AGEING AND CONSUMPTION – THE IMPACT OF DEMOGRAPHIC CHANGE ON FOOD EXPENDITURE PATTERNS

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Abstract:

Populations in most developed countries are ageing while fertility is declining. Policy makers and researchers expect this demographic shift to induce major shifts in most Western societies, economies and public policies. Moreover, changing requirements, demands and public health pressures (e.g. diabetes) of ageing populations are expected are likely to alter food expenditure patterns for various goods categories, including food products.

The objective of this paper is to investigate to what extent household's food expenditure patterns shift around retirement age and what role changes in time use spend on home production play in this context. More specifically this paper reviewes literature releavnt to economic literature that has evolved around Modigliani and Brumberg's (1954) economic life-cycle hypothesis (LCH) based on the model of inter-temporal choice. Analysis of expenditure patterns using a recent sample of Canadian household-level scanner data reveal significant differences in meat product expenditure patterns and preferenecs between consumers of different age cohorts.

Ageing and Consumption – The Impact of Demographic Change on Food Expenditure Patterns

Introduction

Populations in most developed countries are ageing while fertility is declining. Over the next few decades the composition of most western populations will undergo a drastic demographic transformation as the so-called 'baby-boomer' generation, those born between 1946 and 1964, retires. According to estimated by Statistics Canada in 2015 the share of senior citizens across Canada will outnumber the number of children for the first time and as a group make up a quarter of the total population by 2030. This trend is expected to further contribute to the already rapid ageing of the Canadian population which will to amount to 40% of Canadians being 65+ by 2040.

Figure 2: Age Cohorts within the Canadian Age Pyramid, 2006
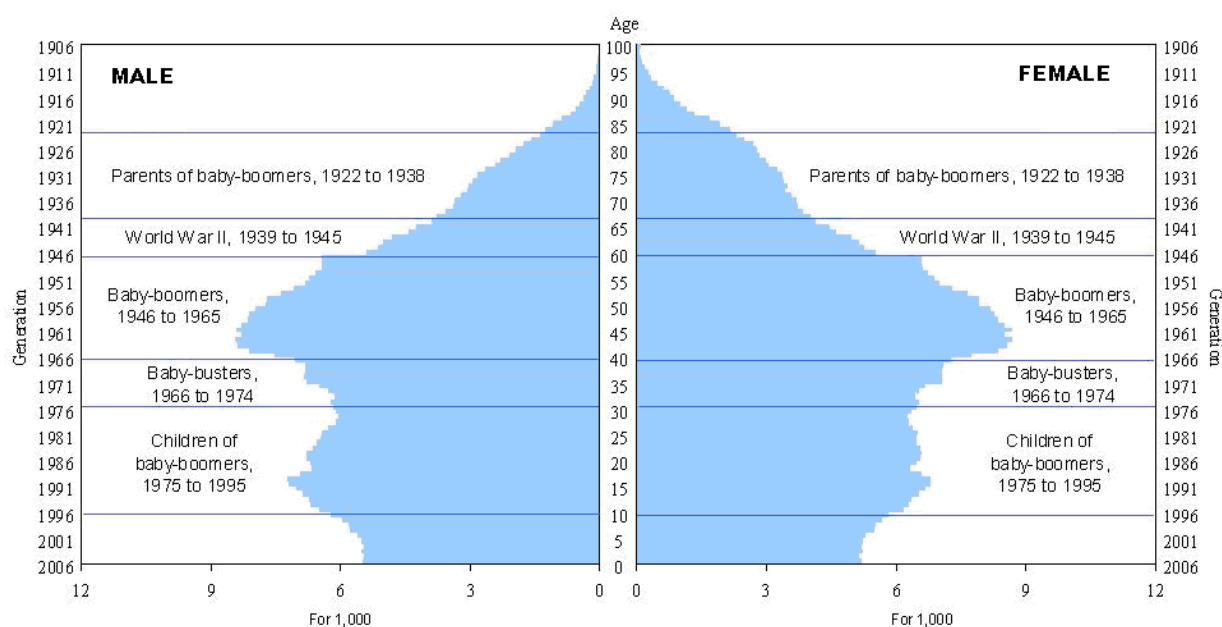
Source: Infrastructure Canada (2006). Calculations based on Statistics Canada data.

The heightened interest by economists in the issue of population ageing is largely driven by the incomplete (lack of) understanding of how consumers in most developed countries

manage their resources later in life. An important part of this understanding focuses on individual's patterns of saving and use of wealth over time as reflection of choices between current and future consumption decisions. This includes the allocation of current available resources on consumption expenditure among different goods and services. Closely related to this choice process is the decision to engage in labour activities beyond a certain (anticipated) retirement age. A better understanding of changes in the allocation of expenditures on different good (e.g. food) and time use (e.g. work, leisure) is of considerable interest to marketing exerts and for policy makers assigned with health and economic policy.

