Online Appendix
The Spending and Debt Response to Minimum Wage Hikes

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Appendix A: Data Appendix

The Consumer Expenditure Survey (CEX)

The empirical analysis primarily relies on the 1983 to 2008 CEX and is briefly described in section 2.[1] In this appendix, we provide further details about the sample selection criteria.

Our sample is driven by requirements to compute S. This is particularly relevant in two cases. State codes are needed to know effective minimum wage levels, but the CEX does not report actual state of residence for the 10 percent of the sample residing in smaller states. These observations are dropped.[2] Another 16.7 percent of the remaining sample are excluded because of incomplete income responses.

To further refine the sample to households with adults that have well-measured hourly wages, we also exclude the self-employed (8.7 percent of remaining sample)[3], households headed by those under 18 or over 64 (21 percent), households in the survey for only one period (11.5 percent), households without an initial wage for the head and spouse (14.7 percent), and households where either of the two member's hourly wage is only 60 percent (that is, implausibly low) or 40 times greater than the effective minimum wage in the initial survey (4.2 percent). Finally, we exclude 5.5 percent of the remaining sample because of large changes in family composition (either the number of kids or the number of adults changes by more than 2), head's age (greater than two years), or head's gender, or log hourly wages between the initial survey and the last survey (log change of 1.5 of greater). These restrictions are meant to reduce the impact of measurement error or to exclude large and difficult-to-model changes in circumstances likely unrelated to minimum wage legislation.

[1] We do not include the 1981-82 panels because of some concern raised in Attansio and Weber (1995) about data quality and because of nontrivial differences in data structure and design. That said, there were no state increases between 1980 and 1982. The federal increases in 1980 and 1981 would be absorbed by time dummies because no state was above the prior federal minimum wage either.

[2] The CEX assigns states to these residents. Our results do not change if we use the CEX-assigned state rather than dropping those residents. We also drop the District of Columbia because of its complicated minimum wage structure.

[3] The percentages reported are ordered in that each one reflects the share of excluded observations relative to the sample that remains up to that point.

For spending, we ultimately use 200,549 household-surveys, representing 60,838 households. Of these, 11.2 percent, or 22,474 household-surveys, are from households with some minimum wage income in the initial period (i.e. $S_i > 0$). Just under 16,000 are from families where minimum wage income makes up over 20 percent of total pre-tax income (i.e. $S_i \geq 0.2$). For income, we use the same 60,838 households but because income is essentially only asked in the first and last surveys, we use 104,788 household-surveys.[4]

Panel A of web table A1 includes descriptive statistics of the key variables, including real total, durables, and nondurables and services spending, real family income, and selected demographics.

The Survey of Income and Program Participation (SIPP) and The Current Population Survey (CPS)

To provide corroboration of the income results estimated from the CEX, we also compute the income response to a minimum wage hike using the SIPP and CPS. The main advantage to these datasets is that they provide larger samples and are specifically designed to collect high-quality earnings and wage information.

The first SIPP panel we use begins in 1986 and the last ends in 2007. Each panel lasts between two and four years and provides interviews with between 12 and 40 thousand households. Households are interviewed every four months during the time they remain in a panel. While they are asked to recall labor market information for each month between interviews, we only use the most recent month information.

Variables are coded, and wage, self-employment, and family composition restrictions are introduced, to be as close as possible to the CEX sample described above. Like the CEX, the numerator on S_i – total income from minimum wage earners – is also computed on the

[4]Whenever an individual is added or deleted from the consumer unit, their income is collected regardless of the survey. Our baseline estimates only include household income in the second (or third if income is missing in the second) and fifth survey. However, we have also included household-surveys where a new worker was added. The results are very similar to those reported in table 1. The weighted average income response (table 1, column 4) is virtually identical.

household head and, when applicable, spouse or nonmarried partner, only in the first period that we observe them.

The one important difference, relative to the CEX, is that we restrict the SIPP sample to households with an hourly worker. This restriction is meant to increase the liklihood that minimum wage workers are correctly identified. As can be seen in table A1, this also reduces the family income of the $S_i = 0$ control group.[5] There are 474,758 household-survey observations remaining after all our sample restrictions,[6] of which 11.4 percent report some minimum wage earnings and 8.3 percent report at least 20 percent of their total household nonproperty income from minimum wage earners.

Panel B of table A1 provides summary statistics for the key SIPP variables.

The CPS data that we use begins in 1980 and ends in 2007. Individuals are in the CPS for four months, out for the following eight, and then in again for four more months. Those in the fourth and eight months of their participation are known as the outgoing rotation files and are asked questions specifically about weekly earnings and hours and hourly wages for those paid-by-the-hour. Therefore, we have two responses for each CPS respondent. Again, we define variables and sample restrictions to be analogous to the CEX.

Like the SIPP, variables are coded, and wage, self-employment, and family composition restrictions are introduced, to be as close as possible to the CEX sample. The numerator on S_i is likewise computed on the household head and, when applicable, adult second earner, in the first period that we observe them.

