SHOCKS, STOCKS, AND SOCKS: SMOOTHING CONSUMPTION OVER A TEMPORARY INCOME LOSS

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Abstract
We investigate how households in temporarily straitened circumstances due to an unemployment spell cut back on expenditures and how they spend marginal dollars of unemployment insurance (UI) benefit. Our theoretical and empirical analyses emphasize the importance of allowing for the fact that households buy durable as well as non-durable goods. The theoretical analysis shows that in the short run households can cut back significantly on total expenditures without a significant fall in welfare if they concentrate their budget reductions on durables. We then present an empirical analysis based on a Canadian survey of workers who experienced a job separation. Exploiting changes in the unemployment insurance system over our sample period we show that cuts in UI benefits lead to reductions in total expenditure with a stronger impact on clothing than on food expenditures. Our empirical strategy allows that these expenditures may be non-separable from employment status. The effects we find are particularly strong for households with no liquid assets before the spell started. These qualitative findings are in precise agreement with the theoretical predictions. (JEL: D11, D12, D91, J65)

1. Introduction

How do agents in a temporarily difficult financial situation—for example, an unemployment spell—adjust to these circumstances? Research by Gruber (1997) and by us (Browning and Crossley 2001) has demonstrated that households cut back on expenditures in an unemployment spell after a job loss. Moreover, some of these households respond to variation in the transitory income provided by unemployment insurance benefits. This suggests that these households are

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constrained in the sense that they respond to variations in current income even if these do not have any permanent impact. In this paper we take up the question of how households in temporarily straitened circumstances cut back and how they spend marginal dollars of transfer income.

Hamermesh (1982) and Parker (1999) 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, on the other hand, suggests that agents who are temporarily constrained will cut back more on goods that exhibit high intertemporal substitution because the utility cost of fluctuations in these is lower than for goods which are not substitutable over time. In Browning and Crossley (2000), we show formally that the Hamermesh and Parker (H-P) effects are identical (if within period preferences are additive); that is, luxuries have a high intertemporal substitution elasticity.

Although the H-P point is valid, in this paper we examine a mechanism that is quite distinct, and which emphasizes the durability of many of the goods that households purchase. Because existing durables stocks continue to provide a flow of services, substantial reductions in durables *expenditures* can be made with only modest cuts in durables *consumption*. This is the well-known accelerator effect. This suggests that, even when households are unable to smooth through borrowing (as may be the case for the unemployed), the welfare costs of transitory income shocks might be quite modest.

Many of the durables that households purchase have poor resale markets, and so are irreversible. In this case, the accelerator mechanism just described operates up to the point at which the irreversibility constraint binds. Beyond that point, there is a relative deceleration of durables adjustment, and further cuts to current expenditure must be financed entirely with reductions in nondurable consumption. This generates a sharp change in the relationship between the size of income shocks and their welfare cost. In the next section we explore these effects in a neo-classical durables model, with transitory income shocks and liquidity constraints.

The sorts of goods that formally fit our model are small durables such as socks, coats, pillows, plates, and so forth.[1] Table 1 illustrates that in Canadian budget survey data these goods account for about 20% of total expenditures (except for housing and car purchases). Clothing accounts for about half of this 20%. Thus, even agents without formal financial saving or accessible equity in homes or automobiles can use their stocks of clothing and other small durables as buffers against transitory negative shocks in income of up to about 15%–20%.

1. Our analysis can also be extended to goods for which there are imperfect capital markets and which are partially collateralizable, such as white goods and electronic goods.

TABLE 1. Expenditure shares, 1992 Canadian family expenditure survey.

Category	Average Budget Share (%)
Food (at home and in restaurants)	28.1
Transportation net of car purchases	19.2
Medical expenditures net of eye and dental	2.9
Toiletries, cosmetics and personal care services	3.2
Recreation (net of recreational equipment and home entertainment equipment) and reading material	5.3
Tobacco and Alcohol	8.2
Miscellaneous	7.2
Total non-durables	74.1
Household textiles	0.8
Household equipment except appliances	1.9
Eye and dental	1.8
Personal care equipment and supplies net of toiletries and cosmetics	0.8
Recreational equipment (net of recreational vehicles) and home entertainment equipment	4.8
Total small durables	10.2
Clothing	10.0
Household appliances	1.5
Furniture	2.1
Recreational vehicles	2.1
Total large durables	5.7

Notes: 1. Calculations based on a sample of 1,406 couples of working age, without children. The data were drawn from the 1992 Canadian Family Expenditure Survey (FAMEX), a detailed budget survey reporting annual expenditures. 2. Budget shares are calculated by dividing by expenditure on all of the categories of goods and services listed herein. Housing and car purchases are omitted.

The expenditure data behind Table 1 are quite detailed, but this budget survey collects annual expenditures, is cross-sectional, and is designed to be representative of all Canadian households. These data are poorly suited, therefore, for a study of responses to job loss. The empirical analysis in this paper is based instead on an unusual Canadian panel survey that collects expenditure information on a limited set of goods (including clothing) from a sample of recent job losers.

In our empirical work we test for accelerator effects in the expenditure patterns of these recent job losers. There are striking differences between the expenditure patterns of households in which the main earner is still unemployed and those in which the main earner is back in satisfactory employment. Conditional on total expenditure, the two groups have very similar food budget shares, but the unemployed exhibit much lower clothing shares. This is consistent with the idea that the unemployed have responded by cutting back on small durables (including clothing.)

A comparison of the unemployed with the re-employed confounds a number of things: Those back in work may have experienced a different permanent shock associated with the job loss or simply have different preferences; there may be costs of going to work or other nonseparabilities between clothing demand and labor supply; and, finally, there is the temporary loss of income due to being out of work (the transitory shock). It is responses to this last impact which we wish to measure, but to do so we must isolate this impact of unemployment from the others.

For these reasons, our main empirical strategy is to relate variation in expenditure patterns among the unemployed to variations in unemployment insurance replacement rates. The latter are generated by a series of reforms to the Canadian Unemployment Insurance system. By focusing just on the unemployed, we eliminate variation in labor supply, and hence do not have to deal with costs of working (or other non-separabilities between labor supply and demands). Moreover, the quasi-experimental nature of the data provides a fairly transparent and plausibly exogenous source of variation in transitory income (benefits).

Our empirical analysis suggests that the impact of temporary short-falls in income differ too dramatically across goods for the H-P effect to be the main driving force behind the adjustments in expenditure patterns; durability is an important part of the story. The outline of the rest of the paper is as follows. The next section lays out the theory, and presents our qualitative and quantitative analysis. Section 3 describes the data we use in our empirical work, and presents some preliminary statistics on the budget allocations of employed and unemployed workers. Section 4 discusses a number of econometric issues that must be resolved in order to give a proper assessment of our theoretical predictions. Section 5 reports our empirical results and Section 6 concludes.