The objective of this paper is to investigate to what extent household's food consumption expenditure shifts around the retirement age. This reserach will also provide first insight into what role changes in time use spend on home production play as a substitute for household consumption expenses. Extension of this preliminary work are aimed at investigating the role of home production and consumption expenditures pre and post-retirement age to quantify to what extent the ageing of the Canadian population follows the predictions of Modigliani and Brumberg's (1954) life-cycle hypothesis, which predicts rational forward-looking agents to make economic decisions such as to smoothen their consumption path over time.

The findings of this reserach are expected to provide a more detailed understanding of household food consumption patterns over different periods of the life-cycle and factors affecting household food budget allocation over time. The complex implications of population ageing for most developed countries so far only have been analysed in the context of expenditure patterns for durable goods. However, increasing public attention and policy emphasis on the well-being of growin senior populations require a broader understanding of their food preferences and related expenditures both of which bear direct implications for public policy.

Background

Canadians are ageing while fertility is declining. Over the next few decades the composition of the Canadian population will undergo a drastic demographic transformation as the so-called 'baby-boomer' generation, those born between 1946 and 1964, retires. According to estimated by Statistics Canada in 2015 the share of senior citizens across Canada will outnumber the number of children for the first time and as a group make up a quarter of the total population by 2030. Several Canadian governmental agencies state that this demographic shift is expected to induce major shifts in the Canadian society, its economy and public policy. Moreover, changing requirements likey to create Addtional pressures on public health (e.g. diabetes)and welfare systems (e.g. pensions) of an ageing population are expected to alter the allocation of expenditures for various goods and services, including food products, across Canada. Previous marketing and demand literature has often argued on the basis of the average household. For instance, it was implicitly assumed that today's young consumer that may be the heaviest users of a good would continue to be the heaviest users in the future.

This assumption is contradicted by economic research findings showing that age-cohorts over time become differentiated in a variety of consumption behaviours and preferences (Denton et al. 1999, Fisher et al. 2005). Hence, cohort, age and time period effects among other socio-economic factors emerge as important determinants of consumption decisions. Since the 1980's household incomes and asset wealth of senior Canadian have increased by 56% together with improvements in education levels and life expectancy that rose from 77 years in 1991 to 80.4 years in just over a decade (Statistics Canada 2008). In 2003 senior couple households aged 65 to 74, spend an average 74 % of their income on personal consumption. Two-thirds of each consumption dollar was spent in accommodation, transportation and food expenditures.

Literature

A distinct drop in spending on consumption around retirement has already been documented for other countries like the U.S., Germany, Italy and the U.K. constituting the so-called 'retirement consumption puzzle' (Aguiar and Hurst 2005). The standard economic life-cycle hypothesis (LCH), base on Irving Fisher's model of inter-temporal choice, predicts that rational forward-looking individuals make their savings decisions such that consumption is smoothened over time (Modigliani and Brumberg 1954). Unlike the standard economic (Keynesian) consumption function build around the individual's disposable income, the LCH assumes that households maximize their utility by consuming a constant percentage of the present value of their life-time budget. Therefore households will choose consumption levels that provide constant utility over the life-cycle, but are not necessarily the same for all periods (Attfield and Browning 1985) (Figure 1).

Figure 1: Illustration of the Concept of Consumption over the Life-cycle
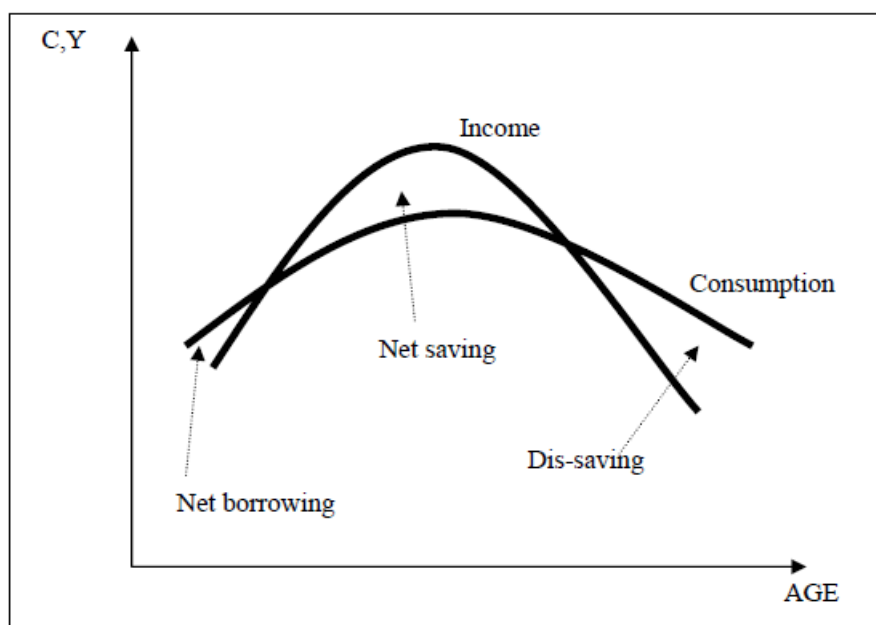
Despite several extensions of the standard model, including uncertainty about life expectation, motives for precautionary savings, and bequest motives, the LCH has been