Using the sample of hourly wage workers, there are 809,631 observations remaining after our sample restrictions, of which 15.0 percent report some minimum wage earnings and 11.6

[5]We can compute a wage from monthly income and monthly hours worked, which is more analogous to the CEX wage measure. In this case, SIPP mean income would be about 20 percent higher.

[6]The definition of a household is not as straightforward as in the CEX. We rely on the variable *ppentry* to define households. Experimentation with other methods, such as holding composition fixed (stable households), does not qualitatively change the results.

percent report at least 20 percent of their total household nonproperty income from minimum wage earners. Panel C of web table A1 provides summary statistics for the key variables.[7]

Credit Bureau Reports

We use a proprietary dataset from a large financial institution that issues credit cards nationally. See Agarwal, Liu, and Souleles (2007) for details. We primarily rely on the credit bureau reports that are appended to these accounts because it allow us to look at the portfolio of debt of these households and test whether the financing of large durables, particularly vehicles, rise after a minimum wage increase.

There are important limitations to this data that give us some pause. First, by construction, the sample is selected on individuals holding a credit card. Minimum wage workers with credit cards are plausibly a selected sample of all minimum wage workers. According to our estimates from the Survey of Consumer Finances, 45 percent of all minimum wage workers have a credit card. This is similar to Johnson's (2007) estimate that 43 percent of households in the bottom quintile of the income distribution own a credit card. Median quarterly income is \$3,656 and \$3,047, median durables are \$9,463 and \$2,291, and median voluntary equity is \$3,663 and \$452 for those with and without a credit card, respectively. Thus it appears that we are selecting on a group of minimum wage workers who are less borrowing constrained than others. Second, as section II notes, demographics and income measures are limited. In particular, we only have the annual income of the account holder at the time of application. However, that data allows us to compute the probability that a worker is paid at the minimum wage (see section II.A).

Panel D of web table A1 provides some key descriptive statistics.

The Survey of Consumer Finances (SCF)

[7]Mean family income is significantly higher, about \$51,000 for $S_i = 0$ households, if the sample is not restricted to hourly workers.

Finally, we use the SCF to provide descriptive information on the initial joint distribution of the state variables used in the dynamic programming problem. The three state variables are the permanent component of income P_{it}, cash on hand X_{it} (which is the sum on income and net financial assets), and the stock of durable goods D_{it}. Equation (**??**) shows that $P_{it} = Y_{it} - \alpha_t$ when there are no transitory shocks, so we just need Y_{it} to infer P_{it}. We assume that permanent income is the same as current income, and define the durables stock as the sum of vehicles plus the stock of non-vehicle durables. We define net financial assets as financial assets less debt against these financial assets or durable goods.

Web table A4 presents descriptive statistics from the 1989, 1992, 1995, 1998, 2001, 2004, and 2007 waves of the SCF. The table includes the state variables as well as total debt and assets which contain other assets, such as housing and business wealth, to provide a more complete picture of household balance sheets.

We present means for both minimum wage households ($S_i = 0$) and above minimum wage households ($S \geq .2$). To compute S_i, we use a methodology very similar to the CEX (described in section 3.1). First, we define someone as a minimum wage worker if that individual makes between 60 and 120 percent of the minimum wage. Next, if an individual is a minimum wage worker, we multiply that individual's hourly wage by hours per week times weeks per year. Because the SCF reports pay at frequencies chosen by the respondent, we compute the wage using given pay and frequency of pay, adjusted appropriately by hours per year. Finally, we take total household income from minimum wage workers and divide through by total household wage income (where wage income is the income of respondent and spouse and is derived using the procedure described above) which gives S_i, the share of income from minimum wage workers.

Web table A4 shows that for minimum wage households[8], mean income, durables, and

[8]Similar to the CEX, the unit of observation in the SCF is the "primary economic unit," which is usually a household.

durables debt are all about one half to one third as large as for non-minimum wage households. However, mean net financial wealth of minimum wage households is only 16 percent of that of non-minimum wage households. Median net financial assets are only $180. Note that that our definition of assets and durables excludes housing and business wealth. Roughly 40 percent of all minimum wage households own their home. For these households, housing represents close to 50 percent of all wealth and housing debt represents over 50 percent of all debt.

State-level Data

We obtained the state minimum wage histories from the January issues of the Monthly Labor Review. See web table A2.

When estimating the effect of the minimum wage on spending and income, we sometimes control for maximum cash welfare benefit for a family of three by state and year, the refundable EITC attainable in a state in a given year, and state unemployment rates to account for possible UI extensions. The welfare levels are obtained from past issues of the Greenbook. For the years 1981, 1988, 1996, and 2006, we used table 7-22 from the 2008 Greenbook (http://waysandmeans.house.gov/media/pdf/110/tanf.pdf). For the years 1994, 1998, 2000, 2002, and 2003, we used table 7-10 from the 2003 Greenbook (http://waysandmeans.house.gov/media/pdf/greenbook2003/Section7.pdf). We were unable to find 1997, 1999, 2001, 2004, 2005, and 2007 and therefore assumed that they were the same as the following year (in most cases the previous and following year were the same). All remaining years were obtained from Diane Schanzenbach and are based on past Greenbooks. The annual EITC measure is the refundable EITC attainable in a state as a percent of the attainable federal EITC. We take this from Baughman and Dickert-Conlin (2007) through 1999 and table I-2 in http://www.cga.ct.gov/2008/rpt/pdf/2008-R-0102.pdf thereafter. In

