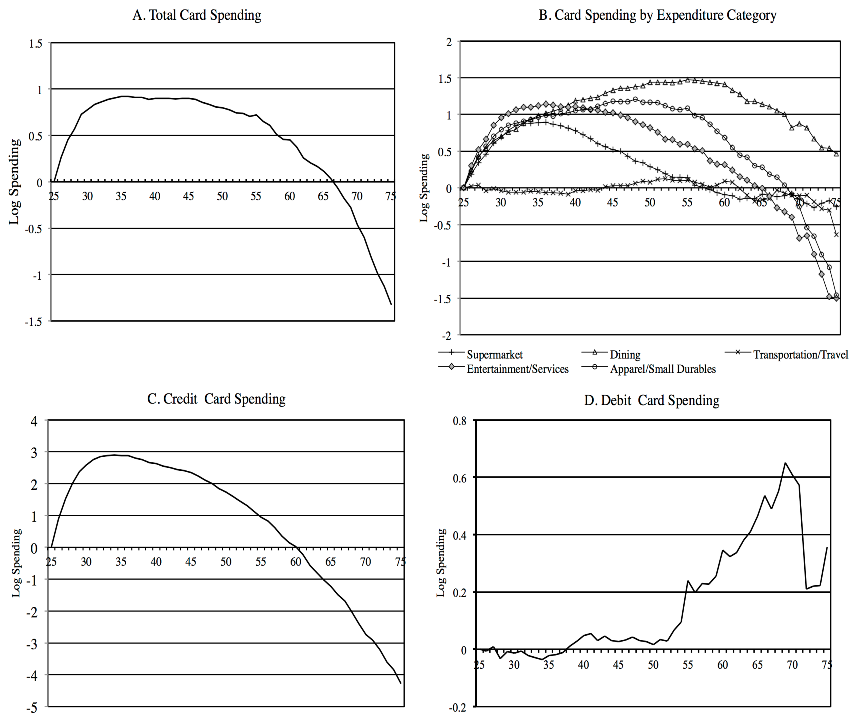

FIGURE 1. LIFECYCLE PATTERNS OF CARD SPENDING

Note: Panel A plots the log total monthly card spending (debit + credit) for each age relative to individuals age 25. Panel B plots the log total monthly card spending separately by consumption categories. Log monthly credit card and debit card spending are plotted separately for each age in Panels C and D, respectively.

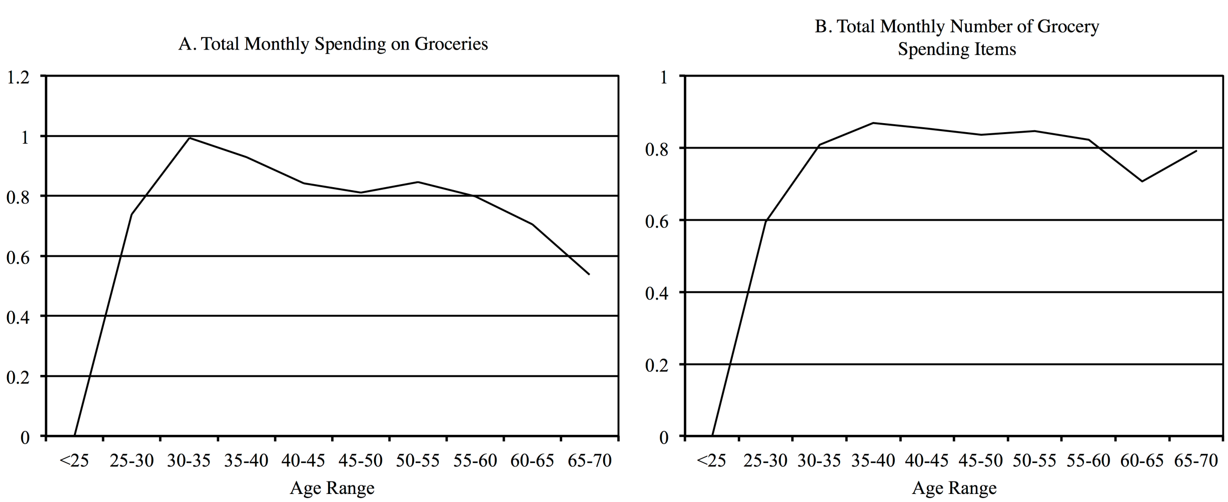

FIGURE 2. GROCERY CONSUMPTION FROM NIELSON SURVEY

Note: The data is from the Nielson Survey Data. Panel A and Panel B plots the log total monthly spending on groceries and log total monthly number of grocery spending items for individuals in each age range relative to individuals age < 25, respectively.

TABLE 1 - EFFECT OF RETIREMENT ON THE COMPOSITION OF SPENDING

		Log Spending on:				
	Log Total Spending	Supermarket	Dining	Transportation & Travel	Entertainmen t & Services	Apparel & Small Durables
	(1)	(2)	(3)	(4)	(5)	(6)
Retired	-0.115	-0.004	0.072	-0.407***	0.075	-0.036
	(-1.31)	(-0.03)	(-0.79)	(-2.85)	(-0.61)	(-0.33)
Observations	35, 354	35, 354	35, 354	35, 354	35, 354	35, 354
R-squared	0.486	0.53	0.442	0.597	0.509	0.414

Notes: Retired is a binary indicator of an individual's retirement status. For each retired individual in our sample, we find a similar non-retired individual (Retired = 0) based on observable characteristics available in the data (age, race, gender, nationality, marital status, income, account balance and housing type). All regressions are based on the sample of retired individuals and the matched sample of non-retirees. All regressions also include controls for log age, log income, log account balance and dummy variables for female, Chinese, public-housing, married, foreigner status, a full set of postal code fixed effects and year-month fixed effects. Standard errors are clustered at the individual level and t-statistics are reported in parenthesis.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.