contradicted by several empirical studies showing that households across Europe and the U.S. reduce their consumption expenditures significantly upon entry into retirement (Banks et al. 1998; Hurd and Rohwedder 2006; Miniaci et al. 2003; Smith 2004; Aguiar and Hurst 2005). The literature cites various reasons to solve this puzzle and to reconcile observed behaviour with the life-cycle theory. Explanations for the drop in consumption expenditure range from changes in preferences due to an unanticipated increase in time for leisure; and related increases in home production; more "efficient" purchase decisions due to reduced search costs. While these factors more or less stand to the non-separability between consumption, time use and home production direct shocks to consumption expenditure may also be induced due to the abrupt shift to retirement affecting the level of consumption and eliminating common work-related expenditures (e.g. transport, out of home meal purchases, clothing). Evidence on the magnitude of influence of these factors in Canada has been presented by Tang and MacLeod (2006), Milligan (2005, 2008). Other explanations may included liquidity problems caused by unexpectedly low pension payments or unexpected health problems around retirement. For instance, in an early study Hamermesh (1984) found that 53% of retired couples reduced their consumption spending by more than 10% relative to the average change in real spending, while Bernheim et al. (2001) found that 31% of U.S. households reduce their expenses by at least 35 percentage points at retirement. Laitner and Silverman (2005) reported an overall pending drop of up to 16% for selected U.S. households.

Food purchases are a major expenditure category for most housheolds and still rank fourth in terms of household expenditure in Canada. Everage household food expenditure has grown at a rate of 2.4% compared to an annual growth rate of 2.7% for the corresponding food share of the Canadian consumer price index (CPI). Adjusted time series data household expenditure suggest that the share of food expenditure of all household expenditures (excl. investements) has been falling steadily from 15.1% in 1982 to a share of 11% in 2002 (Figure 2).

Figure 2: Canadian Household Expenditures, 1982 and 2002 (Total Expenditure = 100)

|	1982	2002	Δ
Personal Taxes	17.7	20.0	2.3
Shelter	20.7	18.6	-2.1
Transportation	11.9	14.0	2.1
Food	15.1	11.1	-4.0
Recreation	4.6	5.9	1.3
Personal Insurance Payments and Pension Contributions	4.2	5.7	1.5
Household Operation	4.3	4.6	0.3
Clothing	6.0	4.1	-1.9
Household Furnishings and Equipment	3.5	3.0	-0.5
Health Care	1.9	2.6	0.7
Tobacco Products and Alcoholic Beverages	3.3	2.5	-0.8
Gifts of Money and Contributions	2.1	2.4	0.3
Education	0.7	1.5	0.8
Miscellaneous Expenditures	1.3	1.5	0.2
Personal Care	1.8	1.4	-0.4
Games of Chance (Lottery)	0.4	0.5	0.1
Reading Materials and Other Printed Matter	0.6	0.5	-0.1

Sources: Statistics Canada, *FAMEX* (1982, adjusted) and *SHS* (2002).

Fisher et al. (2005) are among a few economic studies that empirically test wehther the 'retirement consumption puzzle' holds when more comprehensive consumption data is used to test the hypothesis. Using the United States Consumer Expenditure Survey (CEX) the authors find that as definition of household consumption broadens the magnitude of decline in consumption post retirement diminishes. When comparing median consumption expenditures across different pre- and post retirement age cohorts, food expenditures levels for retired and older cohorts decline by 8% and 10%. These findings match previous results reported by Stephens (2001) and Aguiar and Hurst (2005). However, Bernheim et al. (2001) reports that especially low-wealth senior households and individuals experience a larger decline in expenditures at retirement. However, period-specific economic factors at work in the U.S.– impact of 1990's U.S. recession on incomes, expectations, and financial wealth–may partly offset cohort and aging specific changes in expenditure levels and patterns. Fisher et al. (2005) conclude that food expenditure is a weak proxy for changes in consumption levels

after retirement as food expenditures tend to decline faster with age than total expenditures do. The results suggest that most (U.S.) households tend to accurately predict their future retirement consumption needs and accumulate sufficient savings. This finding confirms the lifecycle hypothesis against contradictory findings of previous studies.

Unfortunately, comparative analyses of food expenditures for Canada do not exist to date. Figure 3 contrasts expenditure shares across expense categories and different groups of senior Canadian households. The evidence suggest that senior one- and two person (couple) households have higher food expenditure levels when compared to all one-person and all two-person housheolds. While single senior spend less on transportatio and taxes, couple hosheolds have higher transportation expenses and yet pay less taxes. These expenditure patterns carrty no immediate implications, however, may overall be reflective of steadily increasing levels of wealth for senior Canadian households (Statistics Canada 2008).

