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HOME COOKING, FOOD CONSUMPTION AND FOOD PRODUCTION AMONG THE UNEMPLOYED AND RETIRED HOUSEHOLDS

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SEDAP Research Paper No. 151

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Home Cooking, Food Consumption and Food Production among the Unemployed and Retired Households[*]

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Abstract:

Utilizing the 1996 Canadian Food Expenditure survey matched with Canadian Nutrient File, we separate actual food consumption from observed expenditure and test the Permanent Income/Life Cycle Hypothesis on the true consumption data. We find that the lower food expenditure during periods of unemployment or retirement (previously reported in the literature), does not translate into poorer nutrition. Household calorie intake and major nutrient intake seem to be unaffected by changes in employment status. We find evidence that unemployed or retired households substitute food purchased from restaurants for food purchased for at home consumption. Further, with the 1998 Time Use Survey we find that individuals who are not employed devote more time for food preparation. Finally we present limited evidence that unemployed and retired households substitute precooked meals for meals made from primary ingredients.

JEL classifications: I31, J22, J26
Key words: Food Production, Nutrition, Consumption Smoothing

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Home Cooking, Food Consumption and Food Production among the Unemployed and Retired Households

Résumé

En utilisant l'Enquête sur les dépenses alimentaires des familles canadiennes en 1996 croisée au fichier canadien sur les éléments nutritifs, nous identifions séparément les quantités de nourriture consommées des montants dépensés en nourriture et testons l'hypothèse du revenu permanent/cycle de vie sur de véritables données de consommation. Nous démontrons que le plus faible montant des dépenses en produits alimentaires des ménages consécutif à une période de chômage ou à la prise de la retraite (précédemment rapportée dans la littérature), ne se traduit pas par une alimentation plus pauvre. La prise de calories ainsi que les sources principales de l'alimentation des ménages ne semblent être affectées par les changements de situations professionnelles de ces derniers. Nous constatons que les ménages sans emploi ou à la retraite substituent les repas pris au restaurant à l'achat de nourriture à consommer à la maison. De plus, à l'aide de l'enquête sur l'emploi du temps des Canadiens en 1998, nous observons que les personnes sans emploi consacrent davantage de temps à la préparation de repas. Enfin, nous trouvons peu d'éléments nous permettant de soutenir que les ménages sans emploi et à la retraite substituent les « repas tout prêts » aux plats préparés à partir d'aliments de base.

1. Introduction

Variations in household non-durable consumption occurring in response to income changes are well documented in economic literature, see for example: Banks, Blundell, and Tanner (1998), Browning and Crossley (2001), Stephens (2001), Bernheim et al (2001). This paper examines differences in household non-durable consumption in response to variation in employment status. More specifically, we use household food consumption as a measure of non-durable consumption. We compare food consumption levels of households where the head is not employed to those where the head is engaging in full employment.

Life Cycle/Permanent-Income Hypothesis (PIH) predicts that households smooth consumption over their life span. Consequently, movements of consumption tracking income changes over the life span contradict the Life Cycle/PIH and present a puzzle for an empirical researcher. "Excess sensitivity" of current consumption to current income, manifesting itself in a drop of consumption following entry into unemployment or retirement (the second outcome is sometimes referred to as the "retirement consumption puzzle") is a commonly observed result (see for example: Banks et al. 1998, Haider and Stephens 2004, Dynarski and Sheffrin 1987, Hurd and Rohwedder 2003, Hurst 2003, Miniaci at al 2003, Smith S. 2004). This paper addresses these puzzles. We find that substitution towards home food production accounts for a large fraction of the apparent drop in consumption. This result holds especially when we account for the quality of food consumed.

Empirical tests of the Life Cycle/PIH are typically conducted using expenditure data on non-durable goods. Often these studies do not distinguish between consumption

and expenditure (Banks at al 1998, Campbell and Mankiw 1990). As first noted in early 1960s (Mincer 1962, Becker 1965), consumption is an output of home production that uses both expenditure and time as inputs. Consequently, household expenditure may be a poor measure of actual consumption, especially for goods requiring large amounts of time input. Examples of such inputs include: meal preparation, child care or house maintenance. Recent studies have extended the general framework of Mincer and Becker and incorporated home production into Life Cycle models (Baxter and Jermann 1999, Apps and Rees 2001, Aguiar and Hurst 2005). The availability of new data allows us to conduct better tests of Life Cycle/PIH.

This paper contributes to the body of literature exploring the relationship between health and socio-economic status (SES). It is widely agreed that poor nutritional intakes are associated with poor health. If it can be shown that changes in labour force status lead to changes in average food consumption, then nutrition could be used to explain the SES-health relationship. This hypothesis is suggested by, for example: Smith (2004) who finds that, conditional on age, education and marital status, the self-assessed health status of not working individuals tends to fall below the self-assessed health status of working individuals.

Utilizing 1996 Canadian Food Expenditure survey (FOODEX) matched with Canadian Nutrient File (CNF) we are able to separate the actual food consumption from the observed expenditure and test Life Cycle/PIH on the true consumption data. We find no evidence of a relationship between the fall in food expenditure and poorer nutrition. Household calorie intake and major nutrient intake seem to be unaffected by the change in employment status. We find evidence that unemployed or retired households substitute

food purchased from restaurants for food purchased for at home consumption. Further using the 1998 General Social Survey (GSS) Time Use Survey we observe that not employed respondents devote more time towards food preparation than employed households. Finally, we examine the possibility that households substitute precooked meals for meals made from primary ingredients.

To our knowledge this is the first Canadian study that uses micro data to test Life Cycle/PIH by separating actual food consumption from food expenditure. We provide separate analysis for the age 25-51 and for the age 55-74 samples. Our results for the older group are similar to those recently obtained by Aguiar and Hurst (2005) from US data. The results for the younger group are different. It appears that in Canada the dietary differences between employed and not employed households are much less pronounced than in US.

The reminder of the paper is composed as follows: Section 2 overviews some recent theoretical and empirical work in this field and outlines the methodology adopted in this paper. Section 3 presents the data. The results are discussed in section 4. Section 5 concludes.

2. Literature Review and the Methodology

Baxter and Jermann (1999) explain the observed excess sensitivity of consumption in a theoretical framework. They model life cycle agents with home production possibilities within a general-equilibrium framework. They show how individuals substitute labor supply across the market and home sectors depending on the wage rate. At the same time, consumers consume both market and home-produced goods,

and substitute between these goods depending on changes in their relative price. Thus, individuals increase labor supply when productivity is expected to be high in the market sector, and at the same time consume more market goods since the relative price of the market good to home good declines. Supported by calibration results, Baxter and Jermann conclude that a macro model with home production can rationalize the observed "excess sensitivity" of consumption growth to predictable income growth.

Apps & Rees (2002) criticize the definition of consumption and income variables used in the traditional Life Cycle/PIH tests. They point out that market expenditure and income are only components of the actual total household consumption and income. They define (full) consumption as the total value of market and domestic produced goods consumed by the household. Further total income is redefined as the income the household can earn if each adult member worked full time (full income). The household life-cycle consumption profile is formulated incorporating these redefined variables. They merge three micro-level cross sectional datasets: the Australian Household Expenditure Survey, Income Distribution Survey and the Time Use Survey. They show that the "excess sensitivity" of market consumption to market income does not apply to "full consumption" and "full income". They also argue that the puzzlingly large decrease of market consumption at retirement is explained by the large increase in time spent on home production.

