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SHOCKS, STOCKS AND SOCKS:

CONSUMPTION SMOOTHING AND THE REPLACEMENT OF DURABLES DURING AN UNEMPLOYMENT SPELL

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Abstract:

We present theoretical and empirical results on consumption during an unemployment spell. The theory model extends the conventional intertemporal allocation model to take explicit account of the fact that households buy clothing and small durable goods (such as pillows and plates) that are indivisible, irreversible and non-collateralisable. The theoretical analysis suggests that liquidity constrained agents cut back on expenditures on these small durables during a low income spell much more than would be suggested by the income elasticities of these goods in 'normal' times. Conversely, non-durable expenditures flows are much smoother than would be predicted in a model without durables. Thus it seems that agents can smooth utility flows even when total expenditure (on durables and non-durables) is quite volatile. The implications of this model are compared to the implications from three other widely used models of intertemporal allocation.

In the empirical section, we exploit the information in a new Canadian panel survey of 20,000 workers who separated from a job in 1993 or 1995. As well as conventional survey information, this survey includes expenditure and asset information. Administrative data from several sources are linked to this panel to provide a detailed picture of the circumstances of households in which one member is unemployed. We estimate a joint total expenditure and demand system and test whether either the level of total expenditure or the structure of demand are sensitive to differences in the Unemployment Insurance benefit rate. We find that they are for households who have no liquid assets. Of the models that we consider, only the intertemporal allocation model proposed in this paper is consistent with this finding.

1. Introduction.

How do agents smooth consumption (if, indeed, they do)? In particular, how do poor agents smooth consumption over income losses due to an unemployment spell? It seems unlikely that they do this by running down liquid assets since they typically have very little in the way of such assets. Equally, it seems implausible that they will run up significant debts even if they can find someone to lend to them. In this paper we suggest an alternative and examine its empirical plausibility using a survey of unemployed persons. The smoothing mechanism we suggest is that agents adjust the timing of replacement of clothing and small durables (such as plates, pillows, cd's etc.) to their income flow. The common features such durables and clothing share are: they all exhibit some durability (relative to a planning period of, say, one month); there are no significant transactions costs for purchases; they are indivisible; there is an element of irreversibility in that there are very imperfect second hand markets for such goods and they are not typically collaterisable. Although our theoretical analysis concerns such 'small durables' we conjecture that similar findings apply to 'large' durables if these have a significant down-payment requirement - strictly if the down-payment exceeds the current service flow.

Our suggestion is that agents in temporarily straitened circumstances put off replacing, say, a winter coat until they have 'some more money'. Although there is a welfare loss to replacing small durables or clothing at a non-optimal time, this welfare loss is typically of second order importance when compared to the loss from postponing the purchase of non-durables (such as food or heating). Thus we posit that agents who are *temporarily* down on their luck (formally: with current income below permanent income) will choose to postpone replacing a worn but serviceable winter coat rather than go hungry. Given discretion over the timing of replacement of clothing and small durables, agents will display considerable volatility in their total expenditures and yet still 'smooth' welfare flows from the purchase of non-durables and the flow of services from durables by concentrating expenditures on non-durables (and the replacement of small durables that are broken) during times of temporarily low income. For example, if expenditures on clothing and 'small durables' are normally about 15% of total expenditures (a figure suggested by budget surveys) then households can temporarily reduce total expenditures by this amount without experiencing any fall in utility levels. Of course, this postponing cannot continue indefinitely but it is an option for the short and medium run.

We refer to the hypothesis that agents draw down stocks of durables during a temporary spell of income loss as the '*internal capital markets*' hypothesis to distinguish it from the more usual '*external capital market*' hypothesis that is given in textbook treatments of the standard intertemporal allocation problem. It is important to emphasize two things. First, this is *not* an alternative to the standard intertemporal model but it does emphasize the inadequacy of examining only expenditures on non-durables when we analyze intertemporal allocation. The second point is that the internal markets hypothesis can be motivated by assuming that agents are liquidity constrained but this is not necessary. That is, it may be that some agents choose to smooth by varying the timing of small durables purchases even if they can borrow at non-prohibitive rates. In our theoretical model we show that the presence of liquidity constraints makes postponing clothes and small durables more likely.

There is some evidence in favour of the hypothesis set out above. One of the obvious predictions of the 'internal capital markets' hypothesis is that we should see more volatility in expenditures on small durables and clothing over the business cycle than we do for non-durables. This is widely known to be the case; for example, Attanasio (1997, Tables 5 and 6) presents an analysis of the variability in income and expenditures on different categories of goods for the U.S. in the 1980's and early 1990's. He finds that the variance of log income is higher than the variance of log nondurable consumption but lower than the variance of log durable expenditure.[1] Even more importantly, in our context, he shows that durables are considerably more volatile (relative to income volatility) for low education households than for high education households. This is consistent with the view that low education/low wealth/high discount factor households are more likely to synchronize their durables expenditures to income fluctuations. Another prediction of the internal capitals markets hypothesis is that households that have a member who is experiencing a spell of unemployment will temporarily cut back on clothing and small durables. Browning and Meghir (1991) find that ‘prime age married’ households in which the husband is unemployed have a budget share for clothing that is about two thirds of the budget share for households in which the husband is employed. Although this could be due to non-separabilities between demands and labour force status, the magnitude of the difference is striking. A further prediction of the internal capital markets hypothesis is that agents will adjust their expenditure patterns to small but predictable changes in income. Parker (1996) presents evidence from the U.S. that agents do exactly this. He considers the change in net income that arises each year for workers who reach their maximum Social Security tax withholding during the year. When the maximum is reached the tax stops and the agent receives a higher net income for the rest of the year. Parker finds strong and robust evidence that agents do indeed spend more when their income increases, even though this change is predictable. Moreover, the effect is quite large with an elasticity of about one half. More importantly, from our viewpoint, there is no effect on `food at home' expenditures, there is a modest but significant effect for 'entertainment and personal care' and a strong effect on clothing expenditures. The latter have an elasticity of about 2.5.

There are, of course, alternatives to the 'internal capital markets' hypothesis. The alternatives we consider in this paper are:

- the *standard life-cycle model* with no frictions: agents borrow or lend on a perfect capital market and set all expenditures so as to equalize the expected marginal utility of expenditure over time (we shall follow Browning and Lusardi (1996) and refer to this as the *'standard additive' model*);

- *'rule of thumb' behaviour*: some agents set consumption equal to current income (or some fraction of current income);

- the *life-cycle model with capital market imperfections*: agents try to keep the marginal utility smooth but are constrained in the capital market, usually by higher or prohibitive interest rates

[1] This is for all durables excluding clothing.

for borrowing. This leads to lower expenditures on all goods, including non-durables.

To distinguish between these hypotheses with data on expenditures on non-durables and services has turned out to be a formidable task (see Browning and Lusardi (1996) and Deaton (1992) for surveys). The usual route is to look for 'excess sensitivity' of non-durable (or food) expenditures changes to anticipated income changes. Detecting such changes is, however, difficult since the changes in income that are typically exploited to generate 'anticipated' income changes are small and noisy. Ideally we would like a sample of households that experienced large and exogenous income changes to overcome these problems. Moreover, a finding of excess sensitivity, by itself, does not distinguish between the 'rule of thumb' and 'liquidity constrained version of the life-cycle' model. This requires supplementary information on, for example, asset levels (see Zeldes (1989)). Even worse, a finding of 'excess sensitivity' is consistent with the standard additive model if agents have a significant precautionary motive (see Carroll (1993)).

In this paper we consider simultaneously the determination of total expenditure (on all goods) and the structure of demands. For the latter, we focus on the differences between expenditures on a non-durable good (food at home) and clothing. The basic idea is that if any of the three alternatives to our internal capital markets hypothesis holds then the structure of demands *conditional on total expenditure* should be uncorrelated with transitory fluctuations in income (whether these are anticipated or not). If, on the other hand, agents do synchronize clothing purchases with income then we should expect to see an effect from income changes on clothing even when we condition on total expenditures. In the theory section (section 3) we discuss in greater detail the predictions from the four models. This leads on to tests of the four alternatives that can be implemented on the data we have.

Our empirical tests rely heavily on the effects of cross-sectional variations in Unemployment Insurance (UI) benefit levels on the structure of demand as well as the level of total expenditure. Most tests of alternative models of intertemporal allocation use only one good (`food' or `nondurable consumption'). Hamermesh (1982) and Parker (1996) discuss how changes in transitory income affect demands for individual goods. On the face of it they seem to present different effects. Hamermesh notes that if agents cut back on total expenditure then there will be a bigger proportional impact on luxuries; this is the standard uncompensated response. Parker (1996), on the other hand, suggests that agents who are temporarily constrained will cut back more on goods that exhibit high intertemporal substitution since the utility cost of fluctuations in these is lower than for goods which are not substitutable over time. In Browning and Crossley (1999) we show formally that the Hamermesh and Parker effects are identical (if within period preferences are additive); that is, luxuries have a high intertemporal substitution elasticity. This is an exact form of Pigou's Law (see Deaton (1974)). This is very distinct from our explanation which emphasizes instead the discretion agents have in the timing of replacement of small durables and clothing.

The data source we use is the Canadian Out of Employment Panel (COEP); section 2 gives a description. The COEP is a sample of all Canadians who had a job separation in specified time windows in early 1993 and early 1995. The useful sample size is about 20,000 people. The survey itself collects detailed information on the job from which the worker separated (the 'reference' job); search behavior; labor force participation since the job loss; family circumstances; personal and household income; assets; expenditures on a range of goods and total expenditure and a number of other variables. This is then merged with Unemployment Insurance (UI) administrative data (including eligibility for UI benefits and past labor supply information) and current and past earnings information on the respondent and their spouse (if any). Thus these data give an unusually detailed picture of the circumstances of unemployed people and their household. For our purposes, the most important aspect of this is that we have information on expenditures and a sizable proportion of the sample experienced a spell of unemployment with an associated loss of income. Often the latter is large so that we are not so troubled by the signal extraction problem. Moreover some part of the income fall varies exogenously over our sample (in particular due to changes to the Unemployment Insurance system over our sample period) so that we can obtain consistent IV estimates of the effects of interest.

We estimate a (partial) demand system for food at home and clothing. This 'structural' approach is the natural complement to the 'reduced form' approach of Gruber (1997) and Browning and Crossley (1998). The reduced form approach most directly answers the immediate policy question: to what extent does expenditure during an unemployment spell depend on UI benefit levels. By contrast, we can provide insight into why expenditure levels depend on benefit levels and who is most affected. Besides being of interest in the wider literature on consumption and saving, this is also critical for the design of UI systems which must balance the incentive losses from higher UI benefits against the enhanced insurance given by higher UI benefits and the welfare gains that result for unemployed people and their families. Moreover, as we show below, our approach allows us to address which goods are particularly efficacious in identifying the reduced form effects. Our data are very different to the PSID in this context. First, all of our sample had a job separation so we have relatively large sample sizes. Second, we have exact details of any UI benefit payments (from the administrative data). Third, we have expenditure measures on food at home, clothing and housing and also a total expenditure measure. Finally, the UI program design (and changes in it over our sample period) give exogenous sources of variation in transitory income. Against this, the survey design forced on us that the first interview could only take place five to eight months after the job loss so that some of the information we use for the pre-job separation period is retrospective. This disadvantage is partially offset by the availability of administrative data going back some years before the survey. In the end, the most serious missing data is on expenditure levels before the job loss to control for the marginal utility of money in the pre-separation period. All we have in this way is a survey measure of the change in total expenditure from before the job separation. In a companion paper (Browning and Crossley (1998)) we use this information to examine the effects of benefit levels and assets on the total expenditure change but this cannot be used to examine the specific (demand) effects we examine in this paper.

When considering consumption during an unemployment spell there are three broad impacts of a job separation on expenditures to take into account. First, if there are costs of going to work then we would expect to see total expenditure fall and also to see a fall in such specific work related items as transport and clothing. More generally, if preferences over goods are not separable from labour supply (see Browning and Meghir (1991)) then a change in labour force status will induce changes in total expenditure and also in the structure of demands conditional on that total. We control for this in our empirical work by considering only respondents who are unemployed so that they all have the same work status.

The second effect comes about because a job loss is often an unpleasant shock and can be expected to lower desired lifetime consumption. This impacts on both durable and non-durable expenditures. Agents will typically wish to run down stocks of durables by letting them depreciate so that we should expect to see lower levels of purchases of durables (or more zeros) after a job loss. There will also be a corresponding fall in non-durable expenditures. These effects can be thought of as ‘permanent’ job loss effects.

Finally, the temporary loss of income due to being out of work may lead to lower total expenditure. This is certainly the case if agents use a 'rule of thumb' or if they are liquidity constrained, either of which will cause the marginal utility of expenditure to fluctuate in an anticipated way from period to period. Our alternative suggestion is that agents may display a sensitivity of current total expenditures to transitory and anticipated income flows and still keep the marginal utility of expenditure approximately constant (that is, they 'smooth' consumption defined as the consumption of non-durables plus the flow of services from durables). They do this by reducing expenditures on small durables and letting these depreciate beyond the optimal level (even allowing for the permanent shock).

In the next section we discuss our data source. In section 3 we present a simple two good theoretical model to illustrate the idea that with stochastic income the timing of the replacement of durables will, under some circumstances, be highly correlated with income changes even though the latter have no informational content (that is, there is no permanent component). This model considers only two goods, one non-durable and one durable, so it is not a serious candidate as a basis for empirical work but it does bring out the essence of our internal capital markets hypothesis. In section 4 we discuss the econometric issues that arise in our estimation. Section 5 contains the results and section 6 concludes.