Figure 3: Shares of Total Household Expenditure in Selected Categories for Different Senior Households
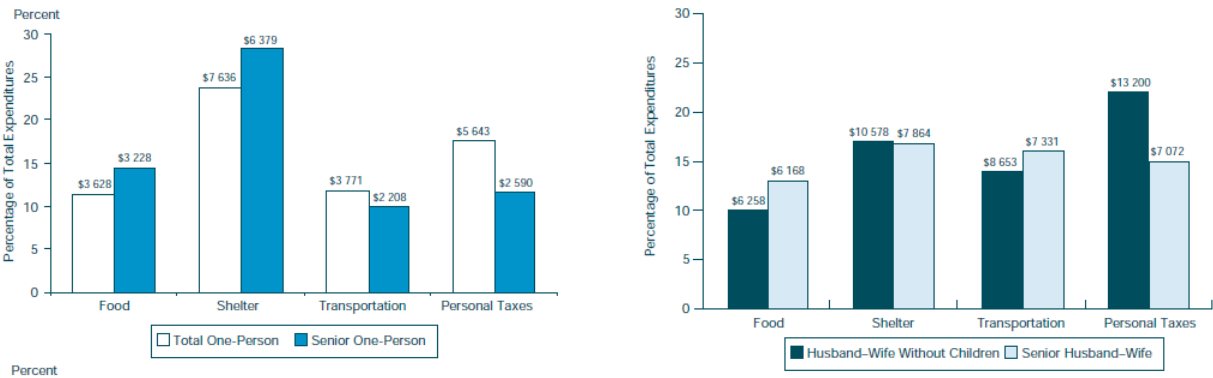
Source: Industry Canada (2005).

For instance, Canadian senior couples report higher (and frequent) expenditures for a number of discretionary items (e.g. clothing, alcoholic beverages, recreational equipment, travel

accommodation, newspapers, cellular phone) which contribute todistinct diffremecs in the level of household expenditures compard to seniors living alone. It is commonly assumed that the latter may be reducing discretionary expenditures during retiremnt as a consequence of lower incomes (National Advisory Council on Aging 2000).

Analysis of Age Cohort Effects in Consumption over the LifeCycle

The importance of the *cohort* as an important concept in the analysis of long term changes in demographic and economic trends is not new. Cohorts have been broadly defined as groups of individuals within a given population who experience a formative event at the same time (Glenn, 2005). The notion of *cohort effects* rests on the assumption that members of a cohort undergo a set of events and experiences that are specific to the circumstances during a period of time. Hence, these events are thought to shape the group's attitudes, preferences, and lifestyles. Different cohorts can emerge through significant historic events, for instance, boom or depression times, ethnic factors, education, or geographical influences.

The easiest to track and most often researched cohort has been the *birth cohort*; those individuals born within a specific time period (Glenn, 2005). However, an important distinction needs to be made between *birth cohort* and *age group*. While *age group* stands for individuals of a certain age at a specific point in time (e.g. survey) the age group will change over time (from survey to survey, the same individuals *birth cohort* remains unchanged.

As a *birth cohort* moves through the life cycle–undergoes the process of ageing–, different events will shape the group's attitudes, preferences, and demand for goods and services. Meredith and Schewe (1994) describe the ages of 17 and 21 years as the most significant–formative years– in shaping individuals lifelong attitudes and preferences distinct for their cohort group. For instance, the population of the United States can be divided into pre- and post depression birth cohorts. One could hypothesize that devastating economic conditions during the 1930's depression created strong habits and attitudes, for instance, the desire to

save for the future. These habits may be standing in sharp contrast to the preferences of the first boomer's birth cohort, born between around 1946 and 1954. Having come to age between 1963 to 1972 North America was experiencing favorable good economic conditions, creating strong attitudes within this cohort towards maintaining a good lifestyle throughout the life cycle (Mori et al. 2000).

The demand for of any food or consumption good or service may be influenced by the structure of a consumer population. Hence, age and cohort membership and time period as well as the interaction between these factors do matter (Nakamura, 1995). Specific period factors will include economic factors, incomes, prices, and market conditions as well as noneconomic factors, such as broader population trends (e.g. education, diet-health awareness). Hence, in this context cohort analysis is targetesd at identifying to what extent differences in formative experiences across age cohorts have had an impacton demand patterns tha tcan be separated from time simple time period effects and othe reconomic and non-economic influencing factors over time (Deaton and Paxson 2000).

Table 1 illustrates potential and hidden cohort effects using an imaginary example of Canadian red meat demand. The below *cohort table* surveys meat consumption for different age groups in ten-year increments between 1980 and 2009.