In order to preserve confidentiality of respondents, noise is added to SCF data. Each responding economic unit is turned into five observations.

some instances (e.g. Iowa), the sources conflict, in which case we use the Baughman and Dickert-Conlin number. State unemployment rates are taken from the BLS' tabulation of the Current Population Survey. Note that the correlation between the change in the state minimum wage and the change in state EITC and welfare benefits are essentially zero, consistent with out finding that these additional controls have little impact on our minimum wage point estimates.

Appendix B: Standard error calculation when averaging over multiple estimates(not for publication)

Define the population marginal propensity to spend (MPS) as β and the estimated MPS as $\hat{\beta} = \frac{\hat{C}}{\hat{Y}}$, where $\hat{C}$ = the estimated coefficient on the minimum wage from a regression of total spending (so C includes durables investment) on the minimum wage (which at the population level we define as C), $\hat{Y}$ = the estimated coefficient on the minimum wage from a regression of income on the minimum wage (which at the population level we define as Y). The spending estimate comes from the CEX, which we define as $\hat{C} = C + \varepsilon_C$. We have three estimates of the income response from the CEX, SIPP, and CPS, defined as $\hat{Y_{CEX}} \equiv Y + \varepsilon_{Y_{CEX}}, \hat{Y_{SIPP}} \equiv Y + \varepsilon_{Y_{SIPP}}, \hat{Y_{CPS}} \equiv Y + \varepsilon_{Y_{CPS}}$. We assume that ε_C and $\varepsilon_{Y_\cdot}$ are white noise. We take the weighted average of these estimates for our estimated income response,

$$\hat{Y} = w_{CEX}\hat{Y_{CEX}} + w_{SIPP}\hat{Y_{SIPP}} + (1 - w_{CEX} + w_{SIPP})\hat{Y_{CPS}} \equiv Y + \varepsilon_Y. \quad (1)$$

A Taylor's series expansion for $\hat{\beta}$ is

$$\hat{\beta} = \beta + \frac{1}{\hat{Y}}\varepsilon_C - \frac{\hat{C}}{\hat{Y}^2}\varepsilon_Y$$

so the variance is:

$$(2) \qquad Var(\hat{\beta}) = E(\hat{\beta}-\beta)^2 = \frac{1}{\hat{Y}^2}Var(\varepsilon_C) + \frac{\hat{C}^2}{\hat{Y}^4}Var(\varepsilon_Y) - 2\frac{\hat{C}}{\hat{Y}^3}Cov(\varepsilon_C, \varepsilon_Y).$$

Our estimate of $Var(\varepsilon_C)$ is the variance of the estimated coefficient $\hat{C}$ (or the square of its standard error). Next, we estimate $Var(\varepsilon_Y)$ using equation (1)

(3)

$$Var(\epsilon_Y) = Var(\hat{Y}) = w_{CEX}^2 Var(\hat{Y_{CEX}}) + w_{SIPP}^2 Var(\hat{Y_{SIPP}}) + (1 - w_{CEX} + w_{SIPP})^2 Var(\hat{Y_{CPS}})$$

where $Var(\hat{Y_{CEX}}), ...$ are the variance of the coefficients $\hat{Y_{CEX}}, ...$ Finally, consider estimating $Cov(\varepsilon_C, \varepsilon_Y)$. This will be nonzero because the CEX is used to estimate both $\hat{C}$ and $\hat{Y}$. Analogous to equation (2) we can recover this covariance using:

$$Var(\hat{\beta_{CEX}}) = \frac{1}{\hat{Y_{CEX}}^2}Var(\varepsilon_{C_{CEX}}) + \frac{\hat{C_{CEX}}^2}{\hat{Y_{CEX}}^4}Var(\varepsilon_{Y_{CEX}}) - 2\frac{\hat{C_{CEX}}}{\hat{Y_{CEX}}^3}Cov(\varepsilon_{C_{CEX}}, \varepsilon_{Y_{CEX}})$$

where $\hat{\beta_{CEX}}$ is the 2SLS estimate of β using the CEX. Rearranging yields

(4)

$$Cov(\varepsilon_{C_{CEX}}, \varepsilon_{Y_{CEX}}) = \frac{\hat{Y_{CEX}^3}}{2\hat{C_{CEX}}}\left[\frac{1}{\hat{Y_{CEX}}^2}Var(\varepsilon_{C_{CEX}}) + \frac{\hat{C_{CEX}}^2}{\hat{Y_{CEX}}^4}Var(\varepsilon_{Y_{CEX}}) - Var(\hat{\beta_{CEX}})\right].$$

Because the SIPP and CPS estimates come from different data sets, the covariance of the income estimates with either the income or spending estimates in the CEX should be 0. Thus

$$\begin{aligned} Cov(\varepsilon_C, \varepsilon_Y) &= Cov(\varepsilon_C, \hat{Y} - Y) \\ &= Cov(\varepsilon_C, w_{CEX}\varepsilon_{Y_{CEX}}) \\ &= w_{CEX}Cov(\varepsilon_C, \varepsilon_{Y_{CEX}}). \end{aligned} \qquad (5)$$

Thus $Var(\hat{\beta})$ can be estimated using equation (2), using equations (4) and (5) to estimate $Cov(\varepsilon_C, \varepsilon_Y)$, and (1) to estimate $Var(\hat{Y})$.