2. The Data.

2.1 The Canadian Unemployment Insurance System .

The Canadian Unemployment Insurance (UI) program provides earnings related benefits of limited duration[2] to unemployed workers who qualify by having worked at least the minimum required number of weeks is the previous year. In recent years, the minimum number of weeks

[2] Canadians are also eligible for social assistance benefits, which are of unlimited duration. These benefits depend on family type and other measures of need rather than past earnings or contributions. There is a means test (on assets) and a high implicit tax on earnings.

worked required to qualify has depended on local unemployment rates and ranged from 10 to 20 weeks. The duration of benefits has depended on both local unemployment rates and the number of weeks worked in the year prior to the unemployment spell and could be up to one year. Benefits are a fixed fraction (the *statutory replacement rate*) of earnings in the 20 weeks prior to the unemployment spell up to the *maximum insurable earnings.* For example, in 1992 the statutory rate was 60% and the maximum insurable earnings was $710/week, so that the maximum weekly benefits were $426. The system is financed by payroll taxes.

In our data period there were two sets of important legislative changes to the Canadian UI system[3], in 1993 and in 1994. These changes were introduced and enacted as Canada came out of the 1991 recession. Broadly, the two Acts were intended to finance a cut in payroll taxes (as a job creation strategy) while keeping the program's budget under control. The 1993 changes cut the statutory replacement rate from 60 to 57 percent of insurable earnings and disentitled individuals who, according to Human Resources Development Canada (HRDC)[4], either voluntarily quit their jobs or were dismissed with cause. Prior to this, 'quitters' were penalized by a 12 week waiting period and had their statutory replacement rate cut from 60 to 50%.

Four further changes to system were introduced in 1994. This reform raised the minimum entrance requirement in high unemployment regions from 10 to 12 weeks (effective July, 1994). It contained a further cut in the statutory replacement rate (from 57% to 55%, also effective July, 1994). There was also a revision in the mapping from weeks of work and unemployment rates into weeks of benefit entitlement (effective April 1994). Finally, a new "dependency rate" was introduced. Individuals with dependent children and low insurable earnings (less than $390 per week) became eligible for a statutory replacement rate of 60%. This change was intended to shield poor families from the 1993/4 cuts in the general statutory rate. It also represented somewhat of a change in the philosophy of unemployment insurance in Canada since previously benefits had been tied strictly to contributions and not to need.

2.2 The Canadian Out of Employment Panels.

To evaluate the impacts of the 1993 reform, HRDC commissioned a panel survey of individuals that separated from jobs in windows before and after the reform came into force on April 3rd, 1993. To avoid issues of strategic filing, the windows were separated from the effective date of the bill by about one month. Each window was about 6 weeks long. This survey has come to be called the 1993 Canadian Out of Employment Panel (COEP). Respondents from the first sampling window constitute "cohort 1" and those from the second window constitute "cohort 2". Because the cohorts span the policy change, the data has a "quasi-experimental" structure.

In Canada, employers are required to submit a Record of Employment (ROE) whenever a

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[3]The previous legislative changes were in 1989.

[4]The federal department responsible for unemployment insurance.

job separation occurs. Approximately 6 million such forms are issued each year. The sampling frame for the COEP is the population of individuals receiving an ROE form in one of the two window periods, and having a Social Insurance number that ends with a particular digit. We refer to the job whose end led to an individuals inclusion in our sampling frame as “the reference job”. The ROE form contains a reason for separation. All reasons were sampled except for participation in a Work Sharing program, apprenticeship, and retirement at age 65. Approximately 6,000 separations were sampled in each window.

Each respondent was interviewed by phone three times, at about 26, 39 and 60 weeks after the reference job separation. The average interview length was 25 minutes for the first interview. Subsequent interviews were shorter. The long lag to the first interview is imposed by the time it takes all the administrative records that form the sampling frame to become available. This lag means that only a selected sample of respondents are observed in unemployment; we return to this issue below.

This survey information is then merged with UI administrative information from HRDC and with administrative earnings data from the current and previous years for the respondent and his or her spouse (if married). Thus these data give an unprecedentedly detailed glimpse into the circumstances of households that contain someone who has separated from a job. For example, the administrative data gives the exact benefit and entitlement period for every respondent; these are usually very badly measured in surveys (or imputed from state level averages). Conversely the earnings data allow us to control, for example, for the labour supply and income of the spouse which is typically missing from administrative data. Finally, the survey provides information concerning expenditures, search measures, demographics, and other variables that are never observed in administrative data. Moreover, there are often two or three independent measures of the same quantity in the multiple data sources (an example is past earnings) which allows for the correction of measurement error.

In 1995, HRDC commissioned a second survey of individuals separating from jobs. The 1995 COEP sampled approximately 4000 ROE’s in each of two windows, timed to roughly correspond to the 1993 sampling windows. We refer to these samples as cohorts 3 and 4. There were no policy changes between cohorts 3 and 4, so they provide a seasonal control for cohorts 1 and 2. In addition, cohorts 2 and 4 provide a before and after framework for the evaluation of the 1994 policy changes. In the 1995 COEP, respondents were only interviewed twice, at approximately 36 and 60 weeks. Sampling of separation reasons was more restricted than in 1993 with further minor categories excluded; the only groups sampled had separations because of ‘short work’, ‘voluntary quit’, ‘dismissal’, ‘illness’ and ‘other’. The survey questionnaire was revised somewhat in light of the experience with the 1993 COEP, but considerable care was taken to ensure backwards comparability.

2.3 The Sample.

While the 1993 and 1995 COEP together comprise some 20,384 respondents (12,490 in cohorts 1 and 2 (1993) and 7,894 in cohorts 3 and 4 (1995)), we work with a sample which is restricted in several important ways. First, we restrict the sample to separation reasons "short work" (about 50% of separations), "voluntary departures" or “quits” (almost 20%) , “dismissals” (some 5%) and the approximately 20 percent labeled "other". These last represent the second largest single category of separations. Discussions with HRDC staff suggest that this group is similar to the “short work” group; our investigations support this and we commonly pool them. This leaves us with 11,228 observations from cohorts 1 and 2 and 7,573 observations from cohorts 3 and 4.

Second, we focus on respondents between the ages of 20 and 60. This reduces the 1993 sample to 10,528 and the 1995 sample to 7195. In addition we select respondents from three family types: singles, couples and couples with children and/or others. Single parents and young individuals living with parents or unrelated adults are the primary groups excluded. Though these latter groups are not unimportant, we found in preliminary analysis that it was difficult to adequately capture the heterogeneity of responses in a pooled sample. Furthermore, the quality of responses to questions about household income and expenditure were very poor among respondents living with parents or unrelated adults. The family types we do consider comprise 6,750 respondents in 1993 and 5,676 in 1995

Finally, we focus on those individuals who are unemployed[5] at the time of the first interview: this is the group who are likely to have current earnings below “permanent” earnings, and for whom UI benefits (if any) provide a good measure of current ‘earnings’. Of course, because the first interview occurs some time after the separation date this cuts down our sample size: we have 3,132 respondents in 1993 and 1,557 respondents in 1995. This selection introduces a possibility that our results will be biased by sample selection; we discuss this below.

In addition to these sample selections, our estimating sample is further reduced because we are forced to discard observations for which the expenditure information is missing or inconsistent and observations which do not have a complete set of information. This leaves us with a final sample of 1,959 respondents (1162 in 1993 and 797 in 1995). The incidence of incomplete records is quite high, but this reflects the fact that we are merging data from four sources (the survey responses, plus three different HRDC administrative files). We consider it the acceptable cost of the very rich set of information we are able to use.

In Table A2 in Appendix A we present some summary statistics both for our sample and for a sample of workers who report being back in a steady job at least as good as the one that they separated from. Below, we will use the latter group for two purposes. First, we use them to correct for a survey design flaw; see the next sub-section. Second, we use them to test for the exogeneity of our instruments.

2.4 The expenditure questions.

One novel feature of the survey information is that we ask questions concerning expenditures.

[5]That is, we exclude both the employed and those that report withdrawal from the labour market.

In 1993 we ask about housing costs (weekly or monthly), food at home (weekly), food outside the home (weekly), clothing (monthly) and total expenditure on everything (monthly). In 1995 the survey period for food inside the home and outside was changed to monthly. The food at home, clothing and total expenditure variables constitute our 'left hand side' variables. In particular we are interested in how the level of total expenditure and the structure of demand varies with the UI benefit level. Since the use of expenditure questions outside expenditure surveys is relatively rare there is a concern about the reliability of the responses. To address this we investigated the expenditure patterns for households in which the COEP respondent is back in what is self-reported to be steady employment at a job at least as good as the old one. These responses were compared to data drawn from the 1992 Family Expenditure Survey (FAMEX) which provides high quality information on household income and expenditures. The conclusion from this analysis is that we are recording something like the 'true' values (albeit with noise and considerable rounding). For example, for the COEP we find that even when we control for current and lagged household income and a wide range of other variables, family size has a highly significant effect on both total expenditure and food expenditures. Moreover this effect is very similar to the effect found in the FAMEX data. Below we shall present additional evidence that our consumption information seems quite reliable.

We also have to address a serious problem in our survey design. As noted above, the survey period for food at home is 'weekly' in 1993 and 'monthly' in 1995. It is tempting to take the 1993 figure and simply multiply it by 4.2 to make it comparable to the 1995 figure. However, there is considerable evidence that increasing the survey period for self-reported expenditures lowers the figure reported once the responses are scaled to a common period, see Deaton and Grosh (1997). This is a problem for us since we use the policy variation between 1993 and 1995 to help in the identification of the effects of changing benefit levels. Since this may be confounded with spurious changes in reported expenditures on food at home, using the unadjusted figures could lead to serious bias. To overcome this, we conducted an analysis of the 'food at home' demand pattern for those back in a 'good' job (the group referred to at the end of the previous sub-section). The results indicate that the 1993 food at home figure needs to be scaled down by about 13% to compensate for the change in survey design; we make this correction everywhere below.

3. Theory.

3.1 A Model of Durable Replacement and Nondurable Consumption.

In this section we derive the implications of the four hypotheses concerning intertemporal allocation. The purpose here is not to rigorously analyze a structural model of the internal capital markets hypothesis but rather to derive the qualitative implications of each of the alternatives which can then be tested for on a joint system of demands and total expenditure. There is not, in fact, any theoretical model of the joint determination of expenditures on non-durables and small durables in the literature. The closest we know of is the model of purchase of nondurables and the control of a durable with a resale price discount of Beaulieu (1993) (see also Eberly (1995)). This model has a nondurable good and a durable good which has to be replaced if the agent wishes to change the stock, with the current stock being sold at a discount. The agent has a financial asset which has a stochastic return but no other source of income; thus assets are always positive. The optimal solution displays the characteristic feature of control models with asymmetric control possibilities, namely that there are upper and lower threshold ratios of durables to assets. The agent does not adjust durables if the ratio is strictly between these thresholds. If, however, the durables-asset ratio hits the lower threshold then the agent buys some durables (and conversely).

Although the Beaulieu model is suggestive it does not allow us to address directly the effects of, say, current earnings being below 'permanent' earnings (because there is no non-capital income) nor can it allow for the possibility of liquidity constraints (since the agent always maintains positive assets). Nonetheless, this paper and the results in other models with fixed costs and/or partial irreversibility (for example, Eberly (1995), Bertola and Caballero (1990) and Grossman and Laroque (1990)) do suggest some conjectures. To supplement these we present some results from numerical simulations of a fairly rich model that is tailored to the context considered here; some of the details follow Adda and Cooper (1996). We emphasize that this is only a 'worked example' to illustrate the effects that can arise; no attempt is made to 'calibrate' this example to realistic values for parameters or income processes. Equally no attempt will be made in this paper to estimate the exact structural model presented here.

In our discrete time model we have an agent who faces an i.i.d. earnings stream (= y_t in period t) but no other uncertainty[6]. The agent can lend as much as desired at a given interest rate (r) but cannot borrow (but note that we find similar qualitative results if we allow the agent to borrow, say, three periods earnings) . In each period the agent observes the current earnings draw and chooses the level of consumption of a nondurable (= c_t) and whether or not to replace the durable good (d_t = 1 for replacing, zero otherwise). The agent can only ever own one unit of the durable and the durable decays in a deterministic fashion.[7] If the agent buys a new durable then the old one is thrown away. The price of non-durable consumption is normalized to unity and the price of a new durable is p. If we denote cash-on-hand (assets from the previous period plus earnings) by X, then the credit constraint gives that:

$$c + d.p \ \leq \ X \qquad \textbf{(1)}$$

That is, nondurable consumption and any purchase of the durable cannot exceed cash-on-hand.

[6] It will become clear that allowing for first order positive auto-correlation in the earnings stream will strengthen our conclusions so that the iid case is a reasonable one to consider.

[7] In an earlier version of this paper, we also allowed for quality choices. Although this allowed for some interesting effects, here we report only the basic results with a single quality.

We assume that within period preferences are additive over the nondurable and the durable[8] and that the utility from the latter depends only on the age of the good (= $a \geq 0$). Specifically, within period utility with a non-durable consumption level of c and a durable of age a is given by:

$$\ln c + \eta \exp(-a*\rho) \quad with\ \eta \geq 0, \quad \rho \geq 0 \tag{2}$$

Thus a new ($a = 0$) durable yields a utility level of η. Cash-on-hand evolves according to:

$$X_{t+1} = (1+r)(X_t - c_t - p.d_t) + y_{t+1} \tag{3}$$

The state variables are *(X, a)* and the control variables are (*c, d*). For an infinite horizon program with a discount factor of β (< *1*) we have the following recursive form for the value function:

$$J(X,\ a) = \begin{matrix} \max(max_c\ [lnc + \eta \exp(-a*\rho) + \beta E(J((1+r)(X-c)+y',a+1))], \\ max_c\ [lnc + \eta + \beta E(J((1+r)(X-c-p)+y',1))]) \end{matrix}$$

where E is the expectations operator for the earnings process y'. Thus the agent computes the value for replacing and not replacing and chooses the action with the highest value. If the agent replaces then the durable is one period old next period, otherwise it is $(a+1)$ periods old.