Table 1: Standard Cohort Table of Canadian Meat Demand by Age Group, 1980–2010, (kg/person, hypothetical)

Time Period	Age Group			
	20 – 29	30 – 39	40 – 49	50 – 59
1980	56.9 [A]	57.2	58.2	60.2
1990	48.3	50.5 [B]	48.7 [C]	56.7
2000	48.0	48.2 [D]	48.6	52.2
2009	40.0	41.9	43.2	51.9

Exact evaluation of a *cohort table* may not be straight forward as can be illustrated by the differences in consumption changes labeled A, B, C, and D. Considering the diagonal line labeled A, first, the 20–29 year-old group in 1980 and the 30–39 year-old group in 1990 belong to the same *birth cohort*. Their consumption declined from 56.9 to 50.5 kg (A–B). The decline in consumption can be attributed to two factors, and aging effects (20-29 years to 30-39 years) and a period effect of going from 1980 to 1990. Based on aggregate consumption data none of the two effects would be readily identifiable. Second, the 30–39 year-old group and 40–49 year-old group consumed 50.5 and 48.7 kg in 1990 (B–C).The difference of 1.8 kg cannot be attributed to the difference in age alone, since the older age groups belong to a different *birth cohort*. Again, the composite effect of age and cohort membership is not easily separable. Third, the 30–39 year-old group consumed 50.5 and 48.2 kg in 1990 and 2000, respectively (B–D). The difference of 2.3 kg cannot be attributed to the 10-year period alone. Part of the explanation may lay in the difference in *birth cohort*, since those consumers who were 30–39 years old in 2000 were only born in the 1950s.

The linear relationship between birth cohort, age, and time period posed a frequent problem in the estimation of cohort-based models as regression results tend to produce an infinite number of least squares solutions for model coefficient estimates (Mason and Fienberg 1985). To overcome this identification problem Deaton and Paxson (1994) propose to assume long-run time effects to be zero, thus only allowing for short-run time effects to capture common business cycles in the underlying data. All remaining time trends are can then be attributed to age and cohort effects. This decomposition involves making all time effects orthogonal to a time trend by replacing conventional year dummies with:

$$\text{Time}_t = \text{time}_t[(t-1)\text{time}_2 - (t-2)\text{time}_1] \tag{1}$$

where time_t is a dummy denoting year t. Following the additional assumption that long-term time trends are zero:

$$\sum_{t=year}^{T} time_t = 0$$

Following this procedure a simple age-period-cohort model (APC) of cohort analysis can be written as the average consumption by individuals of i years of age at period t, Xi

$$X_{it} = B + A_i + T_t + C_k + Z_i + E_{it},$$ (2)

where B stand for grand mean effects, A_i are age effects to be attributed to age group i, and T_t are period effects to be attributed to period t. C_k are cohort effects associated with cohort k. Z_i are other individual or household characteristics and E_{it} are random errors terms. Given that the underlying raw is in cohort table format equation (2) provides a standard framework to decompose individual consumption patterns by age and period (annual) into age, net of period, and cohort specific effects beyond any mean effects. For instance, it can be tested whether a consumer cohort that was the heaviest users of a good at one point in time continued to be the heaviest user in subsequent time periods. Nakamura (1995) proposed an additional assumption of "gradual changes" and associated sum to zero constraints regarding the coefficient estimates that allow a model estimation using common lest square methods.

$$A_i - A_{i+1} = 0, T_i - T_{i+1} = 0, C_k - C_{k+1} = 0$$
$$\sum A_i = \sum T_t = \sum C_k = 0$$ (3)

In order to implement the above model in equations (1,2) to estimate changes in Canadian consumers food (and household) expenditure patterns over the life cycle, detailed information and cohort tables on long-term consumption trends are required. Unfortunately, such information is not readily available from public Canadian sources such as various Statistics Canada databases. However, multiple and complementary longitudinal Canadian surveys do exist that can be exploited to compile a suitable database to achieve the above objectives. Canada's Survey of Household Spending (SHS) and Family Food Expenditure Survey (FFES) track Canadian household consumption expenditures since 1984 together with information on

income, prices and socio-demographic variables. Complementary information on time use patterns of Canadian households, pre- and post retirement can be obtained from Statistics Canada's General Social Survey on Time Use series (GSS). This data will allow for the estimation of the effect of ageing of the Canadian population has on consumption patterns and to separate this effect from other major determinants such and age, cohort and period effects that shape consumption behaviour in the long run. Another complementary data source that provides valuable insights into health-related factors within the Canadian population is the Canadian Community Health Survey. The 2002 version of the survey particulalrly emphasizes food consumption and health which could be used to investigate the relationship between food consumption and health in the context of cohort analysis.