Including Debt Information

Assuming the interest rate is close to zero and $\Delta debt = -\Delta A$, then the asset accumulation equation yields $C = Y + \Delta debt$. Thus a second measure of the MPS is $\hat{\beta}_2 = \frac{\hat{Y}+\Delta\hat{debt}}{\hat{Y}} = 1 + \frac{\Delta\hat{debt}}{\hat{Y}}$. Analagous to equation (2), the of variance of the second measure of the MPS is

$$Var(\hat{\beta}_2) = E(\hat{\beta}_2 - \beta)^2 = \frac{1}{\hat{Y}^2} Var(\varepsilon_{\Delta debt}) + \frac{\Delta\hat{debt}^2}{\hat{Y}^4} Var(\varepsilon_Y) \tag{6}$$

It is also possible to take a weighted average over the two MPS estimates:

$$\hat{\beta}_3 = w\hat{\beta} + (1-w)\hat{\beta}_2 \tag{7}$$

The variance of this object is:

$$Var(\hat{\beta}_3) = w^2 Var(\hat{\beta}) + (1-w)^2 Var(\hat{\beta}_2) + w(1-w)Cov(\hat{\beta}, \hat{\beta}_2). \tag{8}$$

The covariance $Cov(\hat{\beta}, \hat{\beta}_2)$ is not 0 because (i) the same income information is used in both measures and (ii) the CEX income measure is correlated with the CEX spending measure. The covariance is:

$$Cov(\hat{\beta}, \hat{\beta}_2) = -\frac{\Delta\hat{debt}}{\hat{Y}^3} Cov(\varepsilon_Y, \varepsilon_C) + \frac{\Delta\hat{debt}\hat{C}}{\hat{Y}^4} Var(\hat{Y}) \tag{9}$$

where $Cov(\varepsilon_Y, \varepsilon_C)$ is calculated in equation (5), so (9) can be written as:

$$Cov(\hat{\beta}, \hat{\beta}_2) = -\frac{\Delta\hat{debt}}{\hat{Y}^3} w_{CEX} Cov(\varepsilon_C, \varepsilon_{Y_{CEX}}) + \frac{\Delta\hat{debt}\hat{C}}{\hat{Y}^4} Var(\hat{Y}) \tag{10}$$

Minimizing the right hand side of equation (8) with respect to w yields the value of w that minimizes the variance of $\hat{\beta}_3$:

$$w = \frac{Var(\hat{\beta}_2) - Cov(\hat{\beta}, \hat{\beta}_2)/2}{Var(\hat{\beta}) + Var(\hat{\beta}_2) - Cov(\hat{\beta}, \hat{\beta}_2)}. \tag{11}$$

Appendix C: Solving the model (not for publication)

In order to reduce the number of state variables, we follow Deaton (1991) and redefine the

problem in terms of cash-on-hand:[9]

$$X_t = (1+r)A_t + Y_t. \tag{12}$$

Assets and cash-on-hand follow:

$$A_{t+1} = X_t - C_t, \tag{13}$$

$$X_{t+1} = (1+r)(X_t - C_t - I_t) + Y_{t+1}. \tag{14}$$

Thus, the borrowing constraint becomes

$$-\left(\frac{X_t - Y_t}{1+r}\right) \leq (1-\pi)D_t. \tag{15}$$

Note that all of the variables in X_t are known at the beginning of period t. We can thus write the individual's problem recursively, using cash-on-hand as a state variable. In recursive form, the household's problem is to choose non-durables consumption and durables investment to maximize :

$$V_t(Z_t) = \max_{C_t, I_t}\{(C_t^{1-\theta}D_t^{\theta})^{1-\gamma}/(1-\gamma) + \beta \int V_{t+1}(Z_{t+1})dF(Z_{t+1}|Z_t, C_t, I_t, t)\} \tag{16}$$

subject to the constraint in equation (15), where the state variables of the model are $Z_t = (X_t, D_t, P_t)$, and $F(.|.)$ gives the conditional cdf of the state variables, using equations (**??**), (**??**), (**??**), and (14). Solving the model gives optimal consumption and durables investment decision rules.

The source of uncertainty in the model is from income. We integrate over the distribution of income by discretizing P_t using discrete state Markov Chains (Tauchen 1986).

To simulate the model, we take the initial joint distribution of the state variables from the data. We then take draws of income from the data generating process of income. Given

[9] Using cash-on-hand allows us to combine assets and the transitory component of income u_t into a single state variable.

the initial joint distribution of (X_0, D_0, P_0) that we observe in the data, we use the decision rules to obtain C_0, I_0, which gives us a value of (X_1, D_1). We take a draw for P_1, which then gives income. We repeat this for $T = 200$ periods. The figures presented are based on 5,000 simulations of the model.