Using the U.S. Survey of Food Intake of Individuals (CSFII) and the National Human Activity Pattern Survey (NHAPS), Aguiar and Hurst (2005) estimate the effects of unemployment or retirement status on food expenditure and on time spent on home production and consumption. Their results strongly suggest that households do not

experience a decline in food consumption at the time of the retirement. They find that households are able to maintain a smooth consumption by substituting time for expenditure.

We adopt the methodology of Aguiar and Hurst (2005) and approximate demand functions for food expenditure, consumption and food preparation. We estimate the following series of regressions:[1]

$$\ln(x_j) = \alpha_0 + \alpha_1 \, Unemp/Retire_j + \alpha_2 \; p_j \; + \; \alpha_3 \, Y_j + \eta_j \qquad (1)$$

$$\ln(z_j) = \gamma_0 + \gamma_1 \, Unemp/Retire_j + \gamma_2 \; p_j \; + \gamma_3 \, Y_j + \nu_j \qquad (2)$$

$$h_j = \beta_0 \; + \beta_1 \, Unemp/Retire_j + \beta_2 \; p_j \; + \beta_3 \, Y_j + \varepsilon_j \qquad (3)$$

The dependent variables are defined as follows: x_j is a measure of monthly household food expenditure, z_j is a measure of household food consumption and h_j represents the daily time spend on food production by the individual, including time use on food shopping, meal preparation, and clean up.

In addition to total food expenditure we also run separate regressions for shares of total food budget devoted to food purchased from restaurants. Finally, we run regressions on the share of pre-prepared food in all food at home expenditure.[2] To measure food intake z_j we use two alternative specifications: (i) we use a two-week average of daily total calories consumed, and (ii) the two-week average daily consumption of protein, fats, carbohydrates, vitamin C, vitamin A, fibre, iron and calcium.[3]

[1] The methodology appendix outlines the basic structural model behind the reduced form results presented in this paper.
[2] Pre-prepared food as opposed to food made from primary ingredients. Where primary ingredients would for example include: ground meat, cheese, tomato souse or mushrooms, while pre-prepared foods would be items like frozen hamburgers, or pizza. This approach flows from Crossley and Lu (2004).
[3] The results for other measures of nutrition such as fibre, iron or vitamin A yield similar conclusions and are available from the authors.

Unemp/Retire is a dummy variable equal to 1 if household head's is unemployed or retired and zero otherwise. Given that the timing of retirement can be correlated with unmeasured variables that affect the household's expenditure decisions, we use age of the head of the household (level and square of) as instruments for retirement.

Provincial dummies: α_2, γ_2, and β_2 capture provincial differences in the price of food, p_j[4], and Y is a vector of demographic and geographic characteristics for household j which can affect the desired demands for household food expenditure, food consumption and food preparation time. These demographic characteristics are: age of the head of the household, sex of the head of the household, their education level, marital status, household size, and a dummy variable for having kids under 15 years of age. Additionally we are able to add individual's self assessed health status to the vector of demographic characteristics in the time use regressions.

3. Data

The two cross-sectional datasets used in this chapter are the 1996 Food Expenditure Survey (FOODEX) and 1998 GSS Time Use Survey[5]. The 1996 FOODEX survey was designed to provide information on household food consumption in the ten provinces of Canada as well as Whitehorse and Yellowknife. Following the interview, the respondent, who is mainly responsible for household's financial well being (household head), was asked to maintain a daily record of all food expenditures (excluding those while on a trip overnight or longer) using two one-week (back to back) diaries. The public-use datasets comprise two main files: the summary household file and the detailed

[4] The price of food is not reported in the sample. We make the assumption that all households face the same price schedule for each market good sold in the given province.
[5] Henceforth referred to as Time Use Survey.

food purchases file. The household file provides weekly aggregate food expenditure information. It includes total expenditure on broad food categories purchased from stores and from restaurants. The detailed food file presents food expenditures on and quantities off specific food items purchased from stores, locally and on day trips.

The FOODEX data also contains economic and demographic characteristics of the household heads including age, marital status, educational level, sex, household size, household composition and geographic information. There is no explicit information on the unemployment or the retirement status in the data. We therefore define as "unemployed" or "retired", those households where heads reported: "not working, including retired", in the occupation classification. As such, we differentiate between unemployed and retired household heads solely based on their age. One obvious limitation resulting from this definition is our inability to differentiate between those who are truly unemployed and those who are not part of the labour force. Consequently at younger ages we are unable to distinguish between individuals who are unemployed or are undergoing training or academic upgrading. Similarly at older ages we run a risk of confusing those who retire with those who are unemployed (not employed but seeking employment).

We define the food "away from home" expenditure as the total expenditure on food purchased from restaurants, and all expenditure on food from stores is classified as "at home". For the "at home" category, the nutritional value of each food purchase is calculated by matching the quantity of every food item purchased from a store which is provided in the detailed FOODEX file, with the per unit nutritional intake obtained from Canadian Nutrient File (CNF). This approach follows that of Horton and Campbell

(1991). Since FOODEX provides information on expenditure rather than on actual consumption we have to equalize the nutritional value of "purchased" food to that of "consumed" food. This is equivalent to assuming that food waste is negligible.[6] In the Data Appendix, we discuss how to match food items in FOODEX with those in CNF and convert them to nutrient intakes.

This approach is not feasible for the food "away from home" category. Here we observe only the individual meal expenditures and we have no detailed information on their nutritional composition. This presents a problem because employed households tend to spend a higher proportion of their food budget for food "away from home" than not employed households. Comparing the calorie/nutritional intake of employed and not employed households based solely on their "at home" consumption would therefore bias the analysis. In order to correct for this bias we re-weight the calorie/nutrient intake of food "at home" purchases by the inverse of their share in the total number of meals. We assume that a typical household consumes 21 meals per person per week (7 breakfasts, 7 lunches and 7 dinners). If for example, a one person household consumes 5 meals "away from home", then in order to arrive at their weekly total consumption estimate the calorie/nutrient intake for meals "at home" is multiplied by $21/16$.[7]

To examine the extent to which individuals spend time in food production, we use the 1998 GSS Time Use Survey. This survey contains demographic information (age, gender, marital status and etc.) on all household members. An important feature of this

[6] Aguiar and Hurst (2005) who use exact dietary (consumption) information do not need to make this assumption, however even if large quantities of food are wasted, as long as there is no systematic difference in the proportion of wasted food between employed and not employed households our results remain unbiased.