Ageing & Consumption in Canada - A Brief Overview of Meat Consumption by Age Group

Given the current lack of suitable long-run cohort data for Canadian food expenditures we apply a set of Nielsen scanner data (Nielsen Homescan) on elderly Canadian consumer's (age 65+) expenditures and purchase frequencies for various meat products. Purchase pattern for this cohort are contrasted with retail purchase data for younger household cohorts.
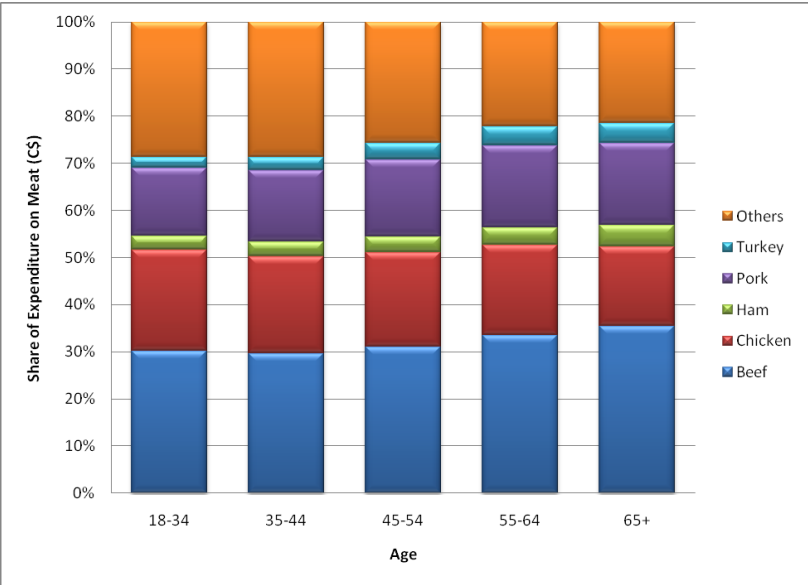
Based on Nielsen Homescan household panel data for the period 2002-2009, we particularly address the question of whether meat consumption patterns across age cohorts differ within a fairly narrow period of time. Aguiar and Hurst (2005) find that the frequency with which retirees consume individual food categories is essentially identical to that of younger consumers with similar demographics, while their consumption expenditures decline at retirement. Hence, including purchase frequency information is crucial. For testing whether Aguiar and Hurst's results for meat demand in Canada. For instance, Hurst (2006) argues that the decline in food expenditures of retirees is the result of higher consumption efficiency as

they have more time to compare food prices and spend more time on the home production of foods.

Meat can be considered to be a particularly important food group as it is the essential source of a number of high quality nutrients (proteins, vitamins and minerals) that are especially meaningful for the health of the elderly. Meat also accounts for a large share of total food expenditure among Canadian households.

Preliminary findings based on over 300,000 individual retail meat purchases in 2007 suggest that elderly Canadian households (HH-head is 65+) show significantly lower (95 % significance) meat purchase frequencies when compared with household from all other age cohorts in the sample. When meat expenditure is concerned, elderly households spend significantly less (99 % significance) on meat products. Meat expenditures differ as much as $1050 between +65 and all other households, while average purchase frequencies show comparatively similar patterns.

**Figure 4: Household Age and Share of Expenditures (C$) by Meat Ttype**

Source: Calculations based on Nielsen Homescan panel data, 2002 to 2009.

Figure 4 summarizes Canadian household meat expenditures at retail for all major meat product categories. Older Canadian households tend to spend a larger portion of their total meat expenditure on beef products, and a smaller share on chicken products when compared to the young household cohorts. Besides beef, the 65+ household cohort spends a larger percentage of their of total meat expenditure on pork products, turkey and ham. However, most differences are not statistically different from each other given the short-term of the analysis.

Closer inspection of the data also reveals that older household cohort's average meat expenditure on different meat types fluctuates over the life cycle. Figure 5 shows that as household's age, total meat expenditure tends to decline, with "other meats" seeing the most prominent drop. Interestingly, expenditures and purchases of Turkey and Ham products–traditional products in the context of the Canadian meat market–remain stable; however at a small share of total category expenditure.

Figure 5: Household age and average annual meat expenditures (C$)
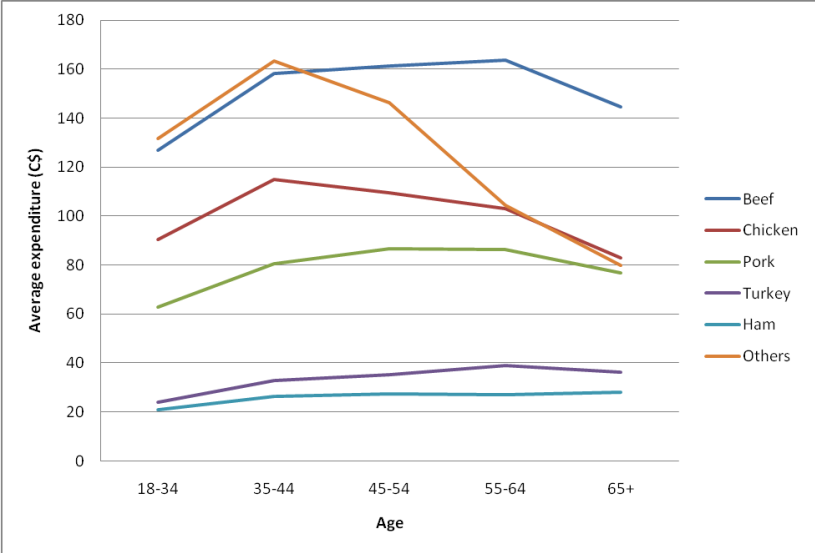
Source: Calculations based on Nielsen Homescan panel data, 2002 to 2009.