Appendix D: Certainty and no borrowing constraints (not for publication)

Using assets instead of cash on hand as the state variable, Bellman's equation (16) without uncertainty is:

$$V_t(A_t, D_t, P_t) = \max_{C_t, I_t} \{U(C_t, D_t) + \beta V_{t+1}(A_{t+1}, D_{t+1}, P_{t+1})\}. \tag{17}$$

The only constraints in this case are the law of motion for assets (equation **??**) and durables (equation **??**) and that final period assets must be non-negative. The first order conditions for non-durables consumption and durables investment are, respectively:

$$\frac{\partial U_t}{\partial C_t} = \beta \frac{\partial V_{t+1}}{\partial A_{t+1}} \tag{18}$$

$$\frac{\partial V_{t+1}}{\partial A_{t+1}} = \frac{\partial V_{t+1}}{\partial D_{t+1}}. \tag{19}$$

Differentiating with respect to assets and the durables stock and using the envelope condition yields, respectively:

$$\frac{\partial V_t}{\partial A_t} = \beta(1 + r) \frac{\partial V_{t+1}}{\partial A_{t+1}} \tag{20}$$

$$\frac{\partial V_t}{\partial D_t} = \frac{\partial U_t}{\partial D_t} + \beta \frac{\partial V_{t+1}}{\partial D_{t+1}}(1 - \delta). \tag{21}$$

Combining equations (19), (20), and (21) yields

$$\beta(1 + r) \frac{\partial V_{t+1}}{\partial A_{t+1}} = \frac{\partial U_t}{\partial D_t} + \beta \frac{\partial V_{t+1}}{\partial A_{t+1}}(1 - \delta). \tag{22}$$

Combining equations (18) and (22) yields

$$(r+\delta)\frac{\partial U_t}{\partial C_t} = \frac{\partial U_t}{\partial D_t}. \tag{23}$$

Inserting the specific functional forms for the utility function from equation (**??**) into equation (23) yields

$$(r+\delta)\left(\frac{1-\theta}{\theta}\right)D_t = C_t. \tag{24}$$

Combining equations (18), (20), and (24) yields the Euler Equation

$$C_{t+1} = C_t(\beta(1+r))^{\frac{1}{\gamma}}. \tag{25}$$

Define

$$PV \equiv A_0 + \sum_{t=0}^{T}\left(\frac{1}{1+r}\right)^t Y_t \tag{26}$$

as "full wealth", i.e., the present value of lifetime income plus wealth. Given that the present value of lifetime spending is equal to full wealth (and given that the annual cost of durables is $(r+\delta)$), the lifetime budget constraint is

$$\sum_{t=0}^{T}\left(\frac{1}{1+r}\right)^t (C_t + (r+\delta)D_t) = PV. \tag{27}$$

Inserting equation (24) into equation (27) yields

$$\sum_{t=0}^{T}\left(\frac{1}{1+r}\right)^t \left(C_t + \left(\frac{\theta}{1-\theta}\right)C_t\right) = PV. \tag{28}$$

Combining equation (25) with equation (28) yields

$$\sum_{t=0}^{T}\left(\frac{1}{1+r}\right)^t \left(\left(1+\left(\frac{\theta}{1-\theta}\right)\right)C_0(\beta(1+r))^{t/\gamma}\right) = PV. \tag{29}$$

Using the formula for an infinite sum and rearranging yields

$$C_0 = (1-\theta)\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right]PV \tag{30}$$

where $(1-\theta)\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right]$ is the marginal propensity to consume non-durables. Inserting equation (24) into equation (30) yields

$$D_0 = (\frac{\theta}{r+\delta})\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right]PV. \tag{31}$$

Holding last period's durables stock fixed, increases in this period's durables stock can only come from increases in investment. Thus

$$\left.\frac{\partial I_0}{\partial PV}\right|_{D_0} = \left.\frac{\partial D_1}{\partial PV}\right|_{D_0} = (\beta(1+r))^{\frac{1}{\gamma}}(\frac{\theta}{r+\delta})\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right] \tag{32}$$

is the marginal propensity to spend on durables. Inspection of equation (27) shows that the marginal propensity to spend is the same for increases in assets and the present value of lifetime income. In order to get time period 1 non-durables and durables spending, note that equation (25) shows that consumption grows at rate $(\beta(1+r))^{\frac{1}{\gamma}}$, and thus the marginal propensity to consume non-durables at time 1, given an increase in full wealth at time 0, is $(\beta(1+r))^{\frac{1}{\gamma}}(1-\theta)\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right]$. To derive the time 1 durables spending response, note that the ratio of durables to non-durables is a constant, and thus the durables stock grows at a rate $(\beta(1+r))^{\frac{1}{\gamma}}$. Using this result, the law of motion for durables, and equation (32)

yields the marginal propensity to spend on durables at time 1:

