THE WEALTH OF THE UNEMPLOYED

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Many studies have investigated the adequacy of unemployment insurance (UI) benefits as a form of income replacement, but few have looked at other resources with which the unemployed can finance their unemployment spells. This paper focuses on one form of resources, own wealth holdings. The author finds that the median worker's financial assets can cover roughly two-thirds of the income loss from an unemployment spell. Wealth holdings vary tremendously, however, and almost one-third of workers are unable to replace even 10% of their income loss. Moreover, predicted wealth holdings decline precipitously with realized unemployment durations, *both* absolutely and (especially) relative to actual income loss. This finding, together with the finding that individuals who are eligible for more generous UI draw down their wealth more slowly than do others during unemployment spells, suggests that UI benefit adequacy could be increased if the benefits were targeted to those with longer unemployment spells.

A central question for the design of the unemployment insurance (UI) program is the adequacy of UI benefits, in terms of maintaining the standard of living of recipients while unemployed. A number of empirical studies have examined the level of UI benefits relative to the previous earnings of the unemployed, and the distribution of this replacement rate, as a measure of the adequacy of the system. But this empirical literature has not generally recognized that the adequacy of UI benefits will be a function of the private resources that individuals have available to finance their unemployment spells. If individuals have few assets available when they lose their job, then UI benefits may be an integral part of their effort to maintain their standard of living; but if individuals who lose their jobs have substantial assets, then the generosity of UI benefits is of little relevance to adequacy. Indeed, the theoretical literature assigns a critical role to private savings in determining both the optimal level of UI benefits (Baily 1978) and the optimal timeline for their disbursement (Shavell and Weiss 1979). Surprisingly, however, there is little previous evidence on the wealth holdings of those who become unemployed, or on the role that UI plays in determining wealth decumulation during unemployment spells.

In this paper I remedy this deficiency by analyzing data from the Survey of Income

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A data appendix with additional results, and copies of the computer programs used to generate the results presented in the paper, are available from the author at Department of Economics, MIT, 50 Memorial Drive, E52-355, Cambridge, MA 02142.

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and Program Participation (SIPP). The SIPP is a large nationally representative survey that follows households over a period of 2–3 years. These longitudinal data allow one to measure both pre- and post-separation characteristics of those becoming unemployed. Most important, the SIPP also collects information from two points in time (one year apart) on the wealth holdings of households. This allows me to examine both the ex-ante wealth levels of those becoming unemployed and how they use their wealth while unemployed.

I use these data to address three questions about the wealth of the unemployed. First, how large are wealth holdings relative to the income risk from unemployment? This goes directly to the question of UI benefit adequacy. Second, how does the adequacy of ex-ante wealth holdings vary with the characteristics of the unemployed? Identifying the key correlates of wealth adequacy can be important for designing an approach that more effectively targets UI spending. Third, how does the use of wealth by the unemployed interact with the generosity of the UI system? Arguably, one role of UI is to keep unemployed individuals from becoming destitute as a result of having to sell all of their assets. Do unemployed persons rely less on their own wealth, and more on the UI system, to finance their unemployment spells where UI is more generous?

Background on Adequacy

The study of UI benefits adequacy has a long history. (O'Leary [1996] provides an excellent review.) Previous studies have generally been of three types. The first computes the distribution of income replacement rates from UI benefits; for example, these studies assess the share of the work force for which UI benefits replaced at least one-half of their foregone income. The second type compares UI benefits instead to previous consumption expenditures, particularly expenditures on "necessities." The advantage of this approach is that the explicit goal of the UI program is to maintain living standards, not necessarily income levels.

But both of these approaches have an important weakness: they assume that there is no offsetting response of other resource flows to differences in UI generosity. That is, individuals may have a variety of private mechanisms upon which they can rely to finance their consumption when they have an unemployment spell. To the extent that these other resources are available, increases in UI benefits will simply crowd them out, reducing the direct impact of UI on well-being. In the limit, if individuals held complete private insurance against unemployment spells, UI would have no effect: for each dollar of increased UI benefits entitlement, individuals would hold one dollar less of private insurance, so that their total coverage would be unchanged.

There are a number of potential sources of private insurance against unemployment spells. The most obvious is individual wealth accumulation. Particularly for individuals who can anticipate having regular unemployment spells, own savings can serve as a consumption-smoothing device that substitutes for the income that is not replaced by UI. Another mechanism is family labor supply; if the head of the household loses his job, his wife (or other family members) may be able to increase their labor earnings to compensate for the income reduction. Other mechanisms include private supplemental unemployment insurance, other government transfer programs (such as food stamps), and transfers from other family members or charitable institutions.