Another interesting difference in the consumption and expenditure patterns reveals itself from the analysis of individual meat products choices made by Canadian consumers belonging to different age cohorts. Figure 6 summarize meat expenditure patterns when all meat products available in Canadian retail stores are grouped according to their degree of value-added, or amount of processing.

Figure 6: Household Age and Expenditure on Fresh, and Processed Meat Products
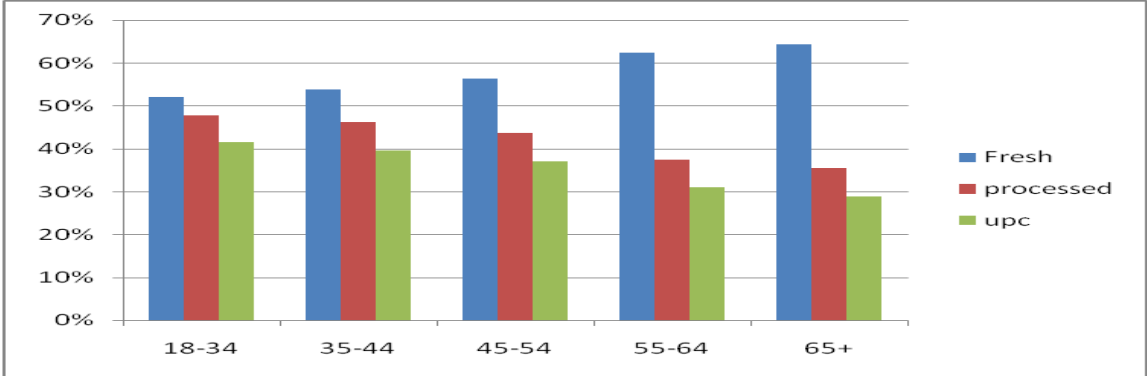
Source: ACNielsen Homescan™ Panel, 2009

On average, the 65+ household cohort spends about 64% of their total meat expenditure at retail on fresh meats, while this figure is only 51% for hoisheolds of the 18-34 years cohort. Within increasing age Canadian households seem to increase ther share of frehs meats. In other words, older consumers purchase considerably less processed meats (mostly standing for convenience products, e.g. "ready to..." meat products) when compared to younger houshold cohorts (presumably those that have underaged children living at home). Here, the major difference is in purchases of UPC-coded meats products. Specific meat prefrenecs of older households also show differences in the selection of retail outlet and and specific meat brands in the available Nielsen data. For instance, 65+ housholds bouhght significntly more meat at Metro stores, younger age cohorts favoured Loblaw's supersores for their meat purchases. Older consumer preferred Maple Leaf and Compliments (Sobey's private label)

products over other brands. Overall, the data reveals that with increasing age household's tend to concentrate their meat expenditure on a smaller number of key fresh meat categories, consistent with the finding that their share of processed and convenience products declines. Fresh beef, pork, turkey and ham products account for about 65 % of all meat expenditures of 65+ households in the Nielsen panel. In 2009, 34.9% of all the meat purchase records can be attributed to 65+ households; 38% of all beef purchased was bought by this age cohort; this regardless of purchase frequency. Suggesting that 65+ Canadian households are a major driver of fresh beef demand at retail.

Conclusions

To date economic research on the implications of effects of increasing ageing on household food expenditure patterns is still scarce. However, a better understanding of individual amd household behaviour and particulalry the allocation of expenditures over the life-cycle as needed to better predict future demand trends, valuable knowledge to industry managers and policy makers concerned with the wellbeing of the elderly. In addtition, little is known about the magnitude of the retirement consumption puzzle in Canada. The same holds for Canadian household's responses to retirement in the context of the allocation of expenditure and time during the process of ageing. This papers outlines an intersting and well-established approach for the analysis of age, cohort and period specific effects in consumption studies. Yet cohort analysis methods haven't received enough attention by agricultutal economists intersted in consumer behaviour, changing prefernecs and habits overa the long term. Also unfortunate is the lack of suitable and detailed enough cohort date for Canada, necessary to conduct a full-fledged analysis of Canadin household food (and household) long-term expenditure patterns.

Preliminary results using Nielsen Homescan household scanner data reveal first insights into differences in retail meat purchase patterns and frequencies for Canadian households belonging to different age cohorts. On major findigns is that expenditures for processed meat

products rapidly delicne with age. Also 65+ aged households make up a sigificant share of frehs meat purchases in Canadian retail store. Ageing meat consumers tend to show less desire for products diversity, convenience attriutes and products, and are major consumers of meat cust and types usually associated with products trends of the past.