This model has both irreversibility (in fact, the old durable has to be discarded) and indivisibility (in fact, only one unit of the good is ever held). Both elements are important for our analysis. For example, in a neo-classical durables model with a continuous stock of the durable that can be added to or run down in a continuous fashion the effects we display below are absent. The irreversibility makes the replacement decision an option; in low income states agents will be reluctant to exercise this option since it will yield low values of the non-durable if the next period income is also low. As set up, our model requires that all of the cost of the durable be paid at replacement; this is appropriate for goods such as socks and pillows. We conjecture that we could replace this assumption with a partial down-payment requirement so long as the down-payment is larger than the 'current service flow' from the new durable. Given this, we see that our model is also applicable to large durables such as televisions (but note that this is a substitute for non-durables such as going to the cinema) so long as agents do not use 'no money down - no payments for a year' schemes to finance these purchases and circumvent the liquidity constraint.

For the continuous time, perfect certainty analogue of our model we can derive exact

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[8] Thus we rule out complementarities or substitution between durables and non-durables. These effects may be important in circumventing some capital market imperfections if, for example, the goods are substitutable and durables can be financed by borrowing against the collateral.

solutions for the consumption and replacement policies. In fact, the optimal strategy is a simple renewal policy for impatient agents. Thus agents choose a fixed replacement period, consume and save optimally during this period to accumulate just enough to pay for the durable and then set assets back to zero at the time of replacement. For the discrete case with certain income the policy is the same except that the (fixed) replacement period is integer valued. For this policy, we can show that for the range of parameters and variables taken below the two goods have income elasticities very close to unity. That is, if income is varied in such a way that average total expenditure rises by one percent then average expenditures on the non-durable and the durable both increase by very close to one percent. This is desirable in the current context since we do not want to consider Hamermesh-Parker necessity/luxury effects.

For the case of uncertain income we need to resort to simulations. Conventional value iteration methods (with error bounds and Gauss-Seidel improvements, see Puterman (1993), for example) can be used to derive the value function and the decision rules $c(X,\ a)$ and $d(X,\ a)$. From these we simulate time paths for consumption and the purchases of the durable. Specifically, we give the agent some starting level of assets and a new durable and then follow them for 11,000 periods with the earnings process used in the determination of the decision rules. From these we calculate various statistics of interest from the last 10,000 outcomes.

In our simulations we always take the same values for the interest rate and the durable characteristics. We shall only examine the effects of varying the discount factor and the income process. Specifically, for the durable we take:

$$p = 0.5,\ \rho = 0.5,\ \eta = 0.5$$

Earnings takes values $(\theta, 1, 2-\theta)$ with probabilities *(0.1,0.8,0.1)* so that mean income is constant at unity. The 'replacement ratio', θ, runs from 0.45 to 0.95. Thus the durable costs half of normal earnings. Finally, we take a value of 0.01 for the interest rate[9]. For the utility parameter values we take either $\beta = 0.99$ or *0.98*; these correspond to a patient and an impatient agent, respectively. With these parameters the durable is replaced once every three periods in the case when income is certain $(\theta = 1)$; thus the average budget share is about 0.16 (= p*frequency) which is close to the empirical value observed for clothing and small durables in budget surveys.

In Table 2.1 we present the ratio of average expenditures when the agent is in the low income state relative to expenditures in the medium income state. We do this for the first period of low income (the top figure in each cell) and for subsequent periods of low income (the bottom figure in each cell). The first panel presents results for an impatient agent. There are two salient features of these results. First, in very low income states non-durable expenditures are lower than in the normal

[9]There is a trade-off in choosing the interest rate. Low values (0.005, say) give a closer approximation to continuous time but convergence is slower. The rate chosen (1%) is obviously rather high if the decision period is a month but lower values gave similar qualitative results and were much slower.

income state, but not by as much as income. For example, with a replacement rate of 50%, food is cut by 12% in the first low income period and by an average of 30% in subsequent periods in longer low income spells. On the other hand, durables are cut back a lot, particularly in long spells. Thus, a halving of income causes average expenditures in the first period of a low income spell to fall to only 42% of average expenditures in the normal income state. For longer spells the effect is very strong and replacement of the durable almost ceases. The second important feature of these results is that both expenditures rise with the replacement rate but non-linearly for durables[10]. In particular, durable expenditures fall sharply when the income fall equals the average budget share of durables; that is, at a replacement rate of about 85%. The results for total expenditure follow from the two component series: total expenditure is cut by about 20% in the half-normal income state and rises fairly sharply at a replacement rate of about 0.8 to 0.85.

TABLE 2.1: AVERAGE EXPENDITURE RATIOS											
IMPATIENT (β=0.98, r= 0.01)											
Income	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95
Nondurable	0.87	0.88	0.88	0.89	0.90	0.91	0.93	0.93	0.92	0.93	0.96
	0.67	0.70	0.75	0.78	0.82	0.85	0.87	0.88	0.93	0.94	0.94
Durable.	0.42	0.42	0.42	0.39	0.41	0.37	0.37	0.41	0.85	1.02	0.98
	0.05	0.04	0.03	0.07	0.03	0.01	0.15	0.57	0.31	0.43	1.16
Total	0.79	0.80	0.81	0.81	0.82	0.82	0.83	0.84	0.91	0.95	0.97
	0.57	0.59	0.63	0.66	0.69	0.71	0.75	0.82	0.83	0.85	0.98
PATIENT (β=0.99, r= 0.01)											
Income	0.45	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95
Nondurable	0.99	0.99	0.99	0.99	0.99	1.00	0.99	0.99	0.99	0.99	0.99
	0.97	0.97	0.98	0.98	0.98	1.00	0.99	0.98	0.96	0.98	0.98
Durable	0.98	0.98	0.96	0.95	1.03	1.09	1.10	1.04	0.97	0.92	1.01
	0.86	1.15	1.01	0.76	0.94	0.92	1.23	1.08	1.01	0.80	1.03
Total	0.99	0.99	0.99	0.99	1.00	1.01	1.01	1.00	0.98	0.98	0.99
	0.95	1.00	0.98	0.94	0.98	0.98	1.03	0.99	0.97	0.95	0.99
Ratio of income and average expenditures in low income state to normal income state. The top value is for the first period of low income and the bottom for longer spells.											

Turning to the patient agent we see that the level of benefits has virtually no effect on expenditures on either non-durable nor durables expenditures. Patient agents accumulate sufficient

[10] Note that sample sizes are relatively small for the low income state (about 1000 for the first period and about 130 for longer spells) so that the ratios are somewhat noisy and display what is probably spurious non-monotonicity.

assets to buffer themselves against any income fluctuations. Readers familiar with the 'income fluctuation problem' (sometimes called the 'buffer stock' model) will recognise many of these features except that here the stock of the physical asset and assets accumulated to pay for the replacement of the durable play the role of the 'buffer stock' for impatient agents.

Although suggestive, these simulation results do not have immediate implications for empirical work since we cannot divide our sample according to subjective discount rates. Instead we shall split our sample on the basis of assets at the beginning of a low income spell. Thus in Table 2.2 we present results from regressions that split the sample into three groups: those with starting assets that are too low to replace the durable; those with assets above this but below the one period normal income and those with higher assets. These split points taken are somewhat arbitrary but they allow us to capture the major features of the responses to benefit differences across agents. To allow for the fact that durables are not usually replaced ('infrequency') these regressions are (non-linear) regressions of expenditures on the exponential of linear functions of the low income value, this value multiplied by a dummy variable for being in a low income state and the level of assets at the beginning of the period for non-low income spells and the level of assets at the beginning of the low income spell for low income states. We discuss the infrequency estimator in the empirical section below.

TABLE 2.2: BENEFIT EFFECTS

	BEGINNING OF PERIOD ASSETS		
	Low (< 0.5)	Medium (0.5 - 1)	High (> 1)
Non-durable	-4.0%	-1.2%	-0.0%
Durable	-39.6%	-15.9%	-1.5%
Total	-8.7%	-4.5%	-0.3%

Percentage change in expenditure in the low income state for a change in the replacement rate from 60% to 50%.

The values presented are the differences in average expenditures in the low income state between an agent with a replacement of 60% and another agent with a replacement rate of 50%. This represents a 'cut' in low income of about 15% so that a marginal propensity to consume of unity would give that total expenditures fall by 15%. The results here mirror those from Table 2.1: for low asset agents food is cut only a little but durables are cut back dramatically. For the medium assets group there is still some effect but it is attenuated. For the high asset group (who are largely, but not exclusively, the patient agents) there is no significant impact of income in the low income state on expenditures.

Although they are highly simplified, our simulation results do suggest some qualitative implications. First, total expenditure is sensitive to the level of low income for agents who have low assets at the onset of a low income spell. Second, food expenditures are much less volatile than income or total expenditure and are relatively insensitive to changes in the replacement rate from 60% to 50%, even for low asset agents. Finally, we see that durables expenditures are highly sensitive to changes in the replacement rate for low asset agents. In particular, the changes in expenditures on non-durables and durables are very different from those we would predict from the change in total expenditure and the income elasticities in the normal income state. The latter are both close to unity in our model so that we would predict that all expenditures would change in about the same proportion if there were no replacement effects. It is this sharp difference in prediction between a conventional Marshallian model and our replacement model that provides the basis for our tests below.

3.2 Controlling for heterogeneity.

We now present an empirical model that is designed to capture some of the features identified in the last subsection. Take the month to be the planning period and denote the expenditure on good i in the month by x_i and total expenditure in the month on all goods (including housing, durables, clothing, services and non-durables) by x. We model these expenditures as a function of three distinct sets of variables. The first set consists of the variable of interest, the level of UI benefits (denoted b). If the cross-sample variation in this was uncorrelated with all other determinants of expenditures then we could identify the benefit effect simply by looking at how expenditures vary with benefits. Benefits are, however, correlated with a host of the other determinants of expenditures and we have to control for these. The second set of controls we use are household demographics that are widely believed to affect consumption and demand. These include the age of the agent, the number of people in the household and their labour force status and the season the household was surveyed. Let $\boldsymbol{y}$ denote the vector of such demographics; see Table B1 in Appendix B for a full listing. The third set of variables, denoted $\boldsymbol{z}$, are associated with controlling for three other broad facets of the determination of consumption: pre-separation lifetime wealth (strictly, the marginal utility of money); the size of the job separation shock and the selection in our data that agents have a relatively long unemployment spell. We discuss each of these separately.

The principal determinant of cross-section variation in total expenditure is cross-section variation in lifetime wealth. This is correlated with UI benefits (since the latter depends on the respondent's earnings which are correlated with lifetime wealth) so that ignoring this correlation would lead to a spurious correlation between expenditures and UI benefits. To control for this, we include the respondent's earnings and household income in the three years before the reference job separation and assets at the separation in our set of $\boldsymbol{z}$-variables. We also include education, home-ownership[11], age and occupation. Note that some of these are also included in the set of demographics so that identification of their effects is problematic; here this is not a problem since our principal interest is in the benefit variable.

Given these correlates for the pre-separation marginal utility of money, we next include variables that are designed to capture how big a lifetime shock the job separation represents. For example, workers who are laid off from a 'good', long tenure job may experience a considerable long term loss in earnings (see Jacobson, Lalonde and Sullivan (1993)). At the other extreme, separation from a seasonal job gives much less of a lifetime earnings shock. Thus we include variables such as

[11] Including net equity in housing rather than a dummy for ownership did not change any of our results.

tenure in the reference job and whether the latter was seasonal in our set of controls. Since these are correlated with the benefit received, ignoring them would lead to endogeneity bias. One further variable that we include here is how important the respondents' earnings were for the household before the reference job separation. Fairly obviously, the loss of a job by the principal bread-winner represents more of a household shock than the loss of a job by someone who only brought in, say, 20% of household income.

Finally, we come to the selection on being unemployed at the first interview. The time between the reference separation and the first interview varies between 14 and 44 weeks. There are two aspects to this: the average time is quite long and also variable. The first of these means that most of our respondents have had a relatively long unemployment spell. Thus it may be that our estimates of what happens to any worker who separates and then experiences a long spell of unemployment may be biased since the sample selection is correlated with duration. There are two competing selection scenarios that are commonly adduced here. The first corresponds to the view that unemployment is a demand phenomenon. For example, in a search model there may be unobserved heterogeneity in the arrival rates of job offers. In this scenario, 'marginal' workers with low employment opportunities are more likely to have long spells and hence to be unemployed at the first interview. If such workers also have few financial resources then they may be more sensitive to the level of UI benefits. In this case our estimates overestimate the impact of UI benefits on consumption. The second view is that unemployment is in some sense a choice, having either an element of search or labour supply. For example, there may be unobserved heterogeneity in the alternative value of time or in search costs. Thus workers who are observed to have a longer spell are those who can 'afford' it; needy workers will be driven to take worse jobs and hence to drop out of our sample. In this case the estimates we have are an underestimate of the impact of UI benefits on consumption for a worker drawn from the population at large who is forced to have, say, a six month unemployment spell.