2. A Model of Allocation with Irreversibility and Liquidity Constraints

2.1. The Accelerator and Decelerator Effect

We present a theoretical model for the many goods case in which at least one good is non-durable (consumption equals current purchases) but others may be durable. We adopt an n good neo-classical framework in which the stock of durable k in period t, S_{kt}, evolves according to

$$S_{kt} = (1-\delta_k)S_{k,t-1} + d_{kt}, k = 1, \ldots, n, \tag{1}$$

where d_{kt} is the addition to the stock in period t, and δ_k is the depreciation of the durable, with $\delta_{kt} \leq 1$. An irreversibility constraint can be imposed by requiring $d_{kt} \geq 0$. We take the first good to be non-durable: $\delta_1 = 1$. The stock evolution equation can be written more succinctly in vector form as

$$S_t = (1-\delta).^* S_{t-1} + d_t,$$

where $.^*$ denotes term by term multiplication.

Before presenting the model with uncertainty, we present the conventional accelerator effect in a very simple setting. This is the principal effect that operates if total expenditure changes but the agent still wishes to purchase positive amounts of all durables. We consider an agent who has homothetic preferences over stocks and is on a no growth path, so that

$$d_{k,t} = \delta_k S_{k,t-1} = \delta_k S_{k,t} \forall k. \tag{2}$$

Now assume that for some reason total expenditure changes from period t and $t+1$ and let g_k denote the growth in expenditure between the two periods for good k $(= d_{k,t+1}/d_{kt})$. The evolution equation (1) and some algebra gives

$$\delta_k(g_k - 1) = \delta_l(g_l - 1) \tag{3}$$

for any two goods k and l. This implies that if expenditures rise ($g_k > 1$ for all goods) then they do so at a faster rate for more durable goods. In particular, non-durables ($\delta_l = 1$) have the lowest positive growth. Conversely, if expenditures fall ($g_k < 1$ for all goods) then they do so at a faster rate for more durable goods.

This accelerator effect takes no account of possible irreversibility effects. If a good is durable enough and the fall in non-durable expenditure is large enough, agents will wish to sell durables. In the simple model here this will happen if

$$\delta_k = 1 - g_1. \tag{4}$$

At this point relative *deceleration* sets in, in the sense that further falls in total expenditure lead to continuing falls in non-durable consumption, but not in expenditures on this durable (which are now constant at zero). Moreover, we have a cascade effect. As total expenditure falls, individual expenditures fall most for the most durable goods and when they hit zero expenditures, spending continues on less durable goods. Thus the ideal data to test for these effects and to estimate their practical importance would be on a range of durables with varying durability. For example, Bils and Klenow (1998) report relatively high depreciation rates for shoes and curtains but low depreciation rates for carpets and china. Unfortunately, we have only have information on one durable (clothing) in our data so that we will not be able to conduct a full structural analysis of the effects discussed here. We now present a simple example showing the implications of this analysis for observables and for welfare.

2.2. Quantitative Effects

The qualitative results given above do not give much hint on how strong the accelerator and decelerator effects will be. To assess these we present a calibration exercise. To keep things manageable, we consider the case of one non-durable and

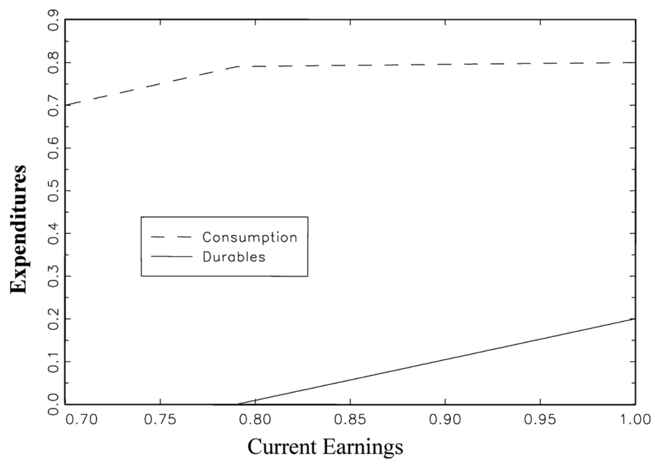

FIGURE 1. Constrained expenditures.

one durable good. We take a model in which the planning period is three months and we set the interest rate equal to the discount rate. We consider a model with no uncertainty, constant earnings of unity each quarter and we assume that the agent does not have any financial assets. In this case the agent sets expenditure on non-durables and durables equal to earnings in each period, keeps consumption constant from period to period, and sets durables expenditures equal to depreciation so that the stock is constant. We set the quarterly real rate to 1% and the depreciation rate to 0.1 (an annual depreciation rate of 0.34). We take an additive log utility function

$$\nu(S_{1t}, S_{2t}) = \ln(S_{1t}) + \gamma \ln(S_{2t}), \tag{5}$$

with a weight on the second sub-utility function so that in the steady state the agent sets consumption expenditure equal to 0.8 and non-durable expenditures equal to 0.2 (values suggested by budget studies). We intentionally impose within period additivity and homotheticity for the preferences over the two stocks to assume away complementarity and H-P ("luxury") effects.

To introduce a constrained program, assume that in one period earnings are set to less than unity and agents are not allowed to borrow. We assume that the agent did not anticipate any earnings fall so that the stock in the previous period is equal to the steady state value and we set earnings in the subsequent period so that the agent returns to the steady state values for consumption and the stock of durables. In this case we have that both non-durable and durable expenditures are lower in the low income period than in the steady state. Figure 1 presents the graph of expenditures on the two goods against current earnings (the figure is to be read "right to left" with small income losses on the right). There are two important

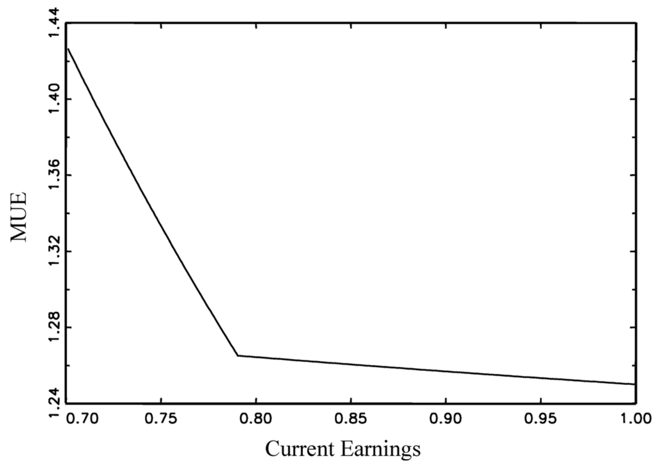

FIGURE 2. Marginal utility of expenditure.

features to this figure. First, for falls in earnings of less than about 20% the effect on non-durables is negligible and the effect on durables expenditures is almost one for one. That is, a cut in earnings of 0.2 leads to cuts of 1% in non-durables expenditures and 95% in durables. The second important feature of the figure is that if earnings are low enough (in the case considered here, below 0.79) then the desired stock exceeds the stock inherited from the last period and because of the irreversibility constraint the agent sets durables expenditures equal to zero. In this case all of the impact of further earnings cuts is forced onto non-durables. Thus there is a distinct shift in responses at a critical value of earnings at about the budget share of non-durables.