The fact that UI may "crowd out" these other forms of insurance leads to an alternative metric for assessing adequacy: the extent to which UI benefits are reflected in consumption behavior. This question was studied by Browning and Crossley (1996), Gruber (1997), and Hamermesh and Slesnick (1996). The last two of those studies found that the consumption of the unemployed in the United States falls little given the existence of UI but would fall substantially if UI were not present, implying that UI benefits are fairly adequate. In contrast, Browning and Crossley, using

Canadian data, found that the consumption of the unemployed falls substantially and UI plays little consumption-smoothing role, suggesting that UI is not very adequate.[1]

The estimates in Gruber (1997) showed that increases in UI benefits are not translated directly to increased consumption. My finding in that study that consumption rose by only 27 cents for each dollar of UI eligibility implies that there are other resources being used by the unemployed to smooth their spells. One resource, as noted above, is the labor supply of spouses. The interaction between UI and spousal labor supply was investigated directly by Cullen and Gruber (2000), who found that the labor supply of the wives of unemployed husbands is very responsive to the unemployment compensation received by those husbands: for each dollar of UI for which a husband is eligible, his wife earns approximately 36 cents less.

A second resource is own savings. Unfortunately, however, we know very little about the wealth holdings of the unemployed; while there has been much distributional analysis of the unemployed population, to my knowledge no previous study has assessed their wealth holdings. Yet, for thinking about adequacy, it is critical to measure the wealth that the unemployed can tap during their unemployment spells. That is the purpose of this paper.

A closely related analysis is that of Engen and Gruber (forthcoming), which examines the extent to which UI generosity affects the wealth accumulation of the employed. In fact, in that study we found a very large percentage crowd out of savings by UI: for each 10% increase in UI generosity, savings falls by 2.8%. Since that paper focuses on the employed, however, it does not measure specifically the asset holdings of those becoming unemployed, nor does it study how wealth was used during unemployment spells.

Of course, a natural implication of the Engen and Gruber results is that the wealth tabulations that we examine here are conditional on the response of wealth holdings to UI systems. As a result, wealth holdings will be lower than they would be in the absence of UI. So these tabulations understate the *potential* of wealth to buffer unemployment shocks, to the extent that in the absence of UI, wealth holdings would be higher than shown here.

Data and Methodology

Data

The data for this analysis are from the SIPP panels for 1984–92. The SIPP follows respondent households for 2–3 years, with interviews every four months. At those interviews, respondents are asked questions about their income and labor force behavior over the previous four months. As a result, the SIPP provides monthly data on income and weekly data on labor force status.[2]

At two points in most SIPP panels (generally waves 4 and 7), respondents are interviewed about their wealth holdings. Data are collected on a wide inventory of assets. For the purposes of this analysis, I focus on three measures of assets. Two of them, gross and net financial assets, measure liquid wealth: gross financial assets consist of interest-earning assets in banking and other institutions, household equity in stocks and

[1]The differences in findings between Browning and Crossley (1996) and the U.S.-based studies probably arise from (a) Browning and Crossley's exclusive focus on the long-term unemployed (6 months or more), and (b) the fact that there is much less variation in the UI replacement rate in Canada, where UI benefits are determined by a national program, than in the United States, where benefits vary from state to state.

[2]In practice, there is a large amount of "seam bias" whereby individuals propagate their status at the point of the interview back through the previous four months. This problem, which is more important for income and government transfer receipt than for labor force status, will lend some imprecision to the present analysis, but it should not systematically bias the calculations.

mutual funds, and other assets such as bonds and checking accounts; net assets subtract unsecured debt from this total. The third measure, total net worth, is the sum of all household assets, liquid and illiquid, including (in addition to those previously mentioned) equity in retirement savings accounts, homes, vehicles, and personal businesses.

There are advantages and disadvantages to each of these different measures. Gross asset holdings most closely approximate the steady state stock of accumulated precautionary savings, whereas net assets also reflect short-run smoothing through consumption loans. Furthermore, debt holding may proxy not for financial constraint but rather for access to debt markets.[3] On the other hand, a person with substantial accumulated unsecured debt may not be in a very good position to finance his unemployment spell, so it is also of interest to examine net financial assets. Total net worth has the advantage that it ignores the decision to divide one's wealth into financial and non-financial instruments, thereby summarizing the total resources available to a family. But it has the disadvantage that illiquid assets such as housing wealth (the dominant form of wealth for most sample households) may be difficult to access in times of transitory income fluctuation such as an unemployment spell.

A further consideration is data quality. For the 1984–86 panels, the SIPP collected a full inventory of family-level asset holdings at two points in time.[4] From the 1987 panel onward, however, the full inventory was collected at only one interview (generally the first of the two); in the other interview, data on gross financial assets were collected, but not data on unsecured debt or home equity. As a result, there is much more complete information on gross financial assets in the earlier panels, particularly for analyzing the change in the family's wealth position. Moreover, studies of the quality of the SIPP data conclude that the information on financial assets is reliable, but that information on non-financial assets (in particular, business equity) may not be (Curtin et al. 1989). This evidence further encourages a focus on financial assets.