The second aspect of the selection problem is that there is variation in the time between the separation and the first interview which may induce a spurious correlation between consumption levels and benefit levels. This derives from the consensus view that there is a significant but small positive effect of benefits on unemployment duration (see, for example, Atkinson and Micklewright (1991), Meyer (1990) or Narendranathan and Stewart (1993)). If this is correct then this induces a correlation between the benefit level and the weeks elapsed between the reference job separation and the first interview. If the latter is itself correlated with consumption levels during the unemployment spell then later interviews will be associated with lower consumption and higher benefits. Moreover, if there is consumption duration dependence then the inferences we draw below refer to what happens to a household in which someone has an unemployment spell of between 14 and 44 weeks. We cannot extrapolate outside this support to infer what happens in a short spell or a very long one.

If the second problem did not exist then we could use the time between separation and interview as an instrument to solve the first problem. Unfortunately we have to control for the second problem by including this 'weeks elapsed between the reference separation and the first interview' variable so that this exclusion restriction is not available. Instead we pursue two alternative strategies. First, without attempting to distinguish between the demand or supply side hypotheses, we note that both concern unobserved heterogeneity that is correlated across duration and consumption. Thus we simply include variables to capture both sets of effects. For example, to control for demand side effects we include the local unemployment rate and a variable for having had some unemployment in the two years before the reference job separation. To capture supply side heterogeneity we include variables such as assets at the separation and household characteristics. Thus we have a large number of variables to wash out correlations between our benefit variable and the error terms in the expenditure equations. Second, we have what we consider to be a good instrument for the benefit level which further mitigates any sample selection bias.

3.3 Implications of the competing allocation models.

Given our three sets of independent variables, denoted $(b,\ \boldsymbol{y},\ \boldsymbol{z})$, the joint system determining the expenditure variables is given by the consumption function:

$$\ln(x) = g(b,\ \boldsymbol{y},\ \boldsymbol{z}) \tag{6}$$

and the Marshallian (uncompensated) demands:

$$\ln(x_i) = f^{\,i}(b,\ \boldsymbol{y},\ \ln(x)) \tag{7}$$

If we substitute (6) into (7) then we have what we refer to the quasi-Frisch[12] demands:

$$\ln(x_i) = f^{\,i}(b,\ \boldsymbol{y},\ g(b,\ \boldsymbol{y},\ \boldsymbol{z})) = g^{\,i}(b,\ \boldsymbol{y},\ \boldsymbol{z}) \tag{8}$$

The four allocation models we consider each have different implications for the effects of changes in the benefit level in the quasi-Frisch system (6) and (8) and for the Marshallian system (6) and (7). To facilitate the comparisons we define:

$$\Delta = \frac{\partial \ln(x)}{\partial b}(b,\boldsymbol{y},\boldsymbol{z}), \qquad \Delta_i = \frac{\partial \ln(x_i)}{\partial b}(b,\boldsymbol{y},\boldsymbol{z}),$$
$$\tau_i = \frac{\partial \ln(x_i)}{\partial b}(b,\boldsymbol{y},\ln(x)), \qquad \epsilon_i = \frac{\partial \ln(x_i)}{\partial \ln(x)}(b,\boldsymbol{y},\ln(x))$$

so that the $\Delta's$ are quasi-Frisch benefit effects, the $\tau's$ are Marshallian benefit effects and the $\epsilon's$ are income elasticities. From equation (8) we have the following relationship between the quasi-Frisch and Marshallian benefit effects:

[12] These are not genuine Frisch functions since they do not condition on the marginal utility of expenditure but rather on determinants of the latter. This is not ideal nomenclature but the obvious alternative of calling these demands ‘reduced form’ is not appropriate since below we shall be instrumenting the benefit level.

$$\Delta_i = \tau_i + \Delta.\epsilon_i \tag{10}$$

Consider first the standard additive model. Here the only effects of an increase in benefit levels are lifetime effects. First there is a re-distribution effect: those who expect to receive net gains from the system - presumably those who expect many unemployment spells - are better off and those who expect to contribute more in the future than they receive in benefits are worse off. There is also an insurance effect since prudent agents will increase current consumption if the insurance aspect of the UI system is enhanced by an increase in benefit levels. The unconditional effects of these changes on current expenditures are likely to be small anyway but since we also include variables such as past use of UI and age the conditional effects on expenditures can be ignored. Thus we have:

$$\Delta = \Delta_i = \tau_i = 0 \tag{11}$$

That is, in a standard model with no liquidity constraints there should not be any effect of benefit levels on either total expenditure or the structure of demands. This corresponds to the patient agent case in our simulation model (such agents effectively self-insure).

We take the 'rule of thumb' model to imply that changes in current income lead to changes in total expenditure but not to the structure of demand conditional on this total. That is:

$$\Delta > 0 \quad ,\tau_i = 0 \Rightarrow \Delta_i = \Delta.\epsilon_i > 0 \tag{12}$$

Taking values of, say, 0.4 and 1.3 for income elasticities for food at home and clothing respectively, this implies that the proportional change in the two goods should be about one half and 1.3 times the proportional change in total expenditure.

Returning to the standard model, if we introduce liquidity constraints then there is a role for benefit effects. Agents who are liquidity constrained have a unit marginal propensity to consume out of current 'cash-on-hand' (see, for example, Deaton (1991)). Thus a one dollar increase in benefit levels will lead to a one dollar increase in total expenditure and a corresponding increase in all expenditures, with the exact amount being equal to the product of the expenditure elasticity and the budget share. This is the same as the 'rule of thumb' model. Indeed, the only way to distinguish these predictions from a rule of thumb model in which agents set total expenditure equal to income is by splitting the sample according to some proxy for being constrained (see Zeldes (1989)). In particular, agents who carry liquid assets forward from one period to the next are not, by definition, liquidity constrained and hence will obey (11) rather than (12). In our empirical work we allow the benefit effects to vary with asset levels.

The common characteristic of the three models above is that the Marshallian demand benefit effect is zero. This is not the case for the internal capital markets hypothesis for expenditures on food at home, clothing and total expenditure. We do not have specific predictions here; all we can present are suggestions from the simulations reported in the last section which only allowed for two goods, one durable and one non-durable. These suggest that for those with some assets at the beginning of the unemployment spell we should see no effect (equation (11) above) but for those with low assets we have:

$$\Delta > 0,\ \tau_f < 0,\ \tau_c > 0 \Rightarrow \Delta_c > 0,\ \Delta_f >/< 0 \qquad \textbf{(13)}$$

Thus changes in benefit levels have an effect on both the level of total expenditures and demands conditional on total expenditure. This gives an unambiguous prediction for the quasi-Frisch clothing expenditure effect but the quasi-Frisch food effect can be positive or negative.

4. Econometric issues.

4.1 Functional Form.

Our choice of functional forms for equations (6) and (7) is partly dictated by the fact that we have many respondents who report zero for their monthly clothing expenditures. We shall return to how to handle this infrequency problem below but for now we choose a functional form which restricts the 'long run' expenditures to be positive. This requirement is not met by several of the usual choices for functional form (for example, the Working-Leser form). Instead we use a log-log form for the long run Engel curve:

$$x_i = x\, e^{\zeta^i(x,\,y,\,b)}\ e^{u_i} \qquad \textbf{(14)}$$

where x_i is the expenditure on good i $(i = f,\ c)$ and u_i is a random error term[13]. Such a system will clearly not satisfy adding-up but since we are only modeling a small subset of goods this is not considered a serious problem. We define:

$$\zeta^i = \gamma_i + \alpha_i \ln(x) + \beta_i\, y + \theta_i\, b \qquad \textbf{(15)}$$

For the food demand equations we can substitute and take logs to give the log-linear form:

$$\ln(x_f) = \gamma_f + (1+\alpha_f) \ln(x) + \beta_f\, y + \theta_f\, b + u_f \qquad \textbf{(16)}$$

[13] In our empirical work we present a test for the adequacy of this somewhat restricted functional form.

Note that with this formulation (multiplicative) measurement error in the food expenditure will not cause identification problems but we do have to take account of measurement error in total expenditure. Additionally, the total expenditure variable is usually taken to be endogenous in demand studies so that we need to instrument it. Our parameterisation of equations (6) is:

$$\ln(x) = \beta_x y + \theta_x b + \phi_x z + u_x \tag{17}$$

If the variables on the right hand side here that do not appear in the demand equation (16) (the z instrumental variables) are uncorrelated with the measurement error then this identifies the parameters in (16). We cannot, of course, use the transformation in equation (16) for the clothing equation since we have many zeros for clothing. Thus this equation must be estimated in non-linear form; the next sub-section presents the details.

4.2 The Infrequency of Clothing Expenditures.

We now deal with the fact that because our expenditure measure for clothing is for one month we would have a fair number of zeros even if agents were all following the standard model. In this case we have a pure 'infrequency' problem and none of the zeros represent corner solutions in the long run. If we had a formal theory model for the purchase of clothing we could formulate a formal statistical model that captured this 'infrequency'. Lacking such a model, the best we can do is to follow the lead of Keen (1986) and Pudney (1988) and model the infrequency relatively informally (see Pudney (1989) for an excellent discussion of infrequency models).

In this context we interpret x_c* as the 'long run average' demand for clothing[14] in a particular employment state. Let p be the probability that an agent buys some clothing in the survey period. Both p and x_c* may be functions of (b, $\mathbf{y}$, $\mathbf{z}$) since agents may adjust both their frequency of purchase and their long run average purchases according to their current circumstances. Observed purchases of clothing, x_c, are given by:

$$x_c = \frac{x_c^* e^v}{p} \quad \textit{with probability } p \tag{18}$$

$$= 0 \quad \textit{with probability } (1-p) \tag{19}$$

$$\textit{where } E(e^v) = 1 \tag{20}$$

[14] Pudney (1989) uses the term 'the unobservable true rate of consumption'. He also presents an interpretation of it as the long run average if all the variables that determine it are held fixed.

Thus:

$$E(x_c|b,\mathbf{y},\mathbf{z}) \; = \; p\,[E(\frac{x_c^* e^{\,v}}{p})] \; + \; (1-p)\,0 \; = \; x_c^* \qquad \textbf{(21)}$$

so that the non-linear regression of the observed purchases x_c for the whole sample (including those who have zero purchases):

$$x_c \; = \; \exp(\gamma_c \; + \; (1+\alpha_c)\ln(x) \; + \; \beta_c y \; + \; \theta_c b)e^{u_c} \qquad \textbf{(22)}$$

gives the mean function for the unobservable x_c*[15]. We estimate the system of equations (16), (17) and (22) by GMM assuming independence across agents but allowing for arbitrary correlation between the residuals in these equations.

4.3 Instruments for benefits.

The principle variable of interest in our empirical analysis is UI benefits. Benefits (in $1,000's per month) were interacted with a dummy for liquid assets at the interview date and a dummy for positive liquid assets at the interview date which gives two benefit variables for the liquidity constrained and unconstrained respectively. The dummy for positive liquid assets at the interview date is among our permanent income controls, y. To address the possibility that variation in the marginal utility of money (λ) not captured by our controls (*y*, z) is correlated with benefits, we follow Gruber (1997) and instrument actual benefits paid with 'potential benefits'. Potential benefits are calculated as a function of past earnings, local unemployment rates, and weeks worked in the reference job. Parameters of the formula varied over the sample period with both legislative (the 1993 and 1994 reforms) and administrative changes. As we control for past earnings, local unemployment rates, and weeks worked in the reference job in our regressions, identification is coming from nonlinearity in the benefit formula and from changes in the program parameters. Because the UI system is federal in Canada, we cannot use the cross-state variation in benefits which is the common basis of U.S. studies of UI.

The variation in program parameters we exploit is described in Appendix A, Table A3. The available variation in the statutory rate is small relative to cross state differences in the US. Against this, our rich controls and exact measurement of benefits means there is less noise from which to extract the signal. Furthermore the source of the variation we are using is transparent: a series of

[15] Although this formulation is very convenient for incorporation into the system we estimate, it is inefficient (relative to *x* there is a lot of noise in x_c*). There are more 'structural' alternatives. These allow us to determine whether, for example, *b* enters both the 'probability of purchase' function *p* and the function x_c* (for example, Blundell and Meghir (1987)). We shall not pursue this further in this paper.

legislative cuts to the UI system designed to reduce program expenditures against the backdrop of a very slowly improving labor market.[16] Elsewhere (Browning and Crossley, 1998) we point out that cross-state variation in replacement rates in the U.S. is not obviously exogenous; state replacement rates might be correlated with the permanent income shock of job separation if, for example, states adjust their replacement rates to smooth program expenditures (or balance their budgets).

We also note that not all our instruments move in the same direction through time. While most of the changes in this period made the program less generous, there were two with the opposite effect. One was the introduction of the "dependency rate" between cohorts 2 and 3 which allowed for higher benefits for low income individuals with dependents. The other was the significant real growth in the maximum insurable earnings over the period, which offset the cuts in legislative replacement rate. This meant that for individuals above the maximum insurable benefits the *actual* replacement rate did not decline. Finally, we note that the relevance and exogeniety of a set of instruments is subject to empirical investigation; we take this up in section 5.1.

Because holding positive liquid assets at the interview date is surely endogenous, we instrument this with a dummy variable for reporting investment income in the previous tax year. Preliminary analysis suggested that reporting investment income in the previous tax year was a very good predictor of having liquid assets of at least 2 months income in the month before the separation date.[17] Potential benefits was interacted with the two dummies indicating receipt of investment income and no investment income in the previous tax year. Thus we have three instruments (two potential benefits variables and the dummy for investment income in the previous tax year) and three endogenous variables (two benefit variables and the dummy variable for positive liquid assets at the interview date).

5. Results.

5.1 Reduced Forms.

We begin our empirical analysis with a discussion of several sets of reduced form relationships. The estimates and related statistics are presented in Appendix B. First we estimate auxiliary regressions for our three endogenous right-hand-side variables in order to assess the relevance of our instruments. The estimates are reported in Appendix Table B1. Conditional on our large set of permanent income and demographic controls, our instruments have good residual explanatory power.