[7] This involves an additional assumption, namely that an average meal "at home" and "away form home" is equally nutritious.

survey is that the respondent is selected at random from all eligible (age 15 or over) household members. The respondents are asked to fill out the Time Use Questionnaire and provide a personal minute-by-minute time diary. We define daily time spent on food production at home as the sum of the four aggregate time use categories. These are: the "total duration (in minutes) for meal preparation", the "total duration (in minutes) for baking, preserving food, etc.", the "total duration (in minutes) for food/meal clean-up", and the "total duration (in minutes) for grocery shopping". [8]

The survey also asks the respondents to self-assess their health. They are asked: "Compared to other people of your age, how would you describe your state of health?" We are therefore are able to include health status dummies as controls in home production regressions. An individual is defined as "healthy" if the answer to the above question is "excellent", "very good" or "good", and the individual is defined as "less healthy" if the answer is "fair" or "poor".

To estimate the impact of job displacement on food consumption, we analyze only household heads (in FOODEX data) or individuals (in Time Use data) age of 25 to 51. FOODEX respondents are defined as unemployed if they report not working in the preceding 12 months. Those who reported engaging in full-time employment for all of the preceding 12 months are deemed employed. We consider Time Use Survey respondents to be unemployed if they report no time spent on regular employment and are looking for paid work in the last 7 days. Employed Time Use Survey respondents are those who reported working full-time.[9]

[8] This definition differs from Aguiar and Hurst who did not include clean up as part of the food production.
[9] Where full time is defined as 30 hours per week or more.

Unlike the FOODEX survey, the Time Use Data collects individual information only. Consequently, while the expenditure and nutrient intake information is presented on per household level, the time use information is presented on individual level only.[10] There are 4445 household heads age 25 to 51 in the FOODEX sample and 22.4% of them reported not working at any time in the previous 12 months. There are 3887 individuals in Time Use Survey sample and about 5% of them reported not working but looking for paid work.

To examine the "retirement-consumption puzzle", we restrict the sample to household heads (FOODEX data) or respondents (Time Use data) between the ages of 55 to 74. The restriction resulted in a sample of 2160 FOODEX households 82% of which were not working in preceding 12 months. 1529 individuals for Time Use sample and 72% are retired. Retired Time Use Survey respondents are those who report no regular employment or those who retired within the 7 days preceding the survey.

The use of cross-sectional data sets is an important limitation of this study. Without panel data we are unable to trace individual responses to income shocks. We are thus limited to analysis of observed consumption differences between individuals reporting different employment status. Furthermore, without the information on the duration of unemployment or retirement, we cannot distinguish between the short-run and the long-run effects. This however is the price we have to pay in order to effectively separate food consumption form food expenditure. To our knowledge no other Canadian survey (panel or otherwise) allow the researcher to make this explicit distinction.

[10] Analysis based on FOODEX data was also performed on per household member basis. These results failed to provide significant additional insight and thus where dropped from final version of the paper. Since the per-household and the per-household member results yield similar conclusions the choice of equivalence scale was of no immediate consequence.

4. Results

In this section, we examine the impact of changes in employment status on food expenditure, on food consumption and on food preparation. We present estimated results of equation (1) – (3) using the information from 1996 FOODEX and 1998 GSS Time Use Survey data sets. We analyze the unemployed and the retired household separately.

4.1. Average weekly food expenditure and daily time use

Table 1 reports mean monthly consumption expenditure and mean time spent on food production for full time employed and for not employed households. Households age 25-51 are summarized in Table 1a and households age 55-74 are summarized by the figures in Table 1b.

Within the 25-51 age group employed households spend, on average, 138 dollars per week on food while unemployed households spend only 115 dollars per week. The difference is higher for expenditure on food away from home (40 dollars vs. 22 dollars) than for food consumed at home (98 dollars vs. 93 dollars). All three of these differences are statistically significant at 5% level. As predicted by the theory of home production, the decline of average expenditure during unemployment spells is correlated with a statistically significant increase in average time spent on food production. Unemployed individuals spend, on average 74 minutes per week on food preparation, food clean up and grocery shopping, this compares to 60 minutes for employed individuals. The result is conditional on positive time spent - 77% of employed households and 72% of unemployed households report positive time spent. Relative figures not conditional on

time spent are: 46 minutes for the employed and 53 minutes for the unemployed, this 6 minute difference is not statistically significant.[11]

As pointed out by, among others, Smith (2004), unemployment rates tend to be higher and permanent income tends to be lower for low educated households. Table 1a provides by education, breakdown of average food expenditures and time use between employed and unemployed households. Table 1a shows that expenditure is lower for both not employed high educated and low educated households.[12] Low-educated, unemployed respondents spend on average 102 dollars on food, this compares to 130 dollars for low educated employed households. The comparable difference in spending for high-educated households is less pronounced (134 dollars vs. 143 dollars). Both differences are statistically significant. Contrary to what can be expected, low educated employed individuals spend on average 1 minute more on food preparation than low educated unemployed households. However, conditional on positive records of food preparation, unemployed individuals spend 11 more minutes on food production than the employed (75 vs. 64 minutes). In the high-educated sub-sample, the statistically significant difference in food preparation not conditional on reporting positive time spent is 57 minutes vs. 45 minutes. Conditional on reporting positive time spent this difference increase to 74 minutes vs. 58 minutes.[13]

Table 1b summarizes results comparable to Table 1a but for the age 55-74 sample. The results confirm that the opportunity cost of time declines with retirement.

[11] This difference is much smaller than the 59% reported by Aguiar and Hurst (2005) even though we incorporate a broader definition of food preparation time use.
[12] Where "high educated" refers to some post-secondary education or higher, and "low educated" refers to completed high school or lower.
[13] Again despite adopting a broader definition of time use, the differences presented in this paper results are much lower than comparable difference for US households as reported by Aguiar and Hurst (2005) where the relevant difference is 42%.

Retirees are willing to use less market goods and more time in the home production of food. We observe that the retired households spent on average 92 dollars on food. This compares to 119 dollars spent by employed households. Upon retirement the expenditure on food consumed at home decreases on average from 86 dollars to 73 dollars per week and the expenditure on food away from home decreases 32 dollars to 19 dollars. In both cases the differences are statistically significant.

The time use results for the age 55-74 sample are similar to the age 25-51 sample. Here too the out of work respondents report considerably more time spent on food preparation and grocery shopping. The retired individuals spend on average 72 minutes per week while employed households spent 46 minutes. The corresponding figures, conditional on individuals reporting positive time spent on foods preparation (85% of retired households and 75% of employed households) are 85 minutes and 62 minutes respectively.

Further results available from the authors show that females are more likely than males to engage in home production of food in any period, the difference between males and females increases further with retirement. Retired women spend 16 minutes more on daily food production than employed women. Retired women are also more likely to report a positive amount of time used on food preparation. Retired men only spent 5 minutes more on home food production than non-retired men in this age group. Conditional on nonzero time spent on food production, retired men and women spent 11% and 18% more time on food production than working men and working women respectively.

Table 2a provides the results of least squares estimation of equations (1) and (3) for the age 25-51 sample. The first column of the table uses the log of total expenditure on all food as a dependent variable. The key coefficient of interest is the one of the unemployment dummy. This coefficient indicates that, controlling for geographic and demographic characteristics,[14] the unemployed households report 31% lower food expenditures then the employed households. The second column of the table looks at the consumption of food at home only. When the definition of the dependent variable rules out expenditure on food consumed away from home the coefficient of the unemployment dummy is reduced to a half of the original amount. In both cases the effect of unemployment is significant at 5% level.