To emphasise our point, in Figure 2 we plot the current marginal utility of money against earnings. As can be seen, modest cuts in earnings do not cause the marginal utility to rise very much. However, once the irreversibility constraint begins to bind, the effect of earnings cuts on the marginal utility of money is much more dramatic. Another important feature of Figure 2 is that the *mue* is convex which is usually taken to indicate prudence. As is well known, adding a liquidity constraint to a program with only a single (non-durable) good and no uncertainty leads to convexity in the *mue* (if we are in the HARA class). Here the kink in the *mue* occurs not at unit earnings but at the value at which "total wealth" (financial assets plus excess durables stock) is zero.

The implication of this analysis is that agents absorb most of a modest earnings cut by cutting back dramatically on durables and leaving non-durables almost untouched. Thus the welfare impact of such an earnings cut is much less than we would anticipate in an environment with no durable goods. If durables are reversible or we only considered this accelerator effect, then we would conclude agents could very effectively buffer themselves against income shocks by adjusting the level of durables. With irreversibility, however, we see that for large earnings falls, agents have to start cutting back on non-durables and this has a much more immediate impact on welfare. Effectively it is as though the financial constraint is unimportant until the irreversibility constraint binds.

Two other facets of durables models that are often emphasized are transactions costs and indivisibilities. For small durables transactions costs are unlikely to be a significant factor. Discreteness is a different matter because most durables come in discrete units. Finding analytic results is usually impossible for models with discreteness, irreversibility, and stochastic earnings, so we conducted some simulations using a simple replacement model. For this we took a non-durable and a durable which is held in unit quantity. The utility derived from the durable falls as it ages so that periodic replacement is required. We do not report the details because they are quite involved and the qualitative results are much the same as for the continuous case. In such a model, impatient agents in "unconstrained" periods keep the marginal utility of the non-durable constant and accumulate assets to finance the periodic replacement of the durable. In periods of temporarily low earnings agents do not replace the durable but concentrate their expenditures on non-durables, even to the extent of running down assets that were being saved for durable replacement. Thus assets serve two roles in the discrete case: as saving toward the replacement of a non-collateralizable durable and as a financial buffer stock. These two functions are complementary in that savings accumulated to replace the durable can be used to buffer non-durables in the event of a transitory negative income shock. The important feature of the discrete model is that in low income periods, the probability of a durables purchase is low relative to non-durable expenditures.

2.3. Allowing for Uncertainty

We now present the analytics allowing for uncertainty. The agent starts each period with assets A_t and receives non-capital earnings (which include transfer income) of Y_t. Cash-on-hand, $X_t = A_t + Y_t$, is then divided between expenditure on goods and saving. Because we are not primarily interested in price effects we shall simply set all relative prices to unity and assume that the real interest rate is constant at the value r. Assets evolve according to

$$A_{t+1} = (1 + r)(X_t - e'd_t),$$

where e is the unit vector. When we have durables, the precise definition of a liquidity constraint depends on whether the agent can borrow against the stocks of durables (see Alessie, Devereaux, and Weber (1997) and Chah, Ramey, and Starr (1995)). For the case of small durables we impose that no collateral borrowing is possible which gives the liquidity constraint $X_t \geq e'd_t$. The state variables are cash-on-hand, X_t, and the stocks of the durable in the last period, S_{t-1}.[2] Taking an infinite horizon stationary program and denoting the value function at time t by $V(X_t, S_{t-1})$ and the within period utility function by $\upsilon(S)$, the Bellman equation is

$$V(X_t, S_{t-1}) = \max_d \left\{ \upsilon((1-\delta).^* S_{t-1} + d) + \beta E_t[V((1+r)(X_t - e'd) + Y_{t+1}, (1-\delta).^* S_{t-1} + d)] \right\}, \quad (6)$$

subject to the liquidity and irreversibility constraints. The parameter β is the discount factor and $E_t[\cdot]$ is the expectations operator conditional on the information set at time t. Assuming Inada conditions so that stocks are always are positive, the first order conditions for the program in equation (6) are

$$\begin{aligned} \upsilon_1^t &= \beta(1+r)E_t\left[V_X^{t+1}\right] + \mu_t, \\ \upsilon_k^t &= \beta(1+r)E_t\left[V_X^{t+1}\right] - \beta E_t\left[V_k^{t+1}\right] - \theta_{kt} + \mu_t \quad \text{for } k > 1, \end{aligned} \quad (7)$$

where υ_k^t is the partial of $\upsilon(\cdot)$ with respect to S_{kt} evaluated at $\hat{S}_t = (1-\delta).^* S_{t-1} + \hat{d}$ and similarly for the partials of the value function. The variables μ_t and θ_{kt} are the (non-negative) Lagrange multipliers associated with the liquidity constraint and the irreversibility constraints respectively. Note that because we have taken the first good to be non-durable the irreversibility multiplier θ_{1t} is always zero. The envelope conditions are

$$\begin{aligned} V_X^t &= \beta(1+r)E_t\left[V_X^{t+1}\right] + \mu_t, \\ V_k^t &= (1-\delta_k)\left(\upsilon_k^t + \beta E_t\left[V_k^{t+1}\right]\right) \quad \text{for } k > 1. \end{aligned} \quad (8)$$

Multiplying the first order conditions for $k > 1$ by $(1-\delta_k)$ and substituting, we have

$$V_k^t = (1-\delta_k)\left(V_X^t - \theta_{kt}\right). \quad (9)$$

Taking leads and expectations this yields

$$E_t\left[V_k^{t+1}\right] = (1-\delta_k)\left(E_t\left[V_X^{t+1}\right] - E_t[\theta_{kt+1}]\right). \quad (10)$$

Collecting everything together we have the following expression for the marginal rate of substitution (*mrs*) between good k and good 1 in period t:

$$\frac{\upsilon_k^t}{\upsilon_1^t} = \frac{(\delta_k + r)}{(1+r)} + \frac{(1-\delta_k)}{(1+r)}\frac{\mu_t}{V_X^t} - \frac{\theta_{kt}}{V_X^t} + \frac{\beta(1-\delta_k)E_t[\theta_{kt+1}]}{V_X^t} \quad (11)$$

2. If we did not have the irreversibility constraint then we could write the program with just one state variable: total assets (financial assets plus the value of the stocks carried forward).