The next set of relationships are `reduced-form' versions of the quasi-Frisch responses

[16] The unemployment rate in Canada drifted down from 11.3% in 1992 to 9.5% in 1995.

[17] Liquid asset holdings prior to the job separation were recorded in the 1995 survey but not in 1993.

(equations (16), (17) and (22)). These estimates condition on potential benefits directly, whereas the structural forms we will subsequently present estimate responses to actual benefits received (instrumented with potential benefits). The complete estimation results are presented in Appendix B, Table B2. Column 1 presents estimates for food at home, column 2 clothing and column 3 total expenditure. These reduced form versions of the quasi-Frisch equations are of interest for at least three reasons. First, they provide the basis for a set of robustness and specification tests. Second, they are most comparable to the estimates of Gruber (1997). Finally, as Gruber points out, the response to potential benefits is often of most interest to policy makers, as it is potential benefits (rather than actual benefits) over which they have direct control.[18] Among our results, column 1 is most comparable to Gruber (1997). We take up the substantive implications of our results for Unemployment Insurance evaluation and a comparison with Gruber's results in our concluding section.

Appendix Table B3 presents statistics pertaining to the empirical fit and adequacy of our specifications for these reduced form quasi-Frisch equations. Note that the nonlinearity of the clothing equation precludes us from employing the usual linear regression diagnostics. We get around this problem by estimating a linear approximation to the clothing equation. The basis of this approximation is the inverse hyperbolic sine transformation of the clothing expenditures. The inverse hyperbolic sine allows for zero expenditures. This transformation approximates the logarithm at larger values of the argument but becomes linear as the argument approaches zero. Since the nonlinearity of this transformation is scale dependent we scale clothing expenditures here by dollars per month (rather than 1000s of dollars per month). The first two rows of Table B3 report the estimated coefficients on the potential benefit variables. Thus in columns 1 through 3 these simply repeat information that was presented in Table B2. The linear approximation to the clothing equation reports benefit effects which are similar to column 3. The third row reports the R^2 for each of the (linear) regressions. The relatively low R^2 values for clothing regressions simply reflects the fact that we are fitting the common conditional mean of observed and 'long run average' expenditures to the former, which is much noisier than the latter (see section (4.2)).

The next row of Table B3 presents RESET tests for omitted variables - essentially a test of the empirical adequacy of our nonstandard functional form. The test detects no difficulty with our functional form for total expenditure, food and clothing. The final two rows of Table B3 report on the robustness of our estimates. We calculate DFBETA influence statistics for each observation for each of the two variables of interest, in each of the three equations. These represent, for each observation, the change (in standard deviations) in the coefficient on a particular variable that would result from the removal of that observation (see Chaterjee and Hadi, 1988) . We report the largest DFBETA (in absolute value) for each coefficient reported in the first two rows of the table; these statistics indicate that no coefficient estimate seems unduly influenced by any one observation.

[18] Gruber also notes that actual UI receipts are very badly measured in the PSID. That is not a problem with our data. We have exact administrative records of UI receipt. Thus our main results are for actual benefit receipt.

The next set of reduced form relationships which we consider are `reduced form' estimates of the quasi-Frisch response for our control sample of respondents back in a good job. These last estimates provide a test of the exogeneity of our instruments. If potential benefits influence expenditures only through actual benefits, then they should have no influence on the demands of respondents who are ineligible for benefits. A similar test is presented in Gruber (1997). Appendix B, Table B4 presents the results. Note that we cannot use the food equation for this test, because this sample was used to calibrate food expenditures across the change in the food expenditure reporting period between the 1993 and 1995 survey (see section (2.4)). However, the clothing and total expenditure questions were the same in both surveys, so that we can use them to validate our exogeneity assumption. Table B4 shows that potential benefits are not a significant determinant of either clothing expenditures or totally expenditures among those back in a good job.

5.2 Estimates of quasi-Frisch and Marshallian responses.

We turn now to an empirical investigation of the four models of consumption behavior introduced in section (3.2). We begin with the quasi-Frisch responses. Table 5.1 summarizes our IV estimates of quasi-Frisch form equations ((6) and (8) above) for food, clothing and total expenditures; the full estimation results are presented in Appendix C, Table C1. The first row reports the impact of UI benefits for respondents who had liquid assets at the interview date - that is, the coefficient on UI benefits crossed with a dummy variable indicating positive assets. The only positive impact is on clothing expenditures and that is insignificant. The second row reports the coefficient on UI benefits crossed with a dummy a variable indicating zero liquid assets at the interview - that is, the impact of UI benefits for those who are more likely to be liquidity constrained. These three coefficients are strikingly different than those in the row above - there are all positive and significant. Thus the distinction between the constrained and unconstrained is empirically significant. Comparing these IV results to our reduced form results of the previous section (Appendix C, Table C2), we note that the reduced form estimates display a similar pattern of much stronger responses for clothing than for food our total expenses. However, the distinction between the constrained and unconstrained is weaker in the reduced form estimates. This reflects the fact that we are using less information to classify the respondents' asset status.

Evaluated at means of the data, our IV results imply the following elasticities.[19] For those with some assets at the interview date, the elasticity of food expenditures to benefit levels five to eight months into an unemployment spell is -0.088; for clothing 0.396 and for total expenditure -0.079. While the elasticities for food and total expenditure have the `wrong' sign, they are not significantly different from zero. For those without any liquid assets the elasticities are food: 0.198, clothing: 0.844 and total: 0.244. Cast in terms of elasticities, the difference between food and clothing responses is striking, with the clothing response more than four times as large. If instead we calculate

[19]Calculation of the elasticities requires the mean of benefits, while calculations of the dollar for dollar cuts requires the mean of expenditures. In each case we calculate the mean for UI recipients only, and separately for recipients with and without liquid assets.

the implied dollar for dollar cuts (again at the means of the data) our results suggest that among those likely to be liquidity constrained a 1 dollar cut in benefits would lead to a 7 cent cut in food expenditures, a 8 cent cut in clothing expenditures and a 38 cent cut in total expenditures. Even though the budget share of clothing among our unemployed sample is only about a quarter of the budget share of food (see Appendix A, Table A1), the much larger elasticity of clothing outlays implies that a 1 dollar cut in benefits results in a larger absolute fall in clothing expenditures than in food expenditures.

Next we turn to the responses of the Marshallian demands to UI benefits. The coefficients on the two benefit variables are presented in the first two rows of Table 5.2. Because the system is recursive, the total expenditure coefficients are of course, identical to those reported in 5.1 (the quasi-Frisch demand coefficients). For food and clothing, these are the conditional on *x* (total expenditure) derivatives - the impact of benefits on the *structure* of demand - holding total expenditure constant. According to these estimates, there is no significant effect of benefits on food expenditure, once we condition on total expenditure. The same is not true of clothing expenditures. Conditional on total expenditures, marginal benefit dollars appear to increase clothing expenditures. Of the alternative models of consumption behavior discussed in section 2, only the "internal capital markets" hypothesis is consistent with this observation.

The third line reports the estimated total expenditure elasticities for food and clothing. These are precisely estimated, the food expenditure elasticity is much smaller than the clothing elasticity and both numbers are consistent with the numbers typically estimated by budget surveys. The complete estimation results for the Marshallian responses are presented in Appendix C, Table C2. Since we have several instruments for total expenditure, the system is overidentified and the Sargan statistic provides an (asymptotically χ^2) test of the overidentifying restrictions. As can be seen from the 3rd note to Table 5.2, the overidentifying restrictions are not rejected.

TABLE 5.1: IV Estimates of Coefficents on UI Benefits
Quasi-Frisch Responses, Unemployed Sample

	Total Expenditure	Food at Home	Clothing
UI benefits x Positive Assets	-0.071 [-0.44]	-0.080 [-0.69]	0.357 [1.15]
UI benefits x No Assets	0.24 [2.70]	0.195 [2.20]	0.830 [2.31]

Notes:
1. t-values in square parentheses
2. 1,959 Observations
3. Full results in appendix C, table C1
4. Expenditures are measured in ln($1000s) per month; Benefits are measured in $1000s per month.
5. (Actual UI Benefits) x (Positive Assets at Interview) is instrumented with (Potential UI Benefits) x (Positive Investment Income the Year Prior to Job loss).

Finally we have estimated reduced form versions of the Marshallian responses (that is, conditioning on potential benefits directly rather than instrumenting actual benefits with potential benefits). When we condition on potential benefits, we can estimate the responses for the employed sample as well as the unemployed sample. The results of this exercise are presented in Appendix C, Tables C3 and C4 for the unemployed and employed samples respectively. Three important observations can be drawn from these tables. First, Table C3 reveals that among the unemployed, the pattern of Marshallian responses to potential benefits is very similar to the IV estimates of Table 5.2; conditional on total expenditure there is no response for food; there is a strong response for clothing; and that response is stronger among those more likely to be liquidity constrained. Second, Table C4 reveals that among the employed there is no response of the structure of demand to potential benefits. This follows the our discussion of Appendix B, Table B4 (subsection 5.1) in confirming the exogeneity of our instrument (potential benefits). Finally we note that the expenditure elasticities for the reduced form Marshallian estimates for the employed sample are very similar to the structural form elasticities for the unemployed sample; this is encouraging since this is an implication of all the theory models.

5.3 Tests of Alternative models

Now we turn to direct tests of the models of consumption behavior discussed in section (3.3). An inspection of Table 5.2 allows us to anticipate the formal tests: the presence of some significant benefit effects for total expenditure rules out the standard model and the differences between those with assets and those without argues against the rule of thumb model. Finally, the fact that benefit has a significant impact on one component of demand, clothing, argues against the liquidity constraint model. Using minimum χ^2 steps we impose the restrictions implied by each model (see equations (11) to (13)) on the Marshallian structural form coefficient estimates. Tests of these restrictions are reported in Table 5.3. The standard additive model has the strong implication that benefits should not matter anywhere. To test this we exclude both benefit variables from all three expenditure equations. This set of six restrictions is strongly rejected by the data. The “rule of thumb” model implies that benefits should have no effect on the structure of demand (that is, should not appear in the Marshallian demands for food and clothing), regardless of liquidity. We also take it to imply that the impact on total expenditure should be the same for those with and without assets. This set of five restrictions is also strongly rejected by the data.

TABLE 5.2: IV Estimates of Selected Coefficients
Marshallian Responses, Unemployed Sample

	Total Expenditure	Food at Home	Clothing
UI benefits x Positive Assets	-0.071 [-0.44]	-0.095 [-1.23]	0.087 [0.335]
UI benefits x No Assets	0.24 [2.70]	0.082 [1.44]	0.587 [2.21]
Total Expenditure		0.577 [8.09]	1.31 [4.39]

Notes:
1. t-values in square parentheses.
2. 1959 Observations.
3. Over-identification of expenditure instruments (Sargan Statistic): $\chi^2_{(8)}$ =6.04 ; p =0.64 .
4. Full results in Appendix C, Table C2.
5. Expenditures are measured in ln($1000s) per month; Benefits are measured in $1000s per month.
6. (Actual UI Benefits) x (Positive Assets at Interview) is instrumented with (Potential UI Benefits) x (Positive Investment Income the Year Prior to Job loss).

Allowing for liquidity constraints changes the predictions of the standard model. Benefits may affect total expenditure for the constrained. However, clothing and food are affected only through the impact on total expenditure and their respective expenditure elasticities - there is no impact on the structure of demand. Thus we exclude both the benefit variables from the food and clothing structural equations and the “high assets” benefits variable from the total expenditure equation. The test is ‘marginal’ for this set of 5 restrictions. Finally, the “internal capital markets” hypothesis allows that benefits might affect both total expenditure and the structure of demand (conditional on total expenditure). Under the additional hypothesis that the unconstrained will prefer external to internal capital markets, these effects should only be evident for the constrained. Thus we test the internal capital markets hypothesis by excluding the “high assets” benefit variable from all three structural equations. The data does not reject these three restrictions.

TABLE 5.3: Tests of Alternative Models

Model	χ^2 Statistic	Degrees of Freedom	Probability
Standard Additive	21.4	6	0.0015
Rule of Thumb	17.9	5	0.0030
Liquidity Constraints	9.24	5	0.10

Internal Capital Markets	2.20	3	0.53
Notes: 1. The restrictions corresponding to each model are discussed in the text.			

To summarize, benefits appear to have an effect on the structure of demand, conditional on total expenditure. This is consistent with the idea that agents in temporarily straitened circumstances smooth consumption by adjusting the timing of durables purchases. Our priors, partly informed by the simulations of Section 3, were that this behavior should be much more prominent among those without liquid assets at the job loss and the data does support this conjecture. Benefits appear to have a significant effect on the pattern of demands only for the liquidity constrained. Based on the restrictions derived in section 2.2, our data rejects the liquidity constraints model only at the 10 percent level. Although this may be considered a marginal rejection, note that this is a test against the completely unrestricted specification of the Marshallian demands. Since the internal capital markets model is nested within the liquidity constraints model we can test the former against the latter; the difference in the minimized differences is 7.04 which has a $\chi^2(2)$ distribution; this indicates clearly that the internal capital markets model is, statistically, the preferred model.

6 Conclusions.

In this paper we have examined how households might smooth 'consumption' over income losses due to an unemployment spell. We proposed that they adjust the timing of the replacement of small durables to the timing of income. Because old but serviceable durables continue to provide a flow of services, such a strategy minimizes the utility cost of a medium run cut in expenditures. The plausibility of such a strategy is confirmed by simulations. Furthermore, we find support for it in data from a survey of unemployed Canadians. In particular, marginal dollars of unemployment insurance benefits tend to increase clothing expenditures *even conditioning on total expenditures*. The same is not true of expenditures on a nondurable good, food at home.