The remaining columns of Table 2a investigate the differences in time allocation between the employed and unemployed individuals. We present our results both for all respondents in the Time Use sample and for those who reported positive time spent on food preparation, on food cleanup and on grocery shopping. We observe that, on average, unemployed individuals spent 14 minutes per day more on those activities. Conditional on reporting positive time spent, the (statistically significant) difference increases by additional 6 minutes. The final column in Table 2a shows the results of a probit estimation, on the probability of reporting positive time spent. Clearly once other explanatory variables are taken into account the effect of unemployment on the likelihood of a respondent engaging in food preparation related activities is negligible.

Food expenditure and food preparation results for the age 55-74 sample are presented in the Table 2b. The coefficient of the retirement dummy for the total food

[14] Since these characteristics are not of explicit interest the discussion of their direction and magnitudes is omitted for clarity of exposition. All the regression tables indicate which of the explanatory variables are significant at the 5% level.

expenditure and food at home expenditure regressions are close to zero and insignificant. The time use regressions indicate that retired individuals spend considerably more time on food preparation related activities. The average, statistically significant, daily difference is close to 24 minutes, this increases to 27 minutes conditional on reporting positive time spent. Unlike it was the case with the age 25-50 sample, the probit for reporting positive time spent shows significant difference between employed and retired respondents. The retired individuals are 34% more likely to report positive time spent on food preparation related activities.

4.2. Calorie consumption and nutrient intake

Potential nutritional consequences of the difference in food expenditure and preparation time between the employed and unemployed households are evaluated in Table 3. We compare the per capita nutrition intakes of employed and unemployed households without children[15] to their "daily nutrient intakes" recommended by the U.S. Food and Nutrition Board and by Health Canada. For most of the examined categories we find no statistically significant differences between the unemployed and full-time employed groups. Irrespective of employment status similar proportions of households meet the recommended daily intakes of protein, vitamin C, vitamin A, calcium and fibre. However, unemployed households report significantly lower intake levels only for carbohydrates and vitamin C. [16] Similar result is evident among the age 55-74 sample.

[15] Childless households are chosen for ease of interpretation of the results. Given that children require age specific nutritional intakes, the comparisons of households with children of different age are problematic.
[16] Changes in spousal labour status occurring in response to the household head entering unemployment may partially account for this result. Further results, available from the authors, indicate that the magnitude of the observed decline is larger for single person households. Interestingly the decline is most pronounced among unemployed single males, the proportion of single females who meet the recommended intake levels does not vary by labour force status.

Again employment status seems to have little effect on the daily nutrient intake. The only significant difference is a higher proportion of retired households report meeting the recommended fibre intake.

First column of the Table 4a presents the results of estimating equation (2) for the age 25-51 sample. Log average daily calories purchased is used as a measure of nutrition. It suggests that, despite the large decline in total food expenditure, the impact of unemployment on household's daily calories consumption is very limited: a not significant decrease of 6%. Our results indicate that employed and unemployed households are consuming similar amounts of calories, and the drop in food expenditure may largely reflect the substitution toward home production rather than the income effect of being unemployed.

Regressions using eight major nutritional components: protein, fat, carbohydrate, vitamin C, vitamin A, calcium, fibre and iron as dependent variables are estimated to test whether households substitute toward "cheap" calories (i.e. foods that contain enough calories but less of other important nutrients) during unemployment. The remaining rows of Table 4a report how consumption of these nutrients varies with employment status. These regressions add total calories consumed as an additional control variable.

Although most of the coefficients for unemployment dummy are negative, only those for vitamin C, calcium and iron are significant. While other nutrient intake levels decrease by at most 6%, the level of Vitamin C is 20% lower for the unemployed households. We also find that the consumption of all the other nutrients is positively related to the overall energy intake, the coefficient on log calories varies between 0.32 and 0.84 and remains significant throughout all the regressions. Holding the total energy

intake and other controls constant, higher educated households purchase “healthier” foods, which contain lower amounts of fat and higher amounts of other nutrients.

Taken together the findings, for the age group 25-51, indicate that, unemployed households spend less on food than employed households. However this difference does not translate into a substantial fall in nutritional intake. These results are somewhat similar to those reported from the U.S. data by Aguiar and Hurst (2005). They find that unemployed household consume less vitamin C, vitamin A and vitamin E. They interpret the lower vitamin intake, along with the decline in propensity to eat at restaurants, as evidence for a limited decline in quality of food consumed following unemployment.

Table 4b present analogous results fort the age 55-74 sample. As explained in the previous section these regressions use an instrumental variable procedure, where the age and square of age of household head serve as the instruments for the retirement dummy. Again log calories is used as an additional control variable in the nutrient intake regressions.

Surprisingly the results indicate that retired households purchase 8% more calories than employed households, the difference is however not significant. As far as individual nutrient intakes are concerned, we observe no significant retirement effects in any of the regressions. Retired households appear to consume similar quantities of either of the nutrients. For this sample too, higher education suggests some positive nutritional effects.

The results in Table 4b provide no evidence that households switch towards “cheap” (low quality) calories during retirement. Assuming there is no waste and households eat all of the food purchased, the findings indicate that, in Canada, the

"retirement consumption puzzle" may not be a puzzle at all. The evidence from 1996 FOODEX suggests no significant decline in food consumption. Further, households appear to consume roughly the same quality and quantity of food irrespective of retirement. They achieve the same nutrient intake levels partly by substituting market expenditure for home food production. The results presented so far suggest that there is little reason to be concerned about the consequences of a change in employment status on nutritional intake among Canadian households.

To further investigate the effects of changes in the employment status on household food consumption decision we analyze changes in the food consumption bundle. Table 5 presents results for two sets of regressions. First we look at changes in the share of food "away from home" in the total food budget. Second we follow the approach developed by Crossley and Lu (2004) and look at change in the share of prepared food in the food "at home" budget. For both samples the coefficients of the unemployment and retirement dummies are negative in either of regressions. However, the magnitude of these coefficients is relatively small and only the coefficients in the restaurant food share regression for the age 25-51 sample is significant at 5% level.

Taken together these results suggest that following termination of employment households substitute away from food purchased from restaurants and towards food purchased for at home consumption. A further substitution is likely taking place in favor of foods made from primary ingredients and thus requiring more preparation time. These results point to a conclusion that unemployed and retired households smooth their consumption by compensating for the loss of income by increased preparation effort.

5. Conclusion

In this paper we analyze the differences in household food consumption based on the employment status. We look at the unemployed and the retired households. We confirm the well-known result that both types of households report lower expenditure on food relative to the employed households in the same age group. The reported fall in expenditure is much more pronounced for food consumed away from home than for food consumed at home.

Through careful use of expenditure and nutritional data we are able to separate actual food consumption from food expenditure. We observe that the fall in expenditure is not reflected by a fall in consumption when consumption is measured by the average daily calorie intake. We also examine household intake of major nutritional components. The evidence suggests that households are able to smooth food consumption and maintain their nutrient intake levels when not employed. Poor nutrition does not appear to be a reason for correlation between low income (not working) and poor health. These findings imply that financial and social support targeted to unemployed and retired households should be more determined by outcomes other than food consumption.