If good k is non-durable then $\delta_k = 1$ and $\theta_{kt} = 0$ for all t (from the assumed Inada condition), so that the within period *mrs* between non-durables is unity (the relative price) and is consequently independent of whether or not the liquidity constraint holds. Meghir and Weber (1996) exploit this condition in a test for liquidity constraints. For a durable ($\delta_k < 1$) the first term on the right-hand side is the user cost; if there are no constraints then this is the usual *mrs* condition for a neo-classical durables model.

In all that follows we assume that

$$\frac{\upsilon_k(S)}{\upsilon_1(S)} > \frac{\upsilon_k(S^*)}{\upsilon_1(S^*)} \Rightarrow \frac{S_k}{S_1} < \frac{S_k^*}{S_1^*}. \tag{12}$$

This is equivalent to assuming enough so that in an environment with no irreversibility or liquidity constraints, a rise in the real rate (which increases the user cost for all durables) would lead to a fall in all stocks relative to the non-durable consumption. A sufficient condition for this is the utility function being additive with each sub-utility function being strictly concave, but weaker conditions will also give the condition. Essentially we need to rule out strong complementarities between the first (non-durable) good and the other goods.

If the liquidity constraint does not bind and the irreversibility constraint does not bind for any good, then we have

$$\frac{\upsilon_k^t}{\upsilon_1^t} = \frac{(\delta_k + r)}{(1+r)} + \frac{\beta(1-\delta_k)E_t[\theta_{kt+1}]}{V_X^t}, \; k = 2, \ldots, n. \tag{13}$$

If there is any state of world in which the agent might have "too much" of durable k in the next period then $E_t[\theta_{kt+1}] > 0$ so that agents, from equation (12), will hold lower stocks of that durable than suggested by the model with reversibility (in which case, $E_t[\theta_{kt+1}] = 0$). If this effect is inoperative then we have a benchmark "unconstrained" level of durable stocks relative to good 1 given by

$$\frac{\upsilon_k}{\upsilon_1} = \frac{(\delta_k + r)}{(1+r)}, \quad k = 2, \ldots, n. \tag{14}$$

This gives rise to a conventional "accelerator" effect. It is easiest to see this if we take homothetic preferences.[3] In this case the ratio of stocks for unconstrained agent is kept constant:

$$\frac{S_{kt}}{S_{1t}} = \alpha_k \frac{(1+r)}{(\delta_k + r)}. \tag{15}$$

3. If preferences are not homothetic then durables that are more luxurious than the non-durable will have a higher ratio of expenditures relative to the non-durable if the latter is increasing over time.

Some algebra then gives

$$\frac{d_{kt}}{d_{1t}} = \alpha_k \frac{(1+r)}{(\delta_k + r)} \left[1 - (1-\delta_k) \left(\frac{d_{1t}}{d_{1,t-1}} \right)^{-1} \right]. \tag{16}$$

This shows that the current ratio of durables expenditure to non-durables is an increasing and concave function of the growth ratio of non-durables consumption. The right-hand side of equation (15) gives the ratio if there is no growth in non-durable consumption. Thus changes in non-durable consumption are amplified for durables expenditures. For example, with $r = 0.05$, $\delta_k = 0.5$ and $\alpha_k = 0.2$, we have ratios of durable expenditure to non-durables of 0.143, 0.191, and 0.229 for values of consumption growth ratio ($d_{it}/d_{1,t-1}$) of 0.8, 1, and 1.25, respectively.

We now consider the other two terms in equation (11) in turn (assuming $\delta_k < 1$). Suppose first that the irreversibility constraint does not bind ($\theta_{kt} = 0$ for all t) and $t+1$ realizations are such that $\theta_{kt+1} = 0$ for all states of the world. If the liquidity constraint binds ($\mu_t > 0$) then we have

$$\frac{\upsilon_k^t}{\upsilon_1^t} = \frac{(\delta_k + r)}{(1+r)} + \frac{(1-\delta_k)}{(1+r)} \frac{\mu_t}{V_X^t} > \frac{(\delta_k + r)}{(1+r)}. \tag{17}$$

Thus the *mrs* of any stock relative to the non-durable is higher than in the unconstrained case. That is, a binding liquidity constraint causes agents to cut back more on the desired stocks by more than on non-durables. This, combined with the accelerator effect, leads to larger falls in durables expenditures than if unconstrained. The liquidity constraint effect operates because the future value of current additions to stocks are discounted more heavily than in the unconstrained case. Moreover, agents cut back proportionately more on durables with a low depreciation rate.

Suppose now that the agent is not liquidity constrained but finds that the desired stock of good k is lower than the stock brought in from the last period. This would follow if, for example, there was a fall in "permanent income" (so that lower stocks are desired) but agents had liquid assets at the beginning of the period. In this case $\mu_t = 0$ and $\theta_{kt} > 0$. Suppose further that the $t+1$ realizations are such that $\theta_{kt+1} = 0$ for all states of the world. In this case, we have

$$\frac{\upsilon_k^t}{\upsilon_1^t} = \frac{(\delta_k + r)}{(1+r)} - \frac{\theta_{kt}}{V_X^t} < \frac{(\delta_k + r)}{(1+r)}, \tag{18}$$

so that the agent starts the period with too much of durable k and, of course, does not buy any of this durable. Examining this equation we see that this effect would be more likely for durables that depreciate slowly or have a high lifetime wealth elasticity.

3. A First Look at the Data

We now consider testing some of the empirical implications of the model developed herein. The source of temporary negative income shocks is the loss of a job with the consequent replacement of earnings by Unemployment Insurance (UI) benefits. The data source we use is the Canadian Out of Employment Panel (COEP). The COEP is a sample of Canadians who had a job separation in one of four windows—two in early 1993 and two in early 1995. We refer to respondents drawn from each of these four windows as belonging to cohorts 1 through 4. Respondents were initially interviewed some 14 to 44 weeks after the reference separation. At this first interview they were asked a broad set of question regarding employment prior to the reference separation, subsequent job search and employment, household demographics, finances, and expenditures. These data can then be matched to several kinds of administrative records, including those from the UI system to provide an extremely detailed picture of these households in the period before and after a job loss. One or two subsequent interviews were conducted so that the households could be followed for about two years.

These data offer several important advantages. First, all respondents had a job separation so we have relatively large sample sizes of households experiencing unemployment. 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 (an advantage over the Panel Study of Income Dynamics (PSID), for example). Finally, the data span two reforms of the Canadian UI system (between the first and second and between the second and third cohorts). As we discuss subsequently this provides a quasi-experimental source of variation in transitory income.