While the primary focus of this paper is to evaluate the proposed smoothing mechanism, the results do have several interesting implications for UI evaluations. First, they imply a methodological point about how one should measure living standards during an unemployment spell, and second, the results - particularly the reduced form and IV quasi-Frisch responses (Appendix Tables B2 and C1) - do represent a set of inputs to the evaluation of Unemployment Insurance of the type reported by Gruber (1997) and Browning and Crossley (1998). We take up the methodological point first.

Our results suggest that the aspect of expenditure behavior on which the researcher should focus will depend crucially on the research question motivating the analysis. If the goal is Unemployment Insurance evaluation, our results suggest that, over the short to medium term, the sensitivity of food expenditures to benefit levels (as measured by Gruber (1997)) will provide a superior guide to benefit adequacy and the welfare costs of unemployment. If the allocation mechanism suggested in this paper is correct, then the impact of benefit levels on food (at home) understates the welfare costs of an income loss since this is the good that is least sensitive to income cuts. However, the postponement of durables replacement will lead to total expenditure movements which are associated with only second order welfare costs, so that total expenditure movements may substantially overstate the welfare costs of income loss. Of course, these arguments make the timing of expenditure information in the unemployment spell crucial. The non-replacement of small durables may have second order welfare costs in the short to medium run, but those costs are likely to rise as old durables depreciate. If the research goal is instead to test for liquidity constraints, food expenditures will provide very little power because such nondurable goods will be preferentially smoothed. An examination of changes in total expenditures (as in Browning and Crossley, (1998)) or demand patterns, including the demand for small durables (as presented in this paper) offers a more powerful test.

Turning now to what our results actually say about optimal UI, we believe that they have two essential aspects. That first is that the mean responses are small. They are certainly much smaller than the one-to-one responses that seem to be assumed in much of the popular policy debate. In this regard our results are in line with the findings of Gruber (1997).[20] Second, the responses, while small, are nonetheless heterogeneous. The elasticity of total expenditures with respect to benefits is essentially zero for those who are likely to be unconstrained but around 0.2 for those who are likely constrained. For clothing the elasticity for those likely to be constrained is more than 0.8 while for the likely unconstrained it is less than 0.4. This heterogeneity is very important. It undermines calculations of optimal benefits via representative agent models such as presented by Bailey (1978) (to which Gruber (1997) applies his estimates) or dynamic general equilibrium analyses that assume a representative agent; see Browning and Crossley (1998) for further discussion.

We have emphasized the internal capital markets models as a smoothing mechanism available to those without access to external capital markets. Nevertheless, there may be other circumstances under which households would optimally synchronise durables purchases to income flows. This is fundamentally a portfolio decision and we speculate that households might choose to do their short to medium run smoothing with the timing of replacement of durables (real assets) in some circumstances where there is a premium to holding illiquid financial assets. Such motivations are not captured by our simulations (which assume a single liquid financial asset with a positive rate of return) or by our empirical work (which focuses on a group - the unemployed - which is dissaving rather than

[20] Direct comparisons with the results of Gruber (1997) are difficult since Gruber uses the sum of food at home and food in restaurants and regresses the change in total food expenditures on the potential replacement rate (potential benefits divided by lost wages). For a sample that includes both permanent and temporary layoffs, Gruber considers the effect of a ten percentage point cut in the replacement rate. Since replacement rates in the U.S. are low this represents a large cut in the benefit (specifically, a 25% cut in benefit if the original replacement rate is 40%). Gruber's estimates suggest that such a cut would lead to a (further)1.75% fall in total food expenditures. This estimate is a mixture of the response of those with assets and those without, so the comparison figure to our 'no assets' group is likely to be a good deal larger but still modest. This is in line with our results.

saving). Whether the optimal portfolio involves smoothing via real (durable) assets, and hence the timing of purchases to income, remains an open question, and is an obvious direction for future research.

7. References.

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Appendices.

Appendix A: Description of Variables and Summary Statistics.

TABLE A1:	**Expenditure Variables.**		
		Mean, Employed n = 1198	Mean, Unemployed n = 1959
food at home	$/month	374	362
	budget share	0.22	0.24
clothing	$/month	150	102
	budget share	0.08	0.06
	dummy for positive expenditure	0.79	0.64
total expenditure	$/month	1872	1675

TABLE A2:	**Description of Controls**		
Category	Variable	Mean, Employed n = 1198	Mean, Un-employed n = 1959
Demographics	dummy for highschool graduate	0.43	0.40
	dummy for tertiary education	0.32	0.29
	age (years/40+0.5)	1.40	1.44
	age squared also included in regressions		
	log of household size	0.92	0.90
	dummy for children	0.47	0.48
Household Type	dummy for single female	0.07	0.08
	dummy for male with spouse employed at separation	0.17	0.18
	dummy for female with spouse employed at separation	0.04	0.08
	dummy for male with spouse not employed at separation	0.30	0.22
	dummy for female with spouse not employed at separation	0.30	0.30
	(omitted category: single male)		
Region	Region dummies (omitted category: Ontario)		
	Atlantic	0.10	0.13
	Quebec	0.30	0.27
	Prairies	0.14	0.16
	B.C.	0.10	0.11
	Local unemployment rate at job separation	0.10	0.11
Seasonality	month dummies (to control for seasonality)		
	September	0.11	0.19
	October	0.13	0.19
	November	0.33	0.30
	December	0.09	0.07
	January	0.20	0.13
	February	0.09	0.04
	(weeks elapsed between separation and interview)/52	0.66	0.58
Household Resources	dummy for home ownership	0.64	0.61
	dummy for some employment between separation and interview	1.00	0.36
	(dropped from regressions on employed sample)		
Characteristics of ROE job	fraction of household income provided by ROE job, prior to separation		
	dummy for separation expected	0.71	0.60
	dummy for seasonal job	0.14	0.16
	dummy for job tenure > 1yr	0.63	0.52
	dummy for managerial occupation	0.27	0.23
	dummy for bluecollar occupation	0.44	0.39
	(insurable weeks)/52	0.58	0.54
Regular UI use	dummy for UI use in previous 2 years	0.60	0.62

Notes:
1. All monetary amounts (expenditures, incomes and benefits) are measured in 1000s of 1993 Canadian dollars per month.

Table A2 (Cont'd): **Description of Instruments for Total Expenditure**			
	Variable	Mean, Employed n = 1198	Mean, Un-employed n = 1959
Instruments for Total Expenditure	respondent's income lagged one year	1.25	1.05
	respondent's income lagged two years	1.17	0.99
	household income lagged one year	1.68	1.49
	household income lagged two years	1.56	1.42
	respondents earnings in lost job	0.43	0.46
	higher order polynomials in these variables also included		
Notes: 2. All monetary amounts (expenditures, incomes and benefits) are measured in 1000s of 1993 Canadian dollars per month.			

TABLE A3: Variation in Potential Benefit Variables.

1. Potential Benefit Formula.

$$I1_t(iw_{it},lur_{it})*I2_t(iw_{it},lur_{it})*RR_t*\max[ie_{it}, mie_t]$$

Individual Characteristics:

iw_{it}: insured weeks in the year prior to separation.
ie_{it}: insured earnings
lur_{it}: local unemployment rate

Potential benefits is a highly nonlinear function of these individual characteristics. In our expenditure regressions we condition on iw_{it}, lur_{it} and a polynomial in ie_{it} in order to capture correlations of these variables with `permanent income'. The residual variation in the instrument (potential benefits) comes from the nonlinearity of the potential benefit formula, and more importantly, the changes to that formula outlined below.

Policy Functions and Parameters:

$I1_t$: indicator function =1 if eligible, 0 other wise.
$I2_t$: indicator function = 1 if weeks of entitlement exceed time between separation and interview.
RR_t: statutory replacement rate.
MIE_t: maximum insurable earnings.

2. Changes in Potential Benefit Formula

RR_t: Statutory rate cut from 60% to 57% between cohort 1 and 2 and to 55% between cohorts 3 and 4. In cohorts 3 and 4 individuals with dependents and low incomes were entitled to a replacement rate of 60%.
MIE_t: The maximum insurable earnings rose by 10% in real terms over the period covered by the data. This completely offset the fall in the statutory rate for those with earnings above the insurable maximum.
$I1_t$:$I2_t$: The mappings from insured weeks and local unemployment rates in qualification and entitlement were reformed.

TABLE A4: Benefit Variables, Asset Variables, and Instruments.		
	Mean, Employed n = 1198	Mean, Unemployed n = 1959
dummy for positive liquid assets at interview	0.51	0.35
dummy for positive Investment income in year prior to job separation.	0.34	0.32
Actual benefits received ($/month)		770
if positive assets		779
if zero assets		765
Potential Benefits ($/month)	1126	1104
if positive investment income	1179	1175
if zero investment income	1099	1071

Appendix B: Reduced Form Results.

TABLE B1: Unemployed Sample, Auxiliary Equations

	Actual Benefits x Positive Assets at Interview	Actual Benefits x No Assets at Interview	Positive Assets at Interview
Potential Benefits X Positive Investment Income, Previous Year	0.326 (.04)	0.272 (.041)	0.012 (.038)
Potential Benefits X No Investment Income, Previous Year	0.157 (.031)	0.427 (.032)	0.042 (.029)
Positive Investment Income, Previous Year	-0.043 (.052)	0.016 (.053)	0.252 (.049)
Constant	-0.129 (.391)	-0.208 (.404)	-0.170 (.371)
Importance of Lost Income	0.097 (.053)	0.542 (.055)	-0.171 (.05)
Completed High School	0.021 (.026)	-0.011 (.027)	0.045 (.024)
College	0.080 (.03)	-0.082 (.031)	0.105 (.028)
Age	-0.012 (.526)	0.404 (.543)	0.259 (.498)
Age Squared	0.030 (.177)	-0.156 (.183)	-0.063 (.168)
Ln(Household Size)	-0.023 (.054)	0.050 (.056)	-0.087 (.051)
Children Present	0.012 (.04)	-0.022 (.041)	-0.010 (.038)
single female	-0.052 (.048)	0.038 (.05)	-0.035 (.046)
male, spouse employed at separation	-0.059 (.061)	0.127 (.063)	0.015 (.058)
female, spouse employed at separation	0.001 (.067)	0.158 (.069)	-0.024 (.063)
male, spouse not employed at separation	0.062 (.059)	0.084 (.061)	0.071 (.056)
female, spouse not employed at separation	0.090 (.064)	0.122 (.066)	0.102 (.061)
Atlantic	0.032 (.038)	-0.006 (.039)	-0.015 (.036)
Quebec	0.054 (.03)	-0.020 (.031)	0.039 (.028)
Prairies	-0.008 (.032)	-0.032 (.034)	0.036 (.031)
British Columbia	0.018 (.037)	-0.043 (.038)	0.036 (.035)
Own Home	0.096 (.025)	-0.072 (.026)	0.111 (.024)
Some Employment	-0.013 (.023)	-0.004 (.024)	-0.004 (.022)
Expected Job Loss	0.035 (.023)	-0.032 (.024)	0.036 (.022)
Seasonal Job	-0.008 (.032)	-0.034 (.033)	0.034 (.03)
Long Tenure	0.016 (.026)	-0.032 (.027)	0.020 (.025)
Manager	0.018 (.029)	-0.024 (.03)	0.046 (.028)
Blue Collar Job	-0.002 (.03)	0.035 (.031)	-0.006 (.028)
Previous UI use	-0.047 (.025)	0.067 (.026)	-0.056 (.024)
Weeks Worked, Previous Year	-0.067 (.042)	-0.049 (.044)	-0.025 (.04)
January	-0.092 (.072)	0.047 (.075)	-0.067 (.069)
February	-0.021 (.066)	0.154 (.069)	-0.003 (.063)
September	0.048 (.044)	-0.036 (.045)	0.050 (.042)
October	0.066 (.037)	-0.106 (.038)	0.050 (.035)
November	0.031 (.024)	-0.002 (.025)	0.023 (.023)
December	0.014 (.023)	-0.062 (.024)	0.011 (.022)
Weeks, Separation to Interview	-0.041 (.04)	-0.005 (.042)	-0.039 (.038)
Local Unemployment Rate	-0.006 (.027)	-0.008 (.028)	0.011 (.026)
Household Income, 1 year previous	0.007 (.02)	-0.033 (.021)	0.016 (.019)
Household Income, 2 years previous	-0.060 (.051)	-0.163 (.053)	0.067 (.049)
Respondent Income, 1 year previous	-0.206 (.068)	-0.400 (.07)	0.115 (.064)
Respondent Income, 2 years previous	-0.026 (.045)	-0.048 (.047)	-0.015 (.043)
Hhld Inc. previous yr, squared	0.020 (.045)	-0.071 (.047)	0.027 (.043)
Hhld Inc. 2 yrs previous, squared	0.021 (.043)	-0.036 (.045)	0.006 (.041)
Ln(earnings in lost job)	0.028 (.056)	-0.104 (.058)	0.102 (.053)
ln(earnings in lost job) squared	-0.085 (.128)	-0.339 (.132)	0.121 (.121)
ln(earnings in lost job) cubed	-0.088 (.317)	-0.113 (.328)	0.024 (.301)

Notes: Standard Errors in Round Parentheses.