We also, present limited evidence of changes in the composition of the average food consumption bundle. Among the not employed households we observe a degree of substitution away from food “away from home” and towards food “at home”. This result holds especially for the age 25 to 51 sample. It appears that individuals who are not employed tend to spend a lower proportion of their food budget on eating out. The substitution towards home production is consistent with the argument that the lower opportunity cost of time makes it relatively cheaper to cook at home.

Our results show that substituting time inputs for market expenditures allows not working households to maintain consumption levels similar to working households. Consistent with the theoretical predictions, respondents experiencing unemployment or retirement spend longer time on food preparation and grocery shopping than working respondents. This additional time allocation compensates for lower food expenditure than their employed counterparts. This time-expenditure substitution provides an explanation for both “excess sensitivity” and “the retirement consumption puzzle”, and indicates that using expenditure data alone leads to a false rejection of the Permanent Income Hypothesis/Life Cycle model.

While our results are similar to those obtained recently by Aguiar and Hurst (2005) in US data they differ in two ways. First despite a broader definition of time use we observe a considerably lower degree of time substitution than evident in US data. Second, unlike Aguiar and Hurst who observed a significant fall in consumption among the unemployed households, our results show no significant difference in consumption conditional on employment status. It is possible that this difference in results can be attributed to a wider social safety net in Canada which combined with home production allows out of work Canadian households to maintain consumption levels similar to those enjoyed by employed households.

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Table 1a:
Food Expenditures and Food Production by Labour Force Status and Level of Education, Age 25-51

		Employed Full Time	Unemployed
All Levels of Education	Total Food Expenditure (Dollars, weekly)	138	115*
	Expenditure on Food "at Home"	98	93*
	Expenditure on Food "Away from Home"	40	22*
	Sample Size	3337	942
	Proportion of households reporting positive Food Preparation Time	0.77	0.72
	Total Time Spent, (Minutes, daily)	46	53
	Sample Size	3716	171
	Total Time Spent, conditional on reporting positive time spent. (Minutes, daily)	60	74*
	Food Preparation	40	47
	Food Clean up	10	15*
	Grocery Shopping	10	12
	Sample Size	2876	123
Completed High School or Less	Total Food Expenditure (Dollars, weekly)	130	102*
	Expenditure on Food "at Home"	95	85*
	Expenditure on Food "Away from Home"	35	17*
	Sample Size	1261	585
	Proportion of households reporting positive Food Preparation Time	0.77	0.64*
	Total Time Spent, (Minutes, daily)	49	48
	Sample Size	1083	67
	Total Time Spent, conditional on reporting positive time spent.	64	75
	Food Preparation	43	50
	Food Clean up	11	16
	Grocery Shopping	10	9
	Sample Size	830	43
Some Post Secondary Education or More	Total Food Expenditure (Dollars, weekly)	143	134*
	Expenditure on Food "at Home"	99	104
	Expenditure on Food "Away from Home"	44	30*
	Sample Size	2073	356
	Proportion of households reporting positive Food Preparation Time	0.78	0.77
	Total Time Spent, (Minutes, daily)	45	57*
	Sample Size	2633	104
	Total Time Spent, conditional on reporting positive time spent.	58	74*
	Food Preparation	38	45
	Food Clean up	10	14*
	Grocery Shopping	10	15
	Sample Size	2046	80

* Indicates that the difference between the two groups is statistically significant at the 5% level.

Table 1b:
Food Expenditures and Food Production by Labour Force Status, Age 55-74

	Employed Full Time	Retired
Total Food Expenditure (Dollars, weekly)	119	92*
Expenditure on Food "at Home"	87	73*
Expenditure on Food "Away from Home"	32	19*
Sample Size	378	1686
Proportion of households reporting positive Food Preparation Time	0.75	0.85*
Total Time Spent (Minutes, daily)	46	72*
Sample Size	430	1099
Total Time Spent, conditional on reporting positive time spent. (Minutes, daily)	62	85*
Food Preparation	41	53*
Food Clean up	8	15*
Grocery Shopping	13	17*
Sample Size	322	932

* Indicates that the difference between the two groups is statistically significant at the 5% level.

Table 2a:
Food Expenditure and Time Use, GLS Regressions, Age 25-51

	ln(All Food Expenditure)	ln (Food Expenditure at Stores)	Time Spent on Food Preparation (minutes per day)	Time Spent on Food Preparation Conditional on Positive Record (minutes per day)	Probit for Reporting Positive Time Spent.++
Unemployment	**-0.31**+ **(-8.42)**	**-0.16** **(-4.55)**	**13.97** **(2.38)**	**19.69** **(2.84)**	-0.02 (-0.16)
Age of Household Head+++	0.01 (0.29)	0.01 (0.61)	**4.40** **(3.15)**	**4.79** **(2.91)**	0.06 (1.37)
Square of Age of Household Head+++	<0.01 (0.14)	<0.01 (-0.10)	**-0.05** **(-2.82)**	**-0.06** **(-2.65)**	<0.01 (-1.19)
Atlantic	-0.06 (-1.73)	-0.03 (-0.82)	-3.22 (-1.05)	2.44 (0.66)	**-0.26** **(-2.94)**
Quebec	**0.10** **(3.07)**	**0.12** **(3.72)**	3.90 (1.38)	3.03 (0.94)	0.07 (0.83)
Prairies	-0.04 (-1.11)	-0.03 (-0.78)	-1.69 (-0.65)	-2.91 (-0.98)	0.03 (0.39)
British Columbia	**0.16** **(4.12)**	0.06 (1.75)	-1.82 (-0.57)	1.88 (0.49)	**-0.20** **(-2.21)**
Rural Area	-0.03 (-0.86)	-0.03 (-0.83)	-1.63 (-0.76)	1.04 (0.43)	**-0.15** **(-2.36)**
Single	**-0.21** **(-4.34)**	**-0.17** **(-3.55)**	-4.77 (-1.75)	-1.90 (-0.61)	-0.16 (-1.80)
Separated/Widowed/Divorced	**-0.22** **(-5.11)**	**-0.18** **(-4.29)**	6.11 (1.61)	5.43 (1.32)	0.14 (1.42)
Presence of Children Under the Age of 15	**-0.10** **(-2.81)**	-0.03 (-0.89)	**6.01** **(2.02)**	1.66 (0.49)	**0.27** **(3.25)**
ln (Household Size)	**0.60** **(14.49)**	**0.67** **(15.97)**	0.76 (0.26)	**7.59** **(2.25)**	**-0.32** **(-3.60)**
Higher Educated	**0.24** **(9.37)**	**0.15** **(5.95)**	**-3.95** **(-1.75)**	**-5.89** **(-2.23)**	**0.03** **(0.56)**
Male	-0.04 (-1.33)	-0.04 (-1.73)	**-34.68** **(-15.70)**	**-29.60** **(-12.28)**	**-0.65** **(-11.03)**
Healthy			-1.84 (-0.87)	-2.22 (-0.90)	0.02 (0.33)
Constant	**3.78** **(9.77)**	**3.21** **(8.02)**	-21.34 (-0.83)	-24.70 (-0.81)	0.18 (0.22)
Sample Size	4323	4275	3887	2999	3887
R^2	0.28	0.32	0.12	0.10	0.07

+ Bold font indicates coefficients significant at 5% level, t-ratio reported in parentheses
++ The results from probit estimation are reported as marginal effects rather than coefficients.
+++ The time use regressions are based on GSS Time Use data. Rather than information on household heads they contain information on respondents who are selected at random from all adult family members.