$$\begin{aligned}
\left.\frac{\partial I_1}{\partial PV}\right|_{D_0} &= \left.\frac{\partial D_2}{\partial PV}\right|_{D_0} - (1-\delta)\left.\frac{\partial D_1}{\partial PV}\right|_{D_0} \\
&= (\beta(1+r))^{\frac{1}{\gamma}}\left.\frac{\partial D_1}{\partial PV}\right|_{D_0} - (1-\delta)\left.\frac{\partial D_1}{\partial PV}\right|_{D_0} \\
&= \left[(\beta(1+r))^{\frac{1}{\gamma}} - (1-\delta)\right]\left.\frac{\partial D_1}{\partial PV}\right|_{D_0} \\
&= \left[(\beta(1+r))^{\frac{1}{\gamma}} - (1-\delta)\right](\beta(1+r))^{\frac{1}{\gamma}}\left(\frac{\theta}{r+\delta}\right)\left[\frac{1-\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}}{1-\left(\frac{(\beta(1+r))^{\frac{1}{\gamma}}}{1+r}\right)^{T+1}}\right]. \qquad (33)
\end{aligned}$$

Solving for time period 2 spending propensities is straightforward.

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NOT FOR PUBLICATION

Table A1

Summary Statistics

Variable	Units with S_i=0 in initial survey		Units with $S_i \geq 0.2$ in initial survey		Income ≥ $20,000 at application		Income < $20,000 at application	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
A. Consumer Expenditure Survey, 1983-2008								
Real average quarterly spending	10,938	7,792	6,462	4,731				
Real Durables	1,818	4,932	890	3,087				
Real Nondurables and services	9,120	5,243	5,573	3,059				
Real before tax family nonasset annual income, first and last surveys	61,896	43,882	21,074	16,148				
Share of income from MW earners	0.00	0.00	0.68	0.30				
Member 1 age	40.4	11.1	35.6	12.8				
Number of adults	1.90	0.81	1.79	0.85				
Number of kids under 18	0.82	1.12	0.88	1.22				
Number of unit-surveys	178,075		15,834					
Number of units	53,629		5,206					
B. Survey of Income and Program Participation, 1986-2007								
Real before tax family nonproperty annual income in initial survey	52,341	35,554	25,914	20,210				
Share of income from MW earners	0.00	0.00	0.62	0.31				
Head age	41.48	10.97	38.21	12.10				
Number of adults	1.93	0.77	1.78	0.74				
Number of kids under 18	0.88	1.12	1.02	1.22				
Number of household-surveys	420,634		39,472					
Number of households	52775		5,176					

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Table A1
Summary Statistics

Variable	Units with S_i=0 in initial survey		Units with $S_i \geq 0.2$ in initial survey		Income ≥ $20,000 at application		Income < $20,000 at application	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
C. Current Population Survey, 1980-2007								
Real annualized family income	38,333	22,471	21,433	15,088				
Share of income from MW earners	0	0	0.65	0.32				
Head age	42.1	10.9	41.2	12.2				
Number of adults	2.15	0.86	2.22	0.92				
Number of kids under 18	0.89	1.11	0.93	1.18				
Number of household-surveys	688,356		93,846					
D. Credit Card and Credit Bureau, 1995-2008								
Annual salary income at application					74,623	49,576	14,033	9,381
Fico Score					737	84	700	73
Active Credit Cards					3.0	2.6	2.3	2.6
Credit Card Balance on All Cards					6,162	7,775	4,713	4,368
Home Equity Balance					703	5,376	753	8,653
Mortgage Balance					20,807	163,738	30,595	118,130
Auto Balance					3,314	8,365	3,432	7,117
Number of observations					4,028,327		582,170	
Number of consumers					317,116		31,624	

Notes: Real spending and income in 2005 dollars. All CEX, SIPP, and CPS descriptive statistics are weighted.