In this paper we focus on expenditure information from the first interview and benefit records for the same period. We also focus on respondents who are unemployed at the first interview as the unemployed are the group who are likely to have current earnings below permanent earnings and for whom UI benefits provide a good measure of current income. By focusing on the first interview we maximize the fraction of respondents who are unemployed. The sample we study comprises singles, couples, and couples with children where the respondent is between the ages of 20 and 60. We also exclude some types of separations which were sampled in the 1993 cohorts but not in 1995. Our final sample has 1,959 observations.

In addition to this sample of unemployed individuals we also construct a control sample of 1,198 workers who report that they are back in a steady job, at least as good as the one that they separated from. In our empirical work, we will use this latter group for an important specification test (described in the next section).

TABLE 2. Summary statistics for expenditures, Canadian Out of Employment Panel.

		Mean, unemployed $n = 1{,}959$	Mean, employed $n = 1{,}198$	*t* test for equal means
Food at home	$/month per capita	143	144	0.37
	Budget share	0.24	0.22	-4.22
Clothing	$/month per capita	37	63	8.35
	Budget share	0.06	0.08	7.31
	Dummy for +ve expenditure	0.64	0.79	8.93
Total expenditure	$/month per capita	696	793	5.40

To evaluate the theory developed in the previous section with our data, a key issue is the size of the income shocks experienced by our respondents' households. The theory predicts a sharp change in behavior when the income shock exceeds the budget share of small durables. Budget studies suggest this number might be on the order of 20%. For a subset of our sample (those respondents who separated from jobs in 1995), we have information on the change in monthly, take-home household income between the month just prior to the job separation and the month prior to the interview. The mean percentage change for unemployed respondents is -21% (median -19%). The modest size of income shocks associated with unemployment (a complete loss of earnings) reflects several factors. The UI system in Canada is fairly generous, with statutory replacement rates over 50% and benefits lasting up to a year.[4] Second, Canada also has a second tier of income support: a means-tested social assistance program that would be available to those who are ineligible for benefits, or whose benefits expire.[5] Finally, workers live in households and those households often have other earners.[6] Further details on the data and sample selection are provided in a Data Appendix (available from the authors).

Table 2 presents summary statistics on expenditure levels and patterns for our two samples, at the first interview. All expenditures are reported in 1993 Canadian dollars ($); the Canadian dollar was worth about 0.75 U.S. dollars at the time. The numbers are striking. Those who are back in steady and satisfactory jobs have much higher per capita total expenditures than those who are still unemployed, but almost identical per capita food expenditures. Consequently, their

4. Moreover, because the Canadian income tax system is progressive, the actual (after-tax) replacement rate is often higher than the statutory rate. Against that, workers losing jobs with earnings above the maximum insurable earnings will have an effective replacement rate below the statutory rate.

5. Social Assistance can also top up unemployment insurance benefits where those benefits are below the cutoff of the means test.

6. Quite mechanically, if a worker provides 50% of household income prior to job loss, and faces a 60% actual replacement rate, then the job loss represents a shock to personal income of -40% but to household income it is a shock of -20%.

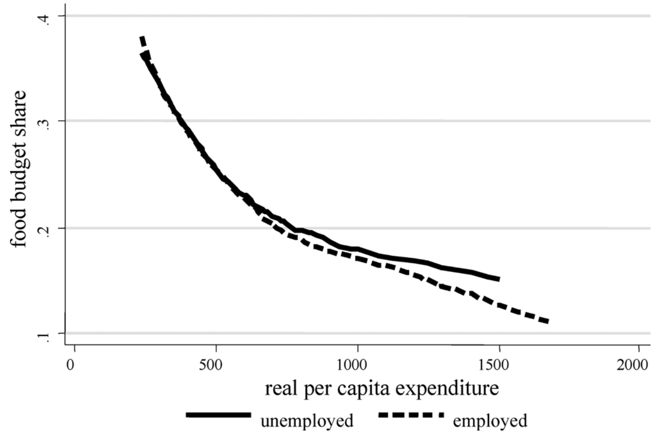

FIGURE 3. Engel curves for food, Canadian Out of Employment Panel.

food shares are significantly lower. Conversely their shares of expenditures on clothing (a small durable) are significantly larger, as is their probability of having a positive expenditure on clothing. These differences in the structure of demand are summarized graphically in Figures 3 and 4, which display nonparametric Engel curves for food and clothing, for the two groups. These numbers and pictures are obviously strongly suggestive of our theoretical predictions. Unfortunately, they are not entirely convincing, for a number of reasons.

An obvious place to start is the issue of heterogeneity. Those back in work may be different from those still unemployed, and this may explain some of the differences in observed expenditure patterns. Beyond that, it is important to

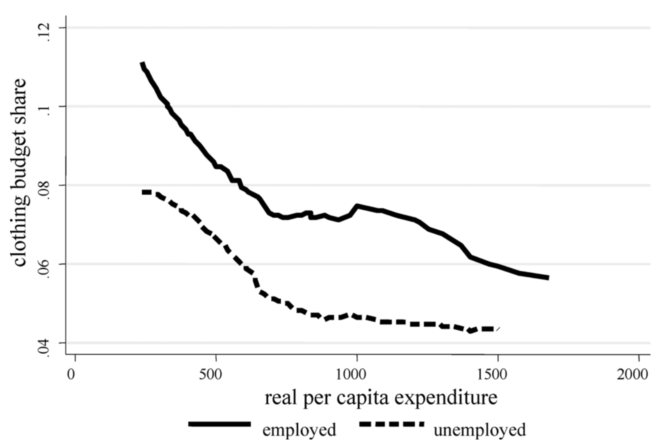

FIGURE 4. Engel curves for clothing, Canadian Out of Employment Panel.

recognize that unemployment likely has three broad impacts on expenditures. 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 labor supply (see Browning and Meghir 1991) then a change in labor force status will induce changes in total expenditure and also in the structure of demands conditional on that total.

Second, job loss is often an unpleasant shock and can be expected to lower desired lifetime consumption. This shock impacts on both durable and nondurable 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 nondurable expenditures. Conversely, finding a new job may be a pleasant shock with corresponding effects. Together these effects can be thought of as the permanent shock effects of job loss and reemployment. These effects will obviously differ between the employed and unemployed samples.

Finally, there is the temporary loss of income due to being out of work. Our theoretical analysis presented herein is concerned with responses to this transitory shock. However, to assess such responses we must isolate this impact of unemployment from the others just noted, and control for heterogeneity. In the next section we outline an empirical framework which allows us to do so by exploiting the quasi-experimental nature of our data.