A final important consideration is imputed data. Roughly one-quarter of the households in the data set I use have imputed information on gross financial assets, and the fraction rises to close to one-half for total net worth. The SIPP imputation methodology has been criticized by a number of commentators (Curtin et al. 1989; Hoynes et al. 1995). On the other hand, the probability of imputation is not random; for example, it rises with income (and therefore with wealth). As a result, if I exclude imputed values it will bias the estimates toward understating the resources of the unemployed; including imputations will add noise to the estimates, but no obvious direction to the bias. I therefore include imputed values.[5]

The sample consists of all spells of unemployment, which are spells following a job separation during which individuals are either on layoff or are searching for a new job. I consider all such spells regardless of duration. It is important to note, however, that there are no data in the SIPP on the reason for the separation. In particular, my sample will include those whose separations arose from both voluntary and involuntary separation. As a result, if individuals build up assets in anticipation of a voluntary separation, these results may overstate

[3]That is, an individual with slightly negative net assets may actually have more precautionary savings than a person with slightly positive net assets, if he or she has better access to unsecured borrowing.

[4]In the 1985 panel, the first wealth inventory is collected in the third wave rather than the fourth.

[5]Results without imputed values are available from the author. These results consistently show wealth adequacy that is about 50% lower than that shown below, reflecting the fact that those with imputed values have higher wealth. But there is no systematic effect on any of the cross-sectional patterns or regression results presented below.

the wealth holdings of those who were involuntarily unemployed.[6]

I also consider two other samples to provide a basis for comparison. The first is those who separate from their job but are not on layoff and not searching for a new job (labor force leavers). The second is a random sample of persons who do not separate from their jobs during the SIPP panel. For the unemployed and labor force leavers, I use separations that occur after the first wealth interview but before the second, in order to consider wealth holdings before the separation and the change in wealth holdings during the spell.[7]

The sample is drawn based on the unemployment spell, in order to capture the features of the representative spell. As a result, about 85% of the observations in each sample are either from persons with only one spell or from the first spell for a person with multiple spells; the remainder are multiple spells.

Empirical Strategy

The first step of the analysis is to tabulate the ex-ante wealth holdings of those becoming unemployed. The three wealth measures described above are used as a numerator. To normalize wealth, I use two types of denominators. The first is weekly earnings, net of income taxes and payroll taxes paid, in the quarter before separation. This provides a sense of how many weeks of unemployment the typical individual could finance from savings. Income taxes paid are computed by applying the federal income tax schedule to the sum of previous own and spousal earnings; I exclude capital income, since that is a direct function of the variable of interest, wealth holdings. In addition, I account for Social Security and Medicare payroll tax payments by applying the year-specific tax rates for those programs, up to the taxable maximum of earnings.

The other denominators measure in different ways the income loss during the unemployment spell.[8] The first is simply the expected loss in net wages: net wages times the duration of the spell. The problem with this measure is that because it fails to account for the fact that the job leaver potentially has access to the unemployment insurance system to provide income during the jobless spell, it overstates the loss of income during the jobless spell and understates the ratio of wealth to net income loss.[9] This is especially important since, as Engen and Gruber (forthcoming) show, wealth holdings are a function of the generosity of the UI system. As a result, it is after-UI expected loss that is the relevant determinant of wealth adequacy.

I therefore correct the expected income loss for the presence of UI in two ways. First, I use potential UI benefits eligibility. That is, for each person becoming unemployed, I measure eligibility for UI and potential benefits entitlement. If the person is eligible, I reduce the income loss by

[6]The fact, documented below, that labor force leavers have much higher asset levels than do the unemployed supports the notion that those leaving their jobs voluntarily will have higher assets than those leaving involuntarily.

[7]This sampling rule results in an under-sampling of very long spells, since they would be ongoing at the point of the first wealth interview. But it is important to have an ex-ante measure of wealth holdings to compare to the ex-post income loss from unemployment. I also select the sample respondents based on their having been in the SIPP for at least 9 months, in order to have a sufficient window of past earnings for computing UI eligibility and potential UI benefits. This is generally not a binding constraint for this sample (since the first wealth interview is done after individuals have been in the survey for 16 months), but some persons join the SIPP in progress.

[8]Note that I measure the spell as consisting of all weeks of separation from work. For those who have some weeks of unemployment (either search or layoff), 80–85% of their spells are weeks of unemployment, and the remainder of the spell is weeks out of the labor force.

[9]In fact, there are many other resources that might be drawn upon during the jobless spell, such as the labor supply of spouses, which might cause a further understatement of the wealth/loss ratio. I do not consider these resources here, because the magnitude of response is unclear ex-ante.