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Table A2

Minimum Wage Changes, 1982-2008

	Date	New	Change		Date	New	Change
U.S.	Apr-90	3.80	0.45				
U.S.	Apr-91	4.25	0.45				
U.S.	Oct-96	4.75	0.50				
U.S.	Sep-97	5.15	0.40				
U.S.	Jul-07	5.85	0.70				
U.S.	Jul-08	6.55	0.70				
Alaska	Jan-03	7.15	1.50	Illinois	Jan-04	5.50	0.35
Arizona	Jan-07	6.75	1.60	Illinois	Jan-05	6.50	1.00
Arizona	Jan-08	6.90	0.15	Illinois	Jul-07	7.50	1.00
Arkansas	Oct-06	6.25	1.10	Illinois	Jul-08	7.75	0.25
California	Jul-88	4.25	0.90	Iowa	Jan-90	3.85	0.50
California	Mar-97	5.00	0.25	Iowa	Jan-91	4.25	0.40
California	Sep-97	5.15	0.15	Iowa	Jan-92	4.65	0.40
California	Mar-98	5.75	0.60	Iowa	Oct-96	4.75	0.10
California	Jan-01	6.25	0.50	Iowa	Apr-07	6.20	1.05
California	Jan-02	6.75	0.50	Iowa	Jan-08	7.25	1.05
California	Jan-07	7.50	0.75	Kentucky	Jun-07	5.85	0.70
California	Jan-08	8.00	0.50	Maine	Jan-85	3.45	0.10
Colorado	Jan-07	6.85	1.70	Maine	Jan-86	3.55	0.10
Colorado	Jan-08	7.02	0.17	Maine	Jan-87	3.65	0.10
Connecticut	Oct-87	3.75	0.38	Maine	Jan-88	3.75	0.10
Connecticut	Oct-88	4.25	0.50	Maine	Jan-90	3.85	0.10
Connecticut	Apr-91	4.27	0.02	Maine	Apr-91	4.25	0.40
Connecticut	Oct-96	4.77	0.50	Maine	Jan-02	5.75	0.60
Connecticut	Mar-97	5.00	0.23	Maine	Jan-03	6.25	0.50
Connecticut	Sep-97	5.18	0.18	Maine	Jan-05	6.35	0.10
Connecticut	Jan-99	5.65	0.47	Maine	Jan-06	6.50	0.15
Connecticut	Jan-00	6.15	0.50	Maine	Oct-06	6.75	0.25
Connecticut	Jan-01	6.40	0.25	Maine	Oct-07	7.00	0.25
Connecticut	Jan-02	6.70	0.30	Maine	Oct-08	7.25	0.25
Connecticut	Jan-03	6.90	0.20	Maryland	Jan-07	6.15	1.00
Connecticut	Jan-04	7.10	0.20	Massachusetts	Jul-86	3.55	0.20
Connecticut	Jan-06	7.40	0.30	Massachusetts	Jul-87	3.65	0.10
Connecticut	Jan-07	7.65	0.25	Massachusetts	Jul-88	3.75	0.10
Delaware	May-99	5.65	0.50	Massachusetts	Apr-90	3.80	0.05
Delaware	Oct-00	6.15	0.50	Massachusetts	Jan-96	4.75	0.50
Delaware	Jan-07	6.65	0.50	Massachusetts	Jan-97	5.25	0.50
Delaware	Jan-08	7.15	0.50	Massachusetts	Jan-00	6.00	0.75
Florida	Jan-06	6.40	1.25	Massachusetts	Jan-01	6.75	0.75
Florida	Jan-07	6.67	0.27	Massachusetts	Jan-07	7.50	0.75
Florida	Jan-08	6.79	0.12	Massachusetts	Jan-08	8.00	0.50
Hawaii	Jan-88	3.85	0.50	Michigan	Oct-06	6.95	1.80
Hawaii	Mar-91	4.25	0.40	Michigan	Jul-07	7.15	0.20
Hawaii	Apr-92	4.75	0.50	Michigan	Jul-08	7.40	0.25
Hawaii	Jan-93	5.25	0.50	Minnesota	Jan-88	3.55	0.20
Hawaii	Jan-02	5.75	0.50	Minnesota	Jan-89	3.85	0.30
Hawaii	Jan-03	6.25	0.50	Minnesota	Jan-90	3.95	0.10
Hawaii	Jan-06	6.75	0.50	Minnesota	Jan-91	4.25	0.30
Hawaii	Jan-07	7.25	0.50	Minnesota	Aug-05	6.15	1.00