Table 2b:
Food Expenditure and Time Use, IV Regressions, Age 55-74

	ln(All Food Expenditure)	ln (Food Expenditure at Stores)	Time Spent on Food Preparation (minutes per day)	Time Spent on Food Preparation Conditional on Positive Record (minutes per day)	Probit for Reporting Positive Time Spent.++
Retirement	0.02+ (0.19)	0.08 (0.68)	**24.17** **(3.14)**	**26.55** **(3.07)**	**0.34** **(2.40)**
Age of Household Head+++					-0.07 (-0.31)
Square of Age of Household Head+++					<0.01 (0.30)
Atlantic	-0.10 (-1.97)	-0.09 (-1.91)	-2.41 (-0.41)	7.39 (1.09)	**-0.48** **(-3.12)**
Quebec	**0.14** **(2.47)**	**0.14** **(2.77)**	0.17 (0.03)	3.22 (0.54)	-0.25 (-1.80)
Prairies	-0.03 (-0.45)	-0.05 (-0.89)	1.89 (0.36)	3.83 (0.67)	-0.10 (-0.72)
British Columbia	**0.15** **(2.77)**	0.10 (1.82)	1.90 (0.30)	9.61 (1.36)	**-0.34** **(-2.19)**
Rural Area	-0.04 (-0.77)	0.04 (0.88)	-1.96 (-0.47)	-3.41 (-0.74)	0.03 (0.26)
Single	-0.04 (-0.45)	-0.06 (-0.75)	9.99 (1.03)	6.22 (0.57)	**0.46** **(2.14)**
Separated/Widowed/Divorced	**-0.17** **(-2.79)**	**-0.14** **(-2.62)**	-4.00 (-0.65)	-4.24 (-0.61)	0.13 (0.80)
Presence of Children Under the Age of 15	<0.01 (-0.02)	<0.01 (-0.02)	5.31 (0.29)	-6.82 (-0.33)	0.51 (1.06)
ln (Household Size)	**0.70** **(9.43)**	**0.74** **(11.35)**	5.39 (0.70)	15.22 (1.68)	-0.33 -(1.64)
Higher Educated	**0.28** **(6.04)**	**0.14** **(3.36)**	2.27 (0.52)	-1.45 (-0.29)	**0.23** **(2.23)**
Male	0.04 (0.97)	-0.02 (-0.53)	**-45.94** **(-10.57)**	**-38.27** **(-8.34)**	**-0.73** **(-6.84)**
Healthy			2.81 (0.71)	3.85 (0.87)	-0.03 (-0.31)
Constant	**3.84** **(23.66)**	**3.63** **(23.64)**	**65.83** **(6.18)**	**65.36** **(5.40)**	3.79 (0.51)
Sample Size	2079	2059	1529	1254	1529
R^2	0.27	0.28	0.14	0.10	0.11

+ Bold font indicates coefficients significant at 5% level, t-ratio reported in parentheses
++ The results from probit estimation are reported as marginal effects rather than coefficients.
+++ The time use regressions are based on GSS Time Use data. Rather than information on household heads they contain information on respondents who are selected at random from all adult family members.

Table 3:
Percentage of Households Meeting Recommended Daily Intake levels[+]

		Employed Full Time	Unemployed/ Retired	Recommended Intake Levels++
Age 25-51	Protein	87	84	56/46 g+++
	Carbohydrates	92	84*	130 g
	Vitamin C	76	63*	90/75 mg
	Vitamin A	83	86	900/700 mg
	Calcium	67	62	1000 mg
	Fibre	34	37	38/25 g
	Sample Size	512	63	
Age 55-74	Protein	88	89	56/46 g
	Carbohydrates	93	93	130 g
	Vitamin C	80	82	90/75 mg
	Vitamin A	84	87	900/700 mg
	Calcium	65	60	1200 mg
	Fibre	50	61*	30/21 g
	Sample Size	141	750	

+ The sample includes singles and couples without children
++ Recommended by: Food and Nutrition Board, Institute of Medicine, National Academies
+++ Recommended intakes for male/ Recommended intakes for female
* Indicates that the difference between the two groups is statistically significant at the 5% level.

Table 4a:
Food consumption, calorie intake and major nutritional components, GLS Regressions, Age 25-51