4. Econometric Issues

Our empirical strategy is to estimate equations for food expenditures (e_i^f), clothing expenditures (e_i^c), and total expenditures (e_i^t) on our sample of unemployed respondents. The explanatory variable of interest is unemployment benefits (b_i). We also include other variables X_i that control for heterogeneity in tastes, for the current marginal utility of wealth ("permanent income," including the impact of the recent separation from a job) and for the process of selection into unemployment (more on this subsequently). Thus our empirical framework can be summarized as

$$\begin{aligned} f^f(e_i^f) &= \alpha^f(b_i) + X_i\beta^f + \varepsilon_i^f, \\ f^c(e_i^c) &= \alpha^c(b_i) + X\beta^c + \varepsilon_i^c, \\ f^t(e_i^t) &= \alpha^t(b_i) + X\beta^t + \varepsilon_i^t. \end{aligned} \tag{19}$$

Among the unemployed, variation in UI benefits gives a source of variation in transitory income. We use simple and convenient functional forms for the $f()$ and $\alpha()$ functions, and focus on using the quasi-experimental nature of our data to derive 2SLS estimates of the effect of benefits on the level and composition of expenditures. In particular, we follow Gruber (1997) and instrument actual benefit paid with "potential benefit." Potential benefits are calculated as a function of past earnings, local unemployment rates, and weeks worked in the reference job. Because the UI system is federal in Canada, we cannot use the cross-state variation in benefits formulae that is the basis of Gruber's study. Instead we use the fact that parameters of the Canadian formula varied over the sample period with both legislative reforms (1993 and 1994) and administrative changes. Because our regression controls (X_i) include past earnings, local unemployment rates, and weeks worked in the reference job, identification is coming from changes in the program parameters and also from nonlinearities in the benefit formula. The available variation in the statutory rate is small relative to cross-state differences in the U.S. Against this, our rich controls and exact measurement of benefits mean there is less noise from which to extract the signal. Furthermore the source of the variation we are using is transparent: a series of legislative cuts to the UI system designed to reduce program expenditures against the backdrop of a very slowly improving labor market.[7] Full details of the program changes are given in an available Data Appendix. However, we note here that although most of the changes in this period made the program less generous, there were two with the opposite effect. One was the introduction of a dependency rate 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 the legislative replacement rate. This meant that for individuals above the maximum insurable benefits the *actual* replacement rate did not decline.

This empirical strategy has a number of advantages. First, by focusing just on the unemployed, we eliminate the variation in labor supply, which confounds comparisons of the employed and unemployed if there are costs of working or non-separabilities between leisure and consumption (as discussed in the previous section). Second, the quasi-experimental nature of the data provides a fairly transparent source of variation in transitory income (benefits), and using potential benefits as our instrument allows us to capture all of the variation generated by the program changes.

Against these, it may be that our simple functional forms may be misspecified. It is also certainly the case that respondents who are out of work at the first interview are a selected sample. We have several ways of addressing these concerns. First, with respect to functional form, we can and do subject our estimates to a variety of standard specification tests. With respect to selection, we note that the data provide us both with a very rich set of controls (X_i), and with quasi-experimental instruments for our variable of interest. All that is required is that our instruments are uncorrelated with the error terms in the expenditure equations conditional on selection and our controls (X_i).

7. The unemployment rate in Canada drifted down from 11.3% in 1992 to 9.5% in 1995.

Most importantly, however, the data provide us with a very natural way to test for a range of potential problems, including those just mentioned. In particular, we can estimate reduced forms of the expenditure equations (that is, with potential benefits in place of actual benefits) on the sample of respondents who are back in good jobs. Because these respondents were not receiving benefits, the potential benefits they would have received had they been unemployed should not affect their expenditures. This is an omnibus test for instrument exogeneity, mis-specification and other potential problems, including those noted above. Intuitively, if the instrumented benefit variables are picking up mis-specifications in our simple functional forms, this should be apparent in the employed sample as well. Similarly, if the instruments are not exogenous conditional on the selection process into employment and unemployment, then this should be apparent in the employed sample.

For the $f()$ functions we use the inverse-hyperbolic sine (*ihs*) proposed by Burbidge, Magee, and Robb (1988). The *ihs* is an alternative to the logarithm that admits zero values (it is linear through the origin), but which is very similar to the logarithm for larger values.[8] Expenditures are measured in dollars. Benefits (the $\alpha()$ functions in equation (19)) are entered linearly, and measured in hundreds of dollars. To aid in interpreting the estimates we calculate the marginal effect of \$100 of additional monthly benefits on dollars of monthly expenditure for each observation, and average over the estimation sample.[9]

Our controls include the size and composition of the household; the age, education, and gender of the respondent; regional and seasonal dummies; characteristics of the lost job and local labor market; dummies for homeownership and investment income in the previous year; measure of the importance of the lost job in household income; and a polynomial in the earnings in the lost job. Further details are provided in the Data Appendix.

The average level of benefits in our sample of 1,959 respondents who are unemployed at the first interview is \$770 per month. Average calculated potential benefits for this group were \$1,104 per month. For the sample of 1,198 respondents back in a good job, calculated potential benefits (had they not been employed) were \$1,126 per month. An important question is the power of our instrument (potential benefits) to explain benefits, conditional on our other controls. Using the unemployed sample, we regressed actual benefits received on potential

8. For food at home and total expenditure, which are always positive and measured in dollars per month, the *ihs* and the logarithm are perfectly correlated.

9. The *ihs* of e is $\sinh^{-1}(\theta e)/\theta$, where θ is a parameter. We use a value of 1 for θ; preliminary investigation suggested that our results were insensitive to this choice. The derivate of the *ihs* (with $\theta = 1$) is $(1 + e^2)^{-\frac{1}{2}}$, so that the coefficient on benefits is transformed into a marginal propensity to spend by multiplying by $(1 + e^2)^{\frac{1}{2}}$. Note that as e becomes large the derivative tends to $1/e$ and the transformation tends to multiplying the coefficient by e (just as one would do to recover a marginal propensity from a log-linear specification).

TABLE 3. Quasi-experimental estimates: Effects of UI benefits on expenditures, Canadian Out of Employment Panel, instrument = potential benefits.