TABLE B2: Unemployed Sample,Quasi- Frisch Demands, Reduced Form Estimates

	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.885 (0.378)	-2.075 (1.243)	-0.601 (0.364)
Potential Benefits X +ve Investment Income	0.022 (0.034)	0.293 (0.113)	0.042 (0.039)
Potential Benefits X no Investment Income	0.068 (0.025)	0.364 (0.085)	0.091 (0.027)
Importance of Lost Income	-0.220 (0.048)	-1.006 (0.164)	-0.507 (0.049)
Completed High School	-0.043 (0.023)	-0.047 (0.076)	0.040 (0.021)
College	-0.062 (0.027)	0.143 (0.092)	0.073 (0.024)
Age	0.131 (0.509)	-1.977 (1.681)	1.115 (0.493)
Age Squared	0.014 (0.171)	0.677 (0.567)	-0.399 (0.168)
Ln(Household Size)	0.512 (0.046)	0.903 (0.150)	0.199 (0.046)
Children Present	0.042 (0.033)	0.074 (0.115)	0.063 (0.033)
single female	-0.119 (0.055)	0.099 (0.191)	0.073 (0.041)
male, spouse employed at separation	-0.105 (0.053)	-0.379 (0.185)	0.014 (0.052)
female, spouse employed at separation	-0.059 (0.060)	-0.310 (0.207)	0.153 (0.054)
male, spouse not employed at separation	-0.090 (0.054)	-0.323 (0.181)	0.057 (0.048)
female, spouse not employed at separation	-0.035 (0.059)	-0.061 (0.204)	0.166 (0.054)
Atlantic	0.058 (0.035)	0.305 (0.108)	-0.050 (0.031)
Quebec	0.097 (0.027)	0.546 (0.089)	-0.070 (0.025)
Prairies	0.008 (0.029)	0.240 (0.101)	-0.066 (0.027)
British Columbia	0.050 (0.031)	-0.122 (0.112)	0.022 (0.029)
Investment Income, Previous Year	0.081 (0.045)	0.097 (0.153)	-0.053 (0.048)
Own Home	0.046 (0.023)	0.117 (0.078)	0.089 (0.021)
Some Employment	0.021 (0.021)	0.266 (0.071)	0.049 (0.019)
Expected Job Loss	-0.022 (0.021)	0.046 (0.070)	-0.046 (0.019)
Seasonal Job	-0.045 (0.027)	0.071 (0.096)	-0.002 (0.027)
Long Tenure	-0.010 (0.023)	0.056 (0.074)	0.002 (0.021)
Manager	0.010 (0.026)	-0.081 (0.093)	0.029 (0.024)
Blue Collar Job	0.033 (0.027)	0.137 (0.092)	-0.013 (0.024)
Previous UI use	0.015 (0.023)	-0.047 (0.078)	0.030 (0.021)
Weeks Worked, Previous Year	-0.056 (0.040)	-0.340 (0.121)	-0.015 (0.035)
January	-0.045 (0.043)	0.463 (0.144)	-0.104 (0.037)
February	0.005 (0.043)	0.403 (0.146)	-0.066 (0.037)
September	-0.006 (0.040)	0.300 (0.142)	-0.036 (0.035)
October	-0.003 (0.050)	0.367 (0.171)	-0.064 (0.047)
November	0.005 (0.048)	0.461 (0.161)	-0.072 (0.045)
December	-0.024 (0.061)	-0.370 (0.230)	-0.100 (0.057)
Weeks, Separation to Interview	0.173 (0.107)	-0.267 (0.383)	0.021 (0.105)
Local Unemployment Rate	0.256 (0.270)	0.014 (0.869)	-0.609 (0.260)
Household Income, 1 year previous	0.024 (0.061)	0.084 (0.210)	-0.006 (0.063)
Household Income, 2 years previous	-0.032 (0.057)	-0.102 (0.191)	0.024 (0.054)
Respondent Income, 1 year previous	-0.041 (0.036)	0.045 (0.123)	0.031 (0.037)
Respondent Income, 2 years previous	0.016 (0.030)	-0.130 (0.102)	0.025 (0.028)
Hhld Inc. previous yr, squared	0.015 (0.020)	-0.051 (0.070)	0.025 (0.021)
Hhld Inc. 2 yrs previous, squared	0.010 (0.020)	0.048 (0.067)	-0.001 (0.020)
Ln(earnings in lost job)	0.107 (0.036)	0.300 (0.121)	0.148 (0.035)
ln(earnings in lost job) squared	0.024 (0.021)	0.067 (0.081)	0.054 (0.024)
ln(earnings in lost job) cubed	0.008 (0.016)	0.024 (0.060)	0.023 (0.017)

Notes: Standard Errors in Round Parentheses.

TABLE B3: Specification Tests and Robustness Checks: Unemployed Sample, Frisch Demands, Reduced Form Estimates

	Total Expenditure	Food at Home	Clothing	Linearized Clothing Equation ihs(xclth*1000)
Potential benefits x lagged (positive assets)	0.042 [1.26]	0.027 [0.74]	0.29 [2.59]	0.35 [1.85]
Potential benefits x lagged (no assets)	0.091 [3.58]	0.073 [2.63]	0.36 [4.24]	0.42 [2.92]
R^2	0.48	0.48		0.18
RESET (F-test for omitted variables/functional form)	$F_{3,1910}$ = 0.60 P = 0.62	$F_{3,1910}$ = 0.26 P = 0.85		$F_{3,1910}$ = 1.20 P=0.31
max[abs(dfbeta)] Potential benefits x lagged (positive assets)	0.41	0.24		0.19
max[abs(dfbeta)] Potential benefits x lagged (no assets)	0.26	0.19		0.18

Notes:
t-values in parentheses
1959 Observations
note that clothing is scaled differently

TABLE B4: Employed Sample, Quasi-Frisch Demands, Reduced Form Estimates

	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.985 (0.501)	-3.067 (1.577)	-1.030 (0.449)
Potential Benefits X +ve Investment Income	0.007 (0.039)	-0.056 (0.113)	0.030 (0.044)
Potential Benefits X no Investment Income	-0.021 (0.034)	0.052 (0.093)	0.027 (0.030)
Importance of Lost Income	-0.250 (0.092)	-0.958 (0.244)	-0.681 (0.093)
Completed High School	-0.031 (0.031)	0.008 (0.083)	0.036 (0.030)
College	-0.073 (0.036)	-0.186 (0.106)	0.066 (0.036)
Age	0.621 (0.682)	0.822 (2.236)	2.175 (0.613)
Age Squared	-0.120 (0.232)	-0.356 (0.774)	-0.763 (0.212)
Ln(Household Size)	0.557 (0.053)	0.325 (0.171)	0.194 (0.062)
Children Present	-0.041 (0.039)	0.003 (0.126)	-0.029 (0.045)
single female	-0.276 (0.084)	0.497 (0.200)	-0.075 (0.057)
male, spouse employed at separation	-0.113 (0.071)	-0.200 (0.206)	-0.054 (0.064)
female, spouse employed at separation	0.004 (0.078)	0.091 (0.243)	-0.003 (0.083)
male, spouse not employed at separation	-0.095 (0.068)	-0.101 (0.185)	-0.004 (0.062)
female, spouse not employed at separation	-0.053 (0.071)	0.117 (0.218)	0.107 (0.068)
Atlantic	0.063 (0.045)	0.270 (0.134)	-0.038 (0.045)
Quebec	0.137 (0.033)	0.342 (0.099)	-0.031 (0.031)
Prairies	0.053 (0.039)	-0.065 (0.116)	0.010 (0.035)
British Columbia	0.107 (0.050)	-0.225 (0.112)	0.077 (0.039)
Investment Income, Previous Year	-0.034 (0.056)	0.268 (0.153)	-0.097 (0.058)
Own Home	0.067 (0.034)	-0.010 (0.094)	-0.036 (0.027)
Expected Job Loss	-0.003 (0.029)	-0.017 (0.073)	0.039 (0.025)
Seasonal Job	-0.011 (0.035)	-0.144 (0.100)	-0.127 (0.036)
Long Tenure	-0.014 (0.030)	-0.199 (0.086)	-0.029 (0.027)
Manager	-0.033 (0.033)	0.187 (0.101)	0.054 (0.033)
Blue Collar Job	0.045 (0.036)	0.260 (0.094)	0.025 (0.033)
Previous UI use	-0.044 (0.028)	0.000 (0.081)	-0.000 (0.025)
Weeks Worked, Previous Year	0.011 (0.048)	-0.210 (0.121)	-0.062 (0.044)
January	0.071 (0.059)	0.191 (0.134)	0.105 (0.052)
February	0.140 (0.064)	0.118 (0.142)	0.118 (0.058)
September	0.093 (0.055)	0.119 (0.129)	0.134 (0.051)
October	0.111 (0.062)	0.147 (0.160)	0.094 (0.058)
November	0.099 (0.058)	0.234 (0.147)	0.089 (0.055)
December	0.077 (0.070)	-0.208 (0.178)	0.099 (0.063)
Weeks, Separation to Interview	-0.218 (0.151)	-0.070 (0.414)	-0.224 (0.140)
Local Unemployment Rate	0.016 (0.339)	1.426 (1.009)	-0.567 (0.352)
Household Income, 1 year previous	-0.111 (0.096)	-0.212 (0.287)	-0.033 (0.088)
Household Income, 2 years previous	-0.050 (0.088)	0.034 (0.247)	-0.055 (0.078)
Respondent Income, 1 year previous	0.037 (0.047)	0.272 (0.147)	0.010 (0.049)
Respondent Income, 2 years previous	-0.022 (0.044)	-0.043 (0.130)	0.040 (0.041)
Hhld Inc. previous yr, squared	0.032 (0.032)	0.131 (0.085)	0.044 (0.028)
Hhld Inc. 2 yrs previous, squared	0.038 (0.029)	-0.021 (0.077)	0.021 (0.026)
Ln(earnings in lost job)	0.142 (0.048)	0.248 (0.122)	0.218 (0.041)
ln(earnings in lost job) squared	-0.010 (0.024)	0.087 (0.064)	0.079 (0.027)
ln(earnings in lost job) cubed	-0.003 (0.008)	0.018 (0.019)	0.008 (0.008)

Notes: Standard Errors in Round Parentheses.

Appendix C: Complete IV results and reduced form Marshallian demands.

In this appendix we present the complete set of estimated parameters from the IV estimates presented in Tables 5.1 and 5.2. We also present reduced form estimates of the Marshallian demands for both the unemployed and employed samples. The results are discussed in the text.

TABLE C1: Unemployed Sample, Frisch Demands, IV Estimates			
	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.799 (0.393)	-1.493 (1.243)	-0.560 (0.379)
UI Benefits Received X assets	-0.080 (0.116)	0.357 (0.311)	-0.071 (0.161)
UI Benefits Received X no Assets	0.195 (0.088)	0.830 (0.360)	0.240 (0.089)
Importance of Lost Income	-0.319 (0.066)	-1.453 (0.228)	-0.630 (0.070)
Completed High School	-0.041 (0.023)	-0.065 (0.081)	0.044 (0.023)
College	-0.040 (0.031)	0.132 (0.098)	0.099 (0.031)
Age	-0.057 (0.543)	-2.975 (1.726)	1.017 (0.510)
Age Squared	0.088 (0.185)	1.016 (0.585)	-0.359 (0.174)
Ln(Household Size)	0.499 (0.048)	0.826 (0.159)	0.185 (0.049)
Children Present	0.051 (0.035)	0.146 (0.117)	0.069 (0.035)
single female	-0.129 (0.057)	0.037 (0.205)	0.061 (0.045)
male, spouse employed at separation	-0.127 (0.056)	-0.461 (0.191)	-0.021 (0.056)
female, spouse employed at separation	-0.085 (0.062)	-0.418 (0.215)	0.115 (0.058)
male, spouse not employed at separation	-0.099 (0.055)	-0.373 (0.190)	0.041 (0.051)
female, spouse not employed at separation	-0.051 (0.061)	-0.201 (0.211)	0.143 (0.058)
Atlantic	0.067 (0.037)	0.257 (0.116)	-0.046 (0.032)
Quebec	0.107 (0.029)	0.505 (0.098)	-0.061 (0.028)
Prairies	0.012 (0.029)	0.225 (0.103)	-0.059 (0.029)
British Columbia	0.064 (0.034)	-0.082 (0.120)	0.034 (0.032)
Positive Liquid Assets	0.071 (0.036)	0.094 (0.106)	-0.060 (0.042)
Own Home	0.065 (0.029)	0.162 (0.122)	0.113 (0.030)
Some Employment	0.024 (0.022)	0.260 (0.075)	0.049 (0.021)
Expected Job Loss	-0.011 (0.023)	0.038 (0.077)	-0.036 (0.022)
Seasonal Job	-0.040 (0.027)	0.190 (0.113)	0.006 (0.029)
Long Tenure	-0.003 (0.024)	0.084 (0.085)	0.010 (0.022)
Manager	0.016 (0.027)	-0.068 (0.095)	0.036 (0.025)
Blue Collar Job	0.025 (0.029)	0.078 (0.114)	-0.022 (0.026)
Previous UI use	-0.001 (0.025)	-0.108 (0.088)	0.011 (0.026)
Weeks Worked, Previous Year	-0.047 (0.039)	-0.277 (0.129)	-0.008 (0.037)
January	-0.039 (0.043)	0.526 (0.156)	-0.094 (0.039)
February	0.021 (0.045)	0.492 (0.160)	-0.047 (0.040)
September	0.002 (0.041)	0.321 (0.151)	-0.026 (0.038)
October	0.027 (0.056)	0.510 (0.199)	-0.037 (0.052)
November	0.028 (0.050)	0.615 (0.176)	-0.038 (0.048)
December	0.031 (0.066)	0.008 (0.248)	-0.018 (0.065)
Weeks, Separation to Interview	0.232 (0.116)	0.183 (0.463)	0.097 (0.113)
Local Unemployment Rate	0.321 (0.271)	0.431 (0.903)	-0.588 (0.270)
Household Income, 1 year previous	0.014 (0.065)	0.087 (0.223)	-0.024 (0.073)
Household Income, 2 years previous	-0.064 (0.061)	-0.193 (0.198)	-0.015 (0.059)
Respondent Income, 1 year previous	-0.031 (0.039)	0.037 (0.128)	0.043 (0.041)
Respondent Income, 2 years previous	0.042 (0.035)	-0.067 (0.119)	0.055 (0.035)
Hhld Inc. previous yr, squared	0.016 (0.022)	-0.052 (0.076)	0.027 (0.024)
Hhld Inc. 2 yrs previous, squared	0.024 (0.022)	0.079 (0.069)	0.015 (0.022)
Ln(earnings in lost job)	0.107 (0.036)	0.317 (0.121)	0.146 (0.036)
ln(earnings in lost job) squared	0.026 (0.022)	0.109 (0.094)	0.056 (0.023)
ln(earnings in lost job) cubed	0.013 (0.016)	0.052 (0.063)	0.031 (0.018)

Notes: Standard Errors in Round Parentheses.