	ln (Calories)	ln (Protein)	ln (Fat)	ln (Carbo hydrates)	ln (Vit C)	ln (Calcium)	ln (Fibre)	ln (Iron)	ln (Vit A)
Unemployment	-0.06 (-1.69)	-0.01 (-0.52)	<0.01 (-0.06)	-0.03 (-1.58)	**-0.20 (-4.30)**	**-0.06 (-2.83)**	**-0.04 (-2.05)**	<0.01 (0.17)	-0.05 (-1.45)
ln (Calories)		**0.98 (52.40)**	**1.11 (51.58)**	**1.00 (84.16)**	**1.10 (32.02)**	**0.87 (48.41)**	**1.03 (51.80)**	**1.06 (83.46)**	**1.06 (33.50)**
Age of Household Head	0.01 (0.27)	0.01 (0.81)	0.02 (1.13)	-0.01 (-1.09)	-0.03 (-1.07)	0.02 (1.07)	-0.01 (-0.60)	<0.01 (0.48)	-0.01 (-0.32)
Square of Age of H-hold Head	<0.01 (0.15)	<0.01 (-0.83)	<0.01 (-1.18)	<0.01 (1.12)	<0.01 (1.19)	<0.01 (-1.18)	<0.01 (0.74)	<0.01 (-0.43)	<0.01 (0.24)
Atlantic	0.02 (0.55)	<0.01 (0.03)	0.02 (1.44)	-0.02 (-1.03)	**-0.15 (-3.36)**	-0.02 (-0.77)	**-0.09 (-4.58)**	-0.03 (-1.79)	-0.02 (-0.50)
Quebec	0.07 (1.97)	-0.01 (-0.29)	0.04 (1.86)	-0.01 (-0.53)	**0.12 (2.52)**	**0.06 (2.62)**	<0.01 (0.22)	0.01 (0.43)	0.05 (1.52)
Prairies	-0.06 (-1.64)	0.01 (0.46)	0.02 (1.02)	-0.01 (-0.96)	**-0.12 (-2.92)**	<0.01 (0.03)	**-0.04 (-2.02)**	-0.01 (-1.02)	0.03 (0.79)
British Columbia	<0.01 (0.07)	0.03 (1.48)	**0.04 (2.06)**	-0.02 (-1.22)	-0.06 (-1.22)	0.02 (1.07)	-0.03 (-1.21)	0.02 (0.91)	**0.10 (2.83)**
Rural Area	0.03 (0.80)	-0.06 (-2.85)	0.02 (1.19)	0.02 (1.00)	**-0.17 (-3.48)**	-0.03 (-1.02)	-0.04 (-1.69)	-0.03 (-1.61)	-0.03 (-0.73)
Single	**-0.12 (-2.31)**	**-0.06 (-2.04)**	-0.06 (-1.83)	**0.04 (2.19)**	<0.01 (<0.01)	-0.01 (-0.49)	<0.01 (0.11)	-0.01 (-0.62)	-0.06 (-1.13)
Separated/ Widowed/ Divorced	**-0.13 (-2.82)**	-0.03 (-1.14)	-0.04 (-1.62)	**0.04 (2.49)**	-0.01 (-0.18)	0.01 (0.20)	0.04 (1.20)	0.04 (1.92)	-0.03 (-0.81)
Presence of Children Under the Age of 15	**-0.08 (-2.09)**	0.03 (1.36)	<0.01 (-0.21)	0.01 (0.93)	0.09 (1.94)	**0.08 (3.63)**	0.01 (0.61)	0.01 (0.31)	<0.01 (0.10)
ln (Household Size)	**0.79 (17.36)**	-0.02 (-0.47)	-0.07 **(-2.12)**	0.02 (0.89)	-0.11 (-1.94)	0.05 (1.66)	-0.07 (-2.62)	-0.05 (-2.34)	-0.04 (-0.98)
Higher Educated	**0.08 (3.00)**	**0.03 (2.22)**	**-0.04 (-2.67)**	**0.04 (3.82)**	**0.18 (5.48)**	**0.07 (4.79)**	**0.07 (4.34)**	**0.03 (2.50)**	**0.08 (2.96)**
Male	0.02 (0.64)	-0.02 (-1.69)	-0.02 (-1.51)	<0.01 (-0.18)	-0.07 **(-2.12)**	-0.01 (-0.55)	-0.03 (-1.90)	<0.01 (0.21)	-0.03 (-1.13)
Constant	**9.63 (21.75)**	**-3.28 (-8.18)**	**-4.67 (-10.97)**	**-1.91 (-10.48)**	**-3.42 (-5.33)**	0.21 (0.64)	**-4.87 (-15.21)**	**-5.68 (-25.04)**	-0.98 (-1.63)
Sample Size	4274	4274	4274	4274	4274	4274	4274	4274	4274
R^2	0.31	0.86	0.89	0.90	0.53	0.79	0.82	0.89	0.66

+ Bold font indicates coefficients significant at 5% level, t-ratio reported in parentheses

Table 4b:
Food consumption, calorie intake and major nutritional components, GLS Regressions, Age 55-74

	ln (Calories)	ln (Protein)	ln (Fat)	ln (Carbo hydrates)	ln (Vit C)	ln (Calcium)	ln (Fibre)	ln (Iron)	ln (Vit A)
Unemployment	0.08 (0.72)	-0.07 (-1.02)	-0.01 (-0.12)	0.04 (0.82)	0.29 (1.91)	-0.08 (-1.34)	0.10 (1.32)	0.02 (0.36)	-0.02 (-0.20)
ln (Calories)		**0.98** **(51.26)**	**1.07** **(56.58)**	**1.00** **(53.50)**	**1.05** **(19.76)**	**0.85** **(37.62)**	**0.92** **(37.36)**	**1.03** **(53.16)**	**1.03** **(31.24)**
Atlantic	-0.07 (-1.24)	**0.06** **(2.09)**	0.02 (0.97)	-0.04 (-1.550	**-0.17** **(-2.35)**	0.01 (0.23)	**-0.10** **(-2.87)**	<0.01 (-0.07)	0.09 (1.75)
Quebec	0.06 (1.12)	0.03 (0.96)	0.04 (1.76)	-0.02 (-0.73)	0.07 (0.86)	0.06 (1.89)	-0.01 (-0.36)	0.02 (0.56)	0.07 (1.29)
Prairies	-0.06 (-0.99)	0.03 (1.02)	0.02 (0.83)	-0.02 (-0.63)	-0.13 (-1.62)	-0.02 (-0.67)	**-0.07** **(-2.01)**	-0.01 (-0.51)	<0.01 (0.04)
British Columbia	0.04 (0.68)	0.02 (0.74)	0.04 (1.40)	-0.02 (-0.74)	<0.01 (0.04)	0.02 (0.47)	0.06 (1.62)	0.07 (2.13)	0.09 (1.46)
Rural Area	0.08 (1.62)	<0.01 (0.02)	0.03 (1.14)	-0.03 (-1.14)	**-0.26** **(-3.31)**	**-0.02** **(-0.55)**	**-0.10** **(-3.20)**	<0.01 (0.13)	**-0.15** **(-2.78)**
Single	-0.01 (-0.16)	-0.03 (-0.63)	-0.03 (-0.75)	0.04 (1.28)	0.01 (0.08)	0.04 (0.79)	0.01 (0.12)	-0.01 (-0.21)	-0.02 (-0.17)
Separated/ Widowed/ Divorced	-0.11 (-1.70)	-0.04 (-1.50)	**-0.07** **(-2.58)**	**0.06** **(2.45)**	0.01 (0.11)	0.01 (0.37)	-0.02 (-0.50)	-0.01 (-0.29)	-0.07 (-1.08)
Presence of Children Under the Age of 15	0.05 (0.34)	0.07 (0.96)	0.07 (1.29)	-0.11 (-1.60)	-0.34 (-1.84)	0.06 (0.95)	-0.13 (-1.55)	-0.05 (-0.91)	-0.12 (-1.32)
ln (Household Size)	**0.85** **(11.93)**	<0.01 (0.07)	-0.06 (-1.89)	0.04 (1.10)	0.13 (1.35)	0.08 (1.82)	0.05 (1.14)	<0.01 (0.06)	<0.01 (0.04)
Higher Educated	0.05 (1.23)	0.01 (0.61)	-0.04 (-1.86)	**0.06** **(3.230**	**0.25** **(4.17)**	**0.06** **(2.14)**	**0.06** **(2.49)**	0.01 (0.24)	0.03 (0.610
Male	0.01 (0.14)	0.01 (0.34)	**-0.04** **(-2.00)**	0.02 (1.14)	-0.01 (-0.16)	0.01 (0.36)	0.04 (1.32)	0.03 (1.38)	-0.07 (-1.47)
Constant	**9.98** **(67.79)**	**-3.05** **(-13.51)**	**-3.92** **(-18.55)**	**-2.16** **(-10.99)**	**-3.81** **(-6.01)**	**0.66** **(2.68)**	**-3.96** **(-13.49)**	**-5.31** **(-23.77)**	-0.74 (-1.95)
Sample Size	2059	2059	2059	2059	2059	2059	2059	2059	2059
R^2	0.29	0.84	0.88	0.87	0.48	0.76	0.77	0.86	0.62

+ Bold font indicates coefficients significant at 5% level, t-ratio reported in parentheses