	Food at Home	Clothing	Total Expenditure
Reduced Forms, Unemployed Sample ($n = 1{,}959$)			
Unconditional mean of monthly expenditures ($)	362	102	1675
Estimated coefficient on *potential* benefits	0.0060	0.037	0.011
t statistic	[2.56]	[2.61]	[4.56]
Average implied marginal propensity to spend ($ per $100 of additional benefits per month)	2.2	4.5	12.9
Reduced Forms, Employed Sample (Omnibus Specification Test; $n = 1{,}198$)			
Unconditional mean of monthly expenditures ($)	373	150	1872
Estimated coefficient	−0.001	0.010	0.005
t statistic	[−0.29]	[0.60]	[1.64]
Average implied marginal propensity to spend ($ per $100 of additional benefits per month)	−0.4	1.5	5.3
2SLS, Unemployed Sample ($n = 1{,}959$)			
Unconditional mean of monthly expenditures ($)	362	102	1675
Estimated coefficient on *actual* benefits	0.010	0.074	0.013
t statistic	[2.55]	[2.83]	[2.89]
Average implied marginal propensity to spend ($ per $100 of additional benefits per month)	3.7	7.6	22.0

Notes: 1. *t* statistics based on robust standard errors. 2. Additional controls include the size and composition of the household; the age, education, and gender of the respondent; regional and seasonal dummies; characteristics of the lost job and local labor market; dummies for homeownership and investment income in the previous year; a measure of the importance of the lost job in household income; and a polynomial in the earnings in the lost job. Further details are provided in the Data Appendix, and complete results are available from the authors.

benefits and all our other controls. The estimated coefficient on potential benefits was 0.588 with a *t* statistic (based on a robust standard error) of 27.0. Thus the reforms to the UI system captured by our data provide substantial variation in benefits.

5. Quasi-Experimental Estimates

Our basic results are presented in Table 3, which contains three sets of estimates in three panels. For each good, in each panel, we report four quantities: the unconditional mean of expenditure in the estimation sample; the estimated coefficient on the variable of interest (benefits, or potential benefits), the *t* statistic for this estimate; and the average implied impact of $100 of additional benefits on dollars of expenditure.

The first panel reports estimation of reduced form relationships—the linear regression of the *ihs* of expenditures on our instrument (potential benefits) and other controls. As Gruber (1997) points out, the response to potential benefits is often of most interest to policymakers, as it is potential benefits (rather than actual benefits) over which they have direct control.[10] Potential benefits have statistically significant effects on food, clothing and total expenditures. Because the *ihs* approximates the log, the estimated coefficients approximate a relative effect. The estimated coefficients are 0.006, 0.039, and 0.011 for food, clothing, and total expenditure, respectively, so that in relative terms, the effect on clothing is six times as large as the effect on food. In absolute terms the effect on clothing is twice as large as the effect on food (averaging $4.5 dollars per $100 of benefits against $2.2 for food). The difference in relative effect is much greater because on average these households spend more on food than clothing ($362 against $102).

We have subjected these reduced form estimates to a standard battery of specification tests. None of these tests suggested any problem. For all three equations, RESET tests for omitted variables could not reject the null hypothesis of no omitted variables.[11] We also calculated DFBETA influence statistics for each observation for the coefficients of interest. These calculations did not reveal unduly influential observations.[12]

We next consider reduced form estimates for a control sample of respondents back in a good job. As discussed in the previous section, these estimates provide a test of the exogeneity of our instruments and of the adequacy of our specification. In fact we cannot use the food equation for this test, because this sample was used to calibrate food expenditures across a change in the food expenditure reporting period between the 1993 and 1995 survey.[13] However, the clothing and total expenditure questions were the same in both surveys, so they are informative. The results demonstrate that potential benefits are not a significant determinant of either clothing expenditures or total expenditures among those back in a good job.

10. 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.

11. The Regression Specification Error Test (RESET), proposed by Ramsey (1969), is often recommended as a test for omitted variables and nonlinearities (see, for example, Kennedy 2003, p. 109) and is a post-estimation option in STATA. It involves regressing the residuals (from the regression of interest) on higher powers of the predictions of the dependent variable (or on higher powers and cross products of the independent variables.) The resulting coefficient estimates are tested against a zero vector by means of a standard F test. The p values of this F test were, respectively, 0.86, 0.26, and 0.72 for food, clothing, and total expenditure.

12. The DFBETA, which is calculated for each observation in the regression sample, is a common statistic for checking whether the *ith* observation is influential (see Chaterjee and Hadi (1988) or Kennedy (2003)). In particular the DFBETA is the normalized change in an OLS coefficient estimate resulting from omitting the *ith* observation. (Note that the *ith* observation will have a different DFBETA for each coefficient in a regression model.) For the potential benefit variable, the largest (in absolute magnitude) DFBETA was, respectively, 0.18, 0.17, and 0.27 in the food, clothing, and total expenditure equations. This means, for example, that removing the most influential observation would alter the estimated coefficient on potential benefits in the food equation by 0.18 times the standard error of that coefficient.

13. Full details are in a Data Appendix available from the authors.

TABLE 4. UI benefits effect interacted with liquid asset holdings, Canadian Out of Employment Panel, unemployed sample ($n = 1{,}959$).

	Food at Home	Clothing	Total Expenditure
	Reduced Forms		
Potential benefits × 1 [previous year investment income > 0]	0.0004	0.023	0.0014
[*t* statistic]	[0.11]	[1.00]	[0.33]
Potential benefits × 1 [previous year investment income = 0]	0.0072	0.046	0.0080
[*t* statistic]	[2.72]	[2.74]	[2.92]
Test of Equality (*p*-value)	0.075	0.32	0.11
	2SLS		
Actual benefits × 1 [Liquid Assets > 0]	−0.029	−0.068	−0.027
[*t* statistic]	[−1.26]	[−0.051]	[−1.05]
Actual benefits × 1 [Liquid Assets = 0]	0.028	0.13	0.028
[*t* statistic]	[2.20]	[1.80]	[2.20]
Test of equality (*p*-value)	0.10	0.32	0.14

Notes: 1. *t* statistics based on robust standard errors. 2. Additional controls include the size and composition of the household; the age, education, and gender of the respondent; regional and seasonal dummies; characteristics of the lost job and local labor market; dummies for homeownership and investment income in the previous year; a measure of the importance of the lost job in household income; and a polynomial in the earnings in the lost job. Further details are provided in the Data Appendix, and complete results are available from the authors.

The final panel of Table 3 reports 2SLS estimates. The variable of interest is now *actual* benefits received, which is instrumented with potential benefits. Again we find statistically significant effects for food, clothing, and total expenditures. The effects of actual benefits are, unsurprisingly, larger than the effects of potential benefits. Benefits have an economically significant effect on total expenditures, although the marginal propensity to consume benefit income is less than 1, with \$100 of additional benefits raising total expenditures by \$22 on average. Note that the median unemployment spell in our data is about 4 months, so that increasing benefits by \$100 per month is a windfall of about \$400. Increasing monthly total expenditure by \$22 per month exhausts this windfall in about 18 months. This is certainly not standard life-cycle behavior. The key finding, however, is that once again the effect on clothing expenditures is much larger (both absolutely and relatively) than the effect on food expenditures.