The extension of this work applying long-term consumption data provides ample opportunity to varify (or reject) this findings. Ultimately, the contribution of this reserach will be to produce reliable estimates of economic factors such as price and expenditure elasticities by age cohort that build the foundation of predictions of consumption behaviour of future generations under the life-cycle hypothesis.

References

Aguiar, M. and E. Hurst (2005), 'Consumption vs. Expenditure', *Journal of Political Economy*, 113: 919-948.

Attfield, C.L. and M. Browning. 1985. A differential demand system, rational expectations and the life-cycle hypothesis. *Econometrica*, 53(1): 31-48.

Banks, J., R. Blundell and S. Tanner. 1998. Is There a Retirement-Savings Puzzle? *American Economic Review*, 88(4): 769-788.

Bernheim, B.D., J. Skinner, and S. Weinberg. 2001. What Accounts for the Variation in Retirement Wealth Among U.S. Households. *American Economic Review*, 91(4): 832-857.

Blundell, R., M. Browning and C. Meghir. 1994. Consumer demand and the life-cycle allocation of household expenditures. *The Review of Economic Studies*, 61(1): 57-80.

Deaton, Angus; Paxson, Christina. 2000. Growth and Saving among Individuals and Households. *Review of Economics and Statistics*, 82(2): 212-225.

Deaton, A. and C. Paxson. 1994. Intertemporal Choice and Inequality. *Journal of Political Economy*, 102(3) 437-467.

Denton, F.T., D. C. Mountain and B.G. Spencer. 1999. Age, trend, and cohort effects in a macro model of Canadian expenditure patterns. *Journal of Business & Economic Statistics*, 17(4): 430-444.

Fisher, J.D., D.S. Johnson, J. Marchand, T.M. Smeeding and B. Boyle Torrey. 2005. The retirement consumption conundrum: Evidence from a consumption survey. *Economics Letters*, 99: 482-485.

Hamermesh, D.S. 1984. Life-Cycle Effects on Consumption and Retirement. *Journal of Labor Economics*, 2(3): 353-370

Hamermesh, D.S. 1984. Consumption During Retirement: The Missing Link in the Life Cycle. *Review of Economics and Statistics*, 66(1): 1-7.

Hayford, M.D. 2006. The Legacy of Franco Modigliani's Life-Cycle Model. International *Journal of Applied Economics and Econometrics*, 14(2): 29-50.

Health Canada. 2008. Canada's Aging Population. A report prepared by Health Canada in collaboration with the Interdepartmental Committee on Aging and Seniors Issues, pp. 52.

Hiroshi, M., E.G. Lowe III, D.L. Clason and W.D. Gorman. 2000. Cohort analysis of food consumption: a case of rapidly changing Japanese consumption. *International Food and Agribusiness Management Review*, 3 :189-205.

Hurd, M. and S. Rohwedder .2006. Some Answers to the Retirement Consumption Puzzle. NBER Working Paper 9586.

Industry Canada, 2005. *The Consumer Trends Report*. Industry Canada Reserach paper, Office of Consumer Affairs., Ottowa, ON.

Laitner, J. and D. Silverman. 2005. Estimating Life-Cycle Parameters from Consumption Behavior at Retirement. Working Paper WP099, University of Michigan, Michigan Retirement Research Center.

Mason, W. and S. Fienberg. (eds.) 1985. *Cohort analysis in social research: beyond the identification problem*. New York: Springer-Verlag.

Meredith, G., and C. Schewe. 1994. The power of cohorts. *American Demographics*, December, 22-31.

Milligan, K. 2005. Lifecycle Asset Accumulation and Allocation in Canada, *Canadian Journal of Economics*, 38: 1057-1106.

Milligan, K. 2008. The Evolution of Elderly Poverty in Canada. Department of Economics University of British Columbia, January 2008.

Miniaci, R., C. Monfardini, and G. Weber. 2003. Is There a Retirement Consumption Puzzle in Italy? Institute for Fiscal Studies, Working Paper WP03/14.

Modigliani, F. and R. Brumberg.1954. Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In: K. Kurihara (ed.), Post-Keynesian Economics, Rutgers University Press, New Brunswick, pp. 388–436.

Mori, H., E. Lowe, D. Clason, and W. Gorman. 2000. Cohort analysis of food consumption: A case of rapidly changing Japanese consumption. *International Food and Agribusiness Management Review*, 3: 189-205.

Nakamura, T. 1995. Bayesian cohort models for general cohort table analyses. Ann. Institute of Statistical Mathematics, 38 (B), 353–370.

Nielsen. 2009. Total Fresh Meats Random Weight. Nielsen Homescan, National Grocery Banners, 52 Weeks, Period Ending July 2009.

Stephens, M. Jr. 2001. The Long-Run Consumption Effects of Earnings Shocks. *Review of Economicsand Statistics*, 83: 28-36.

Tang, J. and C. MacLeod. 2006. Labour Force Ageing and Productivity Performance in Canada. *Canadian Journal of Economics*, 39(2): 582-603.