TABLE C2: Unemployed Sample, Marshallian Demands, IV Estimates

	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.644 (0.350)	-0.781 (1.195)	-0.545 (0.380)
UI Benefits Received X assets	-0.095 (0.078)	0.087 (0.259)	-0.071 (0.162)
UI Benefits Received X no Assets	0.082 (0.057)	0.587 (0.266)	0.246 (0.089)
Importance of Lost Income	0.037 (0.059)	-0.513 (0.250)	-0.636 (0.070)
Completed High School	-0.058 (0.021)	-0.064 (0.076)	0.045 (0.023)
College	-0.092 (0.027)	0.067 (0.098)	0.103 (0.031)
Age	-0.491 (0.494)	-4.882 (1.699)	1.013 (0.510)
Age Squared	0.245 (0.170)	1.673 (0.585)	-0.358 (0.175)
Ln(Household Size)	0.382 (0.046)	0.582 (0.160)	0.184 (0.049)
Children Present	0.012 (0.032)	0.107 (0.115)	0.065 (0.035)
single female	-0.181 (0.050)	-0.200 (0.214)	0.064 (0.045)
male, spouse employed at separation	-0.117 (0.050)	-0.524 (0.196)	-0.019 (0.057)
female, spouse employed at separation	-0.145 (0.057)	-0.612 (0.234)	0.118 (0.058)
male, spouse not employed at separation	-0.113 (0.050)	-0.551 (0.195)	0.042 (0.052)
female, spouse not employed at separation	-0.101 (0.055)	-0.418 (0.227)	0.147 (0.058)
Atlantic	0.089 (0.033)	0.377 (0.110)	-0.040 (0.032)
Quebec	0.135 (0.027)	0.542 (0.095)	-0.056 (0.028)
Prairies	0.044 (0.028)	0.228 (0.098)	-0.059 (0.029)
British Columbia	0.034 (0.031)	-0.100 (0.114)	0.034 (0.032)
Positive Liquid Assets	0.117 (0.030)	0.267 (0.121)	-0.060 (0.042)
Own Home	0.014 (0.022)	0.020 (0.092)	0.112 (0.030)
Some Employment	-0.001 (0.020)	0.185 (0.081)	0.050 (0.021)
Expected Job Loss	0.011 (0.021)	0.089 (0.081)	-0.035 (0.022)
Seasonal Job	-0.039 (0.025)	0.198 (0.095)	0.002 (0.029)
Long Tenure	-0.003 (0.022)	0.062 (0.077)	0.011 (0.022)
Manager	0.001 (0.025)	-0.054 (0.092)	0.032 (0.025)
Blue Collar Job	0.033 (0.025)	0.195 (0.099)	-0.025 (0.026)
Previous UI use	-0.010 (0.023)	-0.097 (0.082)	0.009 (0.026)
Weeks Worked, Previous Year	-0.063 (0.034)	-0.268 (0.113)	-0.010 (0.037)
January	0.010 (0.041)	0.647 (0.164)	-0.095 (0.039)
February	0.041 (0.042)	0.570 (0.156)	-0.045 (0.040)
September	0.022 (0.039)	0.406 (0.145)	-0.027 (0.038)
October	0.049 (0.050)	0.624 (0.188)	-0.039 (0.052)
November	0.041 (0.047)	0.684 (0.177)	-0.032 (0.048)
December	0.048 (0.064)	0.024 (0.247)	-0.023 (0.065)
Weeks, Separation to Interview	0.185 (0.105)	0.062 (0.400)	0.092 (0.113)
Local Unemployment Rate	0.674 (0.255)	1.618 (0.898)	-0.621 (0.271)
Total Expenditure	0.577 (0.071)	1.311 (0.299)	
Household Income, 1 year previous			-0.034 (0.073)
Household Income, 2 years previous			-0.018 (0.060)
Respondent Income, 1 year previous			0.043 (0.041)
Respondent Income, 2 years previous			0.056 (0.035)
Hhld Inc. previous yr, squared			0.031 (0.024)
Hhld Inc. 2 yrs previous, squared			0.016 (0.022)
Ln(earnings in lost job)			0.152 (0.036)
ln(earnings in lost job) squared			0.053 (0.023)
ln(earnings in lost job) cubed			0.032 (0.018)

Notes: Standard Errors in Round Parentheses

Table C3: Unemployed Sample, Marshallian Demands, Reduced Form Estimates

	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.714 (0.341)	-1.724 (1.164)	-0.580 (0.364)
Potential Benefits X lagged assets	-0.009 (0.030)	0.205 (0.111)	0.045 (0.039)
Potential Benefits X lagged no Assets	0.021 (0.023)	0.267 (0.081)	0.095 (0.027)
Importance of Lost Income	0.047 (0.048)	-0.394 (0.183)	-0.510 (0.049)
Completed High School	-0.058 (0.021)	-0.081 (0.071)	0.039 (0.021)
College	-0.100 (0.026)	0.056 (0.092)	0.075 (0.024)
Age	-0.319 (0.470)	-3.235 (1.606)	1.109 (0.493)
Age Squared	0.179 (0.159)	1.094 (0.541)	-0.398 (0.168)
Ln(Household Size)	0.405 (0.043)	0.732 (0.145)	0.199 (0.046)
Children Present	0.010 (0.031)	0.055 (0.110)	0.061 (0.033)
single female	-0.168 (0.050)	-0.100 (0.180)	0.076 (0.041)
male, spouse employed at separation	-0.111 (0.049)	-0.451 (0.177)	0.012 (0.052)
female, spouse employed at separation	-0.133 (0.055)	-0.471 (0.203)	0.149 (0.054)
male, spouse not employed at separation	-0.114 (0.049)	-0.465 (0.177)	0.056 (0.048)
female, spouse not employed at separation	-0.093 (0.054)	-0.249 (0.200)	0.164 (0.054)
Atlantic	0.080 (0.032)	0.368 (0.102)	-0.044 (0.031)
Quebec	0.125 (0.025)	0.547 (0.086)	-0.065 (0.025)
Prairies	0.040 (0.028)	0.225 (0.094)	-0.067 (0.027)
British Columbia	0.032 (0.030)	-0.116 (0.106)	0.022 (0.029)
Investment Income, Previous Year	0.117 (0.039)	0.194 (0.148)	-0.052 (0.048)
Own Home	0.004 (0.021)	0.005 (0.072)	0.090 (0.021)
Some Employment	0.002 (0.020)	0.221 (0.069)	0.051 (0.019)
Expected Job Loss	0.003 (0.020)	0.075 (0.069)	-0.045 (0.019)
Seasonal Job	-0.040 (0.025)	0.114 (0.087)	-0.008 (0.027)
Long Tenure	-0.011 (0.021)	0.032 (0.069)	0.002 (0.021)
Manager	-0.002 (0.024)	-0.047 (0.088)	0.027 (0.024)
Blue Collar Job	0.036 (0.025)	0.213 (0.085)	-0.017 (0.024)
Previous UI use	0.002 (0.020)	-0.035 (0.071)	0.028 (0.021)
Weeks Worked, Previous Year	-0.069 (0.035)	-0.312 (0.110)	-0.018 (0.035)
January	0.001 (0.041)	0.562 (0.141)	-0.102 (0.037)
February	0.025 (0.041)	0.478 (0.142)	-0.063 (0.037)
September	0.016 (0.038)	0.372 (0.136)	-0.034 (0.035)
October	0.028 (0.048)	0.483 (0.168)	-0.067 (0.048)
November	0.025 (0.045)	0.536 (0.156)	-0.067 (0.045)
December	0.028 (0.059)	-0.268 (0.218)	-0.101 (0.057)
Weeks, Separation to Interview	0.169 (0.100)	-0.179 (0.364)	0.011 (0.105)
Local Unemployment Rate	0.612 (0.255)	1.079 (0.806)	-0.643 (0.260)
Total Expenditure	0.516 (0.064)	0.909 (0.221)	
Household Income, 1 year previous			-0.013 (0.063)
Household Income, 2 years previous			0.027 (0.054)
Respondent Income, 1 year previous			0.027 (0.037)
Respondent Income, 2 years previous			0.019 (0.028)
Hhld Inc. previous yr, squared			0.026 (0.021)
Hhld Inc. 2 yrs previous, squared			-0.000 (0.020)
Ln(earnings in lost job)			0.152 (0.036)
ln(earnings in lost job) squared			0.054 (0.023)
ln(earnings in lost job) cubed			0.025 (0.017)

Notes: Standard Errors in Round Parentheses.

TABLE C.4: Employed Sample, Marshallian Demands, Reduced Form Estimates

	Food At Home	Clothing Expenditure	Total Expenditure
Constant	-1.880 (0.476)	-1.469 (1.502)	-0.982 (0.449)
Potential Benefits X lagged assets	-0.027 (0.040)	-0.125 (0.118)	0.041 (0.044)
Potential Benefits X lagged no Assets	-0.043 (0.032)	0.042 (0.088)	0.036 (0.031)
Importance of Lost Income	0.092 (0.092)	-0.203 (0.248)	-0.652 (0.092)
Completed High School	-0.037 (0.029)	-0.022 (0.082)	0.031 (0.030)
College	-0.096 (0.034)	-0.266 (0.106)	0.066 (0.036)
Age	-0.139 (0.676)	-2.040 (2.097)	2.135 (0.615)
Age Squared	0.163 (0.230)	0.643 (0.723)	-0.751 (0.213)
Ln(Household Size)	0.466 (0.053)	0.034 (0.162)	0.193 (0.062)
Children Present	-0.025 (0.037)	0.146 (0.115)	-0.030 (0.045)
single female	-0.240 (0.074)	0.576 (0.198)	-0.083 (0.057)
male, spouse employed at separation	-0.064 (0.068)	-0.074 (0.195)	-0.052 (0.064)
female, spouse employed at separation	0.019 (0.070)	-0.057 (0.223)	0.001 (0.083)
male, spouse not employed at separation	-0.075 (0.064)	-0.040 (0.180)	0.004 (0.062)
female, spouse not employed at separation	-0.082 (0.067)	-0.162 (0.193)	0.113 (0.068)
Atlantic	0.097 (0.044)	0.274 (0.128)	-0.040 (0.045)
Quebec	0.167 (0.031)	0.325 (0.088)	-0.031 (0.031)
Prairies	0.062 (0.037)	-0.124 (0.108)	0.006 (0.035)
British Columbia	0.068 (0.045)	-0.259 (0.116)	0.078 (0.039)
Investment Income, Previous Year	0.021 (0.056)	0.532 (0.167)	-0.098 (0.059)
Own Home	0.067 (0.031)	-0.032 (0.082)	-0.037 (0.027)
Expected Job Loss	-0.011 (0.026)	-0.105 (0.075)	0.042 (0.025)
Seasonal Job	0.048 (0.035)	0.059 (0.103)	-0.132 (0.036)
Long Tenure	0.002 (0.027)	-0.088 (0.078)	-0.032 (0.027)
Manager	-0.039 (0.031)	0.087 (0.099)	0.053 (0.033)
Blue Collar Job	0.044 (0.034)	0.091 (0.102)	0.024 (0.034)
Previous UI use	-0.045 (0.027)	0.031 (0.077)	0.001 (0.025)
Weeks Worked, Previous Year	0.035 (0.044)	-0.033 (0.116)	-0.078 (0.044)
January	0.026 (0.057)	0.013 (0.165)	0.097 (0.051)
February	0.052 (0.059)	-0.104 (0.171)	0.111 (0.058)
September	0.022 (0.055)	-0.181 (0.161)	0.136 (0.050)
October	0.068 (0.062)	-0.109 (0.180)	0.086 (0.058)
November	0.045 (0.056)	-0.091 (0.166)	0.089 (0.055)
December	0.031 (0.068)	-0.399 (0.195)	0.103 (0.063)
Weeks, Separation to Interview	-0.059 (0.145)	0.181 (0.416)	-0.264 (0.140)
Local Unemployment Rate	0.294 (0.347)	2.074 (0.881)	-0.547 (0.351)
Total Expenditure	0.476 (0.082)	1.508 (0.228)	
Household Income, 1 year previous			-0.069 (0.089)
Household Income, 2 years previous			-0.032 (0.078)
Respondent Income, 1 year previous			0.038 (0.050)
Respondent Income, 2 years previous			0.026 (0.041)
Hhld Inc. previous yr, squared			0.054 (0.028)
Hhld Inc. 2 yrs previous, squared			0.017 (0.026)
Ln(earnings in lost job)			0.199 (0.041)
ln(earnings in lost job) squared			0.065 (0.029)
ln(earnings in lost job) cubed			0.004 (0.009)

Notes: Standard Errors in Round Parentheses.