The numerical simulations in Section 2 assumed that households cannot borrow, and have no liquid financial assets to draw down. This is not likely true of all of the households in our sample. Thus in Table 4 we report estimates of specifications which allow the benefit effect to vary by the financial circumstances of the household. In particular, our benefit variable is interacted with a dummy variable indicating whether the household had any liquid assets at the interview date. Our instrument is now potential benefits interacted with a dummy variable indicating whether the household had any investment income in the calendar year before the year of job loss. Households without liquid assets are more likely to be liquidity constrained.[14] The top panel of Table 4 reports reduced forms (where we regress expenditures directly on the instrument) and the second panel reports 2SLS estimates. The results show that unemployment benefits only have a statistically significant impact on the expenditures of households without assets. This mirrors the findings of Browning and Crossley (2001). However, the estimates are not sufficiently precise to allow us to reject (for any equation, and at conventional significance levels) the null hypothesis that the responses of the two groups are the same (see the tests of equality of coefficients at the bottom of each panel). Finally, the no-asset benefit effect is much larger for clothing than for food.

To summarize, we find that marginal dollars of unemployment benefit income have statistically significant, but economically small effects on food, clothing, and total expenditures. The effect of marginal dollars of benefits on clothing expenditures is twice as large in absolute terms (dollars) as the effect on food expenditures despite the fact the households in our sample spend a much larger fraction of their budget on food. We find that benefit effects are stronger for households without liquid assets, and for this group, they are again much larger for clothing than for food. These findings are consistent with the theory developed in the first half of this paper, which suggested that households in temporarily straitened circumstances would cut back primarily on durables (see Figure 1 in particular).

The final question we address is: Could our finding simply reflect the mechanism discussed by Hamermesh and Parker? Although our simulations assumed homothetic preferences in order to abstract from H-P effects, the households in our sample certainly have non-homothetic preferences, with clothing having a greater income (total expenditure) elasticity than food. Nevertheless, we do not think that H-P effects can explain our results. The (absolute dollar) benefit effect on clothing is about twice the effect on food, while food expenditures are three to four times greater than clothing expenditures in our sample. Thus if these effects were generated by the benefit effect on total expenditure operating through different income elasticities, clothing would have to be seven times as income elastic as food. Budget studies (see for example Bils and Klenow 1998) suggest

14. This strategy of splitting the sample by financial assets, with those with low assets most likely constrained, follows Zeldes (1989), McCarthy (1995), and Browning and Crossley (2001). Households were classified according to their responses to the question: *Do you or someone in your household have any assets that you could draw on if it was really necessary? For example, money in the bank, savings bonds or RRSPs that are cashable, or insurance policies, etc. Please do not include fixed assets such as house, cars, boats, etc.* An RRSP is a tax-favored retirement savings account similar to a 401(k). Cash withdrawn from an RRSP is counted as taxable income in the year of the withdrawal. Because holding positive liquid assets at the interview date is surely endogenous, we also tried splitting the sample on the basis of whether the household reported investment income in the previous tax year. This led to similar, albeit less sharp, results. Liquid asset holdings prior to the job separation were recorded in the 1995 survey but unfortunately not in 1993.

TABLE 5. Effects of UI benefits on the structure of demands, Canadian Out of Employment Panel, 2SLS on 1,959 unemployed respondents, selected coefficients.

	Budget Share of Food (at Home) Expenditures	Budget Share of Clothing Expenditures
Estimated Effect of Log of Monthly Total Expenditure ($)		
Coefficient	-0.115	0.0052
t statistic	[-8.44]	[0.44]
Implied total expenditure elasticity	0.52	1.09
Estimated Effect of $ 100 of *Actual* Monthly Benefits		
Coefficient	0.0006	0.0020
t statistic	[0.67]	[2.59]

Notes: 1. With the Working-Leser form (budget share linear in the logarithm of total expenditures) the total expenditure elasticity is $1 + \beta/w$, where β is the coefficient on the logarithm of total expenditure and w is the budget share of the good in question. Because we observe zeros for clothing we calculate the elasticity at the mean budget share. 2. *t* statistics based on robust standard errors. 3. Additional controls include the size and composition of the household; the age, education, and gender of the respondent; regional and seasonal dummies; characteristics of the lost job and local labor market; dummies for homeownership and investment income in the previous year; a measure of the importance of the lost job in household income; and a polynomial in the earnings in the lost job. Further details are provided in the Data Appendix, and complete results are available from the authors.

that the ratio of clothing to food income elasticities is more in the range of 2 or 2.5.

To investigate this directly with our data we switch from modeling expenditures on food and clothing and instead model the effect of unemployment benefits on the structure of demand (conditional on total expenditure). To model demands, we use the simple and familiar Working-Leser form (budget shares linear in the logarithm of total expenditures and other controls). We include benefits (linearly) as an explanatory variable, and continue to instrument with potential benefits. These estimates are reported in Table 5. As expected, food and clothing have different income elasticities. Food is a necessity, with an income elasticity of about 0.5, whereas clothing has an income elasticity of just over 1. These numbers are typical of what is found in budget studies. However, even controlling for total expenditure, marginal dollars of benefit income have an additional impact on the structure of demand. In particular, they increase the budget share of clothing. This result cannot be explained by H-P effects.

6. Conclusion

In this paper we consider the question of how households in temporarily straitened circumstances cut back and how they spend marginal dollars of transfer income. The first contribution is to empirically document accelerator effects in clothing, a small durable that is typically categorized as nondurable expenditure in studies of consumption smoothing. The second contribution is to show theoretically the importance of accelerator effects in clothing and other small durables for the welfare costs of transitory income shocks.

These findings have important implications for research questions such as the validity of the Life Cycle Hypothesis and the structure of demand over the business cycle and also for policy questions such as the design of social insurance systems. Which aspect of expenditure behavior the researcher should focus on will depend crucially on the research question motivating the analysis.

If the research goal is to test for liquidity constraints (or incomplete markets more generally), non-durable expenditures may provide little power because such goods will be preferentially smoothed. This is particularly true for food expenditure, which is often the item we have in panel data. An examination of changes in total expenditures (as in Browning and Crossley 2001) or demand patterns, including the demand for small durables (as presented in this paper) offers a more powerful test.

Conversely, 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. Significant drops in food expenditures indicate real hardship as opposed to drops in total expenditure which may only reflect the postponement of the replacement of durables.

Our theoretical and empirical analyses also improve our understanding of the cyclical volatility of durables expenditures. It extends non-convex adjustment cost theories of durables expenditure, by emphasizing how discretionary replacement may depend not only on the state of the durable (depreciation) and wealth (or permanent income) of the household but also on the (short run or transitory) economic circumstances of the household (strictly, cash on hand). And because it emphasizes *postponed* replacements, it may provide a microeconomic foundation for the notion of pent up demand coming out of a recession.

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