Table 5:
Components of Food Expenditure

	Age 25-51		Age 55-74	
	(Exp on Food "Away from Home")/(Total Food Budget)	(Exp on pre-prepared food)/(All Food "at Home")	(Exp on Food "Away from Home")/(Total Food Budget)	(Exp on pre-prepared food)/(All Food "at Home")
Unemployment/Retirement	**-0.07+** **(-6.54)**	-0.01 (-1.26)	-0.06 (-1.83)	-0.04 (-1.68)
Age of Household Head	0.01 (1.19)	<0.01 (-0.17)		
Square of Age of Household Head	<0.01 (-1.41)	<0.01 (-0.10)		
Atlantic	-0.01 (-1.13)	**0.02** **(2.75)**	-0.03 (-1.70)	0.01 (0.69)
Quebec	-0.02 (-1.92)	-0.01 (-1.55)	<0.01 (-0.23)	<0.01 (0.09)
Prairies	0.02 (1.86)	0.01 (1.85)	0.03 (1.64)	<0.01 (0.03)
British Columbia	**0.04** **(3.47)**	-0.01 (-1.86)	0.02 (1.03)	-0.02 (-1.61)
Rural Area	0.01 (0.51)	0.01 (1.30)	**-0.04** **(-2.52)**	-0.01 (-1.09)
Single	**-0.04** **(-2.44)**	0.01 (1.10)	<0.01 (0.02)	0.01 (0.39)
Separated/Widowed/Divorced	**-0.03** **(-2.04)**	<0.01 (-0.17)	<0.01 (-0.19)	0.01 (0.48)
Presence of Children Under the Age of 15	**-0.04** **(-3.47)**	-0.01 (-1.27)	-0.01 (-0.28)	0.04 (1.39)
ln (Household Size)	**-0.08** **(-5.68)**	0.01 (1.56)	**-0.04** **(-2.00)**	-0.01 (-0.73)
Higher Educated	**0.04** **(4.93)**	**-0.01** **(-2.32)**	**0.08** **(5.38)**	-0.01 (-1.29)
Male	0.01 (1.03)	0.01 (1.31)	0.02 (1.48)	<0.01 (-0.43)
Constant	0.23 (1.76)	**0.26** **(2.84)**	**0.24** **(5.79)**	**0.23** **(7.49)**
Sample Size	4323	4275	2079	2059
R^2	0.11	0.03	0.06	<0.01

+ Bold font indicates coefficients significant at 5% level, t-ratio reported in parentheses

Data Appendix

Canadian Nutrient File (CNF) is a computerized food composition database. It provides average values nutrient content of foods available in Canada. It is largely based on the United States Department of Agriculture (USDA) Nutrient Database for Standard Reference[i]. For Canadian purposes the USDA database is adjusted by including types and brands of food that are exclusive to Canada. Furthermore, Canadian regulatory standards[ii] are also reflected by the CNF.

The latest 2005 version of CNF contains 5370 food items for up to 129 aggregate food components. For each food item, actual quantities of nutrients are calculated and provided. In most cases nutrient content was determined by Association of Official Analytical Chemists method (*Official Methods of Analysis,* 1995*)* or by methods approved by Health Canada nutrition research scientists.

In our approach we follow Horton and Campbell (1991). Since the food items in CNF are more detailed than those in FOODEX, we first need to aggregate the food items in CNF to broader categories, corresponding to those used in FOODEX. For example, there is one food code "eggs" in FOODEX, while there are "higher fat eggs", "lower fat eggs" and some brand name eggs recorded as different items in CNF. Every "eggs" item in CNF may have different types and amounts of nutrients, and we take arithmetic average values from all types of eggs and use them as the nutritional intakes for "eggs" in FOODEX.

[i] U.S. Department of Agriculture, Agricultural Research Service. *USDA Nutrient Database for* Standard Reference. Composition of Foods: Raw, Processed, Prepared.
[ii] Department of National Health and Welfare. 1981**.** *Food and Drugs Act and Regulations.* Minister of Supply and services Canada

As long as we have the unit value of every nutrient every food code contains, we can time it with the quantity purchased by a household and obtain the nutrient value for the food code.

Methodology Appendix

The theoretical model adopted in this paper is broadly based on that of Aguiar and Hurst (2005). Consider a consumer who derives utility from commodities z_i, $i=1,\ldots\ldots,I$, each commodity is the output of a home production function, f_i, which uses time (h_i) and market expenditures (x_i) as inputs. The consumer's problem at time t, in recursive form, is summarized as:

$$V(a_t, w_t, \{p_{it}\}_{i=1,\ldots\ldots,I}) = \max_{\{x_i, h_i\}} \left\{ U(z_{1t},\ldots z_{It}) + \beta E_t V(a_{t+1}, w_{t+1}, \{p_{i,t+1}\}_{i=1,\ldots\ldots,I}) \right\}$$

$$\begin{aligned} s.t. \quad & \Sigma\, p_{it}\, x_{it} + a_{t+1} \leq w_t\, h_{mt} + (1+r)\, a_t \\ & z_{it} = f_i(x_{it}, h_{it}),\ \forall i \\ & \Sigma\, h_{it} + h_{mt} = 1 \\ & h_{it}\, h_{mt},\ x_i \geq 0,\ \forall i \end{aligned} \qquad \text{(A1)}$$

where total resources in period t consist of financial assets a_t, which earn an interest rate r, and of labour income which is provided at a market wage w_t . The time worked at labour market equals h_m. p_{it} is the market price of one unit of x_i in period t and total expenditure in period t is the sum of the expenditures for all I goods. β is the intertemporal discount factor and E_t represents expectation condition on information through period t. The total amount of time is normalized to one.

Substituting out the constraints, the following first order conditions, an interior solution can be derived:

$$U_i(\partial f_i / \partial x_{it}) = p_{it}\beta EV_1$$

$$U_i(\partial f_i / \partial h_{it}) = w_t\beta EV_1 \qquad \text{(A2)}$$

where U_i represents the derivative of U with respect to z_i and V_1 represents the derivative of V with respect to a. The first order conditions imply that the marginal rate of transformation in home production equals the relative price of inputs:

$$(\partial f_i / \partial h_{it}) / (\partial f_i / \partial x_{it}) = w_t / p_{it} \qquad \text{(A3)}$$

Further the imply existence of the demand curve for market expenditure, $x_{it} = x(z_{it}, w_t, p_{it})$, and for time input $h_{it} = h(z_{it}, w_t, p_{it})$. Dropping the t and i subscripts, the quasi-Slutsky equation for the demand for market expenditures is derived as:

$$dx/dw = \partial x/\partial w \big|_z + \partial x/\partial z * \partial z/\partial w \qquad \text{(A4)}$$

Where the first part represents a substitution effect away from market expenditure towards time spent in home production in response to a reduction in w, holding the level of consumption constant, and the later part is the income effect on consumption associated with fluctuations in the current wage.

This paper examines the response of expenditures, home production, and consumption to changes in the labor force status. Following the usual practice, we use food expenditures as the measure of non-durable consumption. The home production function implies that individuals substitute toward home-produced food consumption as the opportunity cost of time declines. Unemployment and retirement are two such periods.

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