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Table A2 -cont-

Minimum Wage Changes, 1982-2008

	Date	New	Change		Date	New	Change
Missouri	Jan-07	6.50	1.35	Rhode Island	Jul-86	3.55	0.20
Missouri	Jan-08	6.65	0.15	Rhode Island	Jul-87	3.65	0.10
Montana	Jan-07	6.15	1.00	Rhode Island	Jul-88	4.00	0.35
Nevada	Nov-06	6.15	1.00	Rhode Island	Aug-89	4.25	0.25
Nevada	Jan-07	6.33	0.18	Rhode Island	Apr-91	4.45	0.20
New Hampshire	Jan-87	3.45	0.10	Rhode Island	Oct-96	4.75	0.30
New Hampshire	Jan-88	3.55	0.10	Rhode Island	Jul-99	5.65	0.50
New Hampshire	Jan-89	3.65	0.10	Rhode Island	Sep-00	6.15	0.50
New Hampshire	Jan-90	3.75	0.10	Rhode Island	Jan-04	6.75	0.60
New Hampshire	Apr-90	3.80	0.05	Rhode Island	Mar-06	7.10	0.35
New Hampshire	Jan-91	3.85	0.05	Rhode Island	Jan-07	7.40	0.30
New Hampshire	Apr-91	4.25	0.40	South Dakota	Jul-07	5.85	0.70
New Hampshire	Sep-07	6.50	1.35	Vermont	Jul-86	3.45	0.10
New Hampshire	Sep-08	7.25	0.75	Vermont	Jul-87	3.55	0.10
New Jersey	Apr-92	5.05	0.80	Vermont	Jan-89	3.65	0.10
New Jersey	Sep-97	5.15	0.10	Vermont	Jul-89	3.75	0.10
New Jersey	Oct-05	6.15	1.00	Vermont	Apr-90	3.85	0.10
New Jersey	Oct-06	7.15	1.00	Vermont	Apr-91	4.25	0.40
New Mexico	Jan-08	6.50	0.65	Vermont	Jan-95	4.50	0.25
New York	Jan-05	6.00	0.85	Vermont	Jan-96	4.75	0.25
New York	Jan-06	6.75	0.75	Vermont	Jul-97	5.15	0.40
New York	Jan-07	7.15	0.40	Vermont	Sep-97	5.25	0.10
North Carolina	Jan-07	6.15	1.00	Vermont	Nov-99	5.75	0.50
North Dakota	Jul-07	5.85	0.70	Vermont	Jan-01	6.25	0.50
Ohio	Jan-07	6.85	1.70	Vermont	Jan-04	6.75	0.50
Ohio	Jan-08	7.00	0.15	Vermont	Jan-05	7.00	0.25
Oregon	Sep-89	3.85	0.50	Vermont	Jan-06	7.25	0.25
Oregon	Jan-90	4.25	0.40	Vermont	Jan-07	7.53	0.28
Oregon	Jan-91	4.75	0.50	Vermont	Jan-08	7.68	0.15
Oregon	Jan-97	5.50	0.75	Washington	Jan-89	3.85	0.50
Oregon	Jan-98	6.00	0.50	Washington	Jan-90	4.25	0.40
Oregon	Jan-99	6.50	0.50	Washington	Jan-94	4.90	0.65
Oregon	Jan-03	6.90	0.40	Washington	Sep-97	5.15	0.25
Oregon	Jan-04	7.05	0.15	Washington	Jan-99	5.70	0.55
Oregon	Jan-05	7.25	0.20	Washington	Jan-00	6.50	0.80
Oregon	Jan-06	7.50	0.25	Washington	Jan-01	6.72	0.22
Oregon	Jan-07	7.80	0.30	Washington	Jan-02	6.90	0.18
Oregon	Jan-08	7.95	0.15	Washington	Jan-03	7.01	0.11
Pennslyvania	Feb-89	3.70	0.35	Washington	Jan-04	7.16	0.15
Pennslyvania	Apr-90	3.80	0.10	Washington	Jan-05	7.35	0.19
Pennslyvania	Jan-07	6.25	1.10	Washington	Jan-06	7.63	0.28
Pennslyvania	Jul-07	7.15	0.90	Washington	Jan-07	7.93	0.30
				Washington	Jan-08	8.07	0.14
				West Virginia	Jul-06	5.85	0.70
				West Virginia	Jul-07	6.55	0.70
				West Virginia	Jul-08	7.25	0.70
				Wisconsin	Jun-05	5.70	0.55
				Wisconsin	Jun-06	6.50	0.80

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Table A3

Employment, Hours, and Wage Responses to a Minimum Wage Increase

Current Population Survey, 1980-2007

Sample: Hourly Wage Workers

Share of income from minimum wage jobs (S_i)	Employment			Hours			Hourly Wage		
	Total	Head	Spouse	Total	Head	Spouse	All	Head	Spouse
0	-0.005	-0.001	-0.004	-0.15	-0.03	0.03	-0.03	0.01	0.09
	(0.002)	(0.002)	(0.002)	(0.11)	(0.06)	(0.07)	(0.08)	(0.06)	(0.06)
	688,356	672,523	543,129	688,356	619,073	438,720	688,356	513,895	378,890
>0	0.009	-0.003	0.015	1.12	0.31	0.71	0.47	0.41	0.42
	(0.009)	(0.006)	(0.008)	(0.40)	(0.21)	(0.27)	(0.19)	(0.15)	(0.11)
	121,275	117,203	102,764	121,275	104,554	91,038	121,275	82,311	86,859
≥0.2	0.011	-0.001	0.017	0.82	-0.02	0.67	0.54	0.40	0.40
	(0.011)	(0.008)	(0.010)	(0.49)	(0.26)	(0.33)	(0.20)	(0.15)	(0.13)
	93,846	90,453	75,929	93,846	79,487	66,258	93,846	63,230	63,164

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Table A4

Summary Statistics, 1989, 1992, 1995, 1998, 2001, 2004, and 2007 Survey of Consumer Finances

Variable	Households with S_i=0		Households with $S_i \geq 0.2$	
	Mean	Median	Mean	Median
Family income	54,106	40,735	20,008	14,295
Value of durables (D_{it})	19,579	12,590	9,232	5,146
Value of loans against durables	6,447	0	3,911	0
Financial assets	136,384	17,035	24,549	824
Net financial assets (A_{it})	129,937	11,367	20,637	180
Voluntary equity ($A_{it}+(1-\pi)D_{it}$)	141,684	20,889	26,176	2,842
Homeowner (=1 if yes)	0.62	1.00	0.40	0.00
Age of head	41.7	41.0	37.1	35.0
Number of households	79,385		3,842	

Notes: Real income, assets, and debt in 2005 dollars. All descriptive statistics are weighted. Income variable is pre-tax earnings of husband and wife. Financial assets includes stocks, bonds, checking and money market accounts, less liabilities against these. Net financial assets is financial assets less value of loans against durables.