Table 1. Ex-Ante Wealth Holdings of the Unemployed.

Percentile	*Gross Financial*	*Net Financial*	*Net Total*
	Levels of Wealth (1994$)		
10th pctile	0	–7,086	–413
25th pctile	66	–2,098	2,066
50th pctile	1,171	0	21,865
75th pctile	7,052	4,352	83,102
90th pctile	28,235	24,510	175,526
	Relative to Earnings		
10th pctile	0.00	0.00	0.00
25th pctile	0.34	0.00	10.36
50th pctile	5.35	0.00	96.18
75th pctile	33.73	18.56	404.23
90th pctile	159.58	129.10	1,125.64
No. Obs.	15,070	12,679	12,679

Notes: Data tabulated from SIPP. The top panel presents the distribution of real (1994$) wealth holdings, and the bottom half normalizes holdings by after-tax weekly earnings in high or last quarter.

the UI to which he or she is entitled, accounting for the taxation of those UI benefits. The net income loss from unemployment is therefore

$$(1) \quad W*D*(1-\tau_1) - \mathrm{UI}*\max(D,26)*(1-\tau_2),$$

where W is pre-unemployment weekly wage, D is the duration of the unemployment spell, UI is potential UI weekly benefits, τ_1 is the average tax rate for the previous year, and τ_2 is the average tax rate during the year of unemployment.

The first term in (1) is the first measure of expected loss, which ignores unemployment insurance. The second term is the potential UI income during the spell: the weekly benefit for the duration of the spell, up to a maximum entitlement of 26 weeks.[10]

I also adjust for the fact that the person faces a lower tax rate while unemployed than while employed, since income is lower. I do this by recalculating income for the year including the unemployment spell, which is a weighted average of this potential income from UI while unemployed and earnings from the previous job for the remaining $(52 - D)$ weeks.[11]

I calculate potential UI benefits and eligibility using a simulation program that models each state's UI rules over this time period.[12] Eligibility and benefits are determined based on earnings levels and distributions over the first four of the previous five quarters. For some individuals, I do not have sufficient earnings histories to calculate these constructs; I therefore expand the available earnings information to simulate the full required period. If individuals are assigned to be ineligible for UI, I set UI equal to 0 in expression (1); for the regression analysis examining wealth use during the unemployment spell, ineligibles are excluded from the sample.

The problem with this approach, however, is that it overstates the income-smooth-

[10]In fact, many individuals are entitled to less than the full 26 weeks, but calculating potential duration of UI benefits is beyond the scope of this exercise. Moreover, in some states and years, individuals are entitled to more than 26 weeks if the state unemployment rate exceeds some "trigger" level, or if a federal extended benefits program is in place. But in my SIPP sample fewer than 3% of observations receive UI benefits for more than 26 weeks.

[11]This tax calculation is simplified along a number of dimensions. I do not account for the precise calendar timing of the spell; I simply restart the year at the point that the spell begins. And I assume that the earnings on the post-spell job are equal to the earnings on the pre-spell job. Variations in these assumptions have little effect on the measure of expected loss in practice, since (particularly from 1987 onward) the income tax system is relatively flat so that even moderate change in income has little effect on average taxes. Also, for some individuals with very low earnings it is possible that (1) could be negative; that is, UI replaces more than 100% of their earnings, so that expected income is higher during joblessness. I deal with these cases by setting the expected loss in income to be at least 5% of the expected non-UI income loss (the first term in (1)). Finally, I account for the partial taxation of UI benefits before 1987, and their full taxation afterward.

[12]See Gruber (1997) and Cullen and Gruber (2000) for a more detailed description of this simulation program. While this type of simulation of UI entitlements undoubtedly provides a noisy proxy for potential benefits for any individual, the estimates of entitlements should be correct on average, and these other papers do find significant effects of similar simulated UI variables on real behavior.

Table 2. Wealth Holdings of Other Groups.

	Gross Financial		*Net Financial*		*Net Total*	
Percentile	*Dollars $1994*	*Relative to Earnings*	*Dollars $1994*	*Relative to Earnings*	*Dollars $1994*	*Relative to Earnings*
			Labor Force Leavers			
10th pctile	0	0	–7,472	0	0	0
25th pctile	404	1.98	–1,868	0	6421	32.7
50th pctile	2,952	15.72	513	2.53	49,022	230.4
75th pctile	15,012	92.82	11,745	64.69	132,009	838.4
90th pctile	54,289	423.3	51,087	357.4	257,636	2,533
No. Obs.	21,660	21,660	17,964	17,964	17,964	17,964
			Employed			
10th pctile	106	0.3	–6,816	0	947	3.05
25th pctile	859	2.39	–1,392	0	12,128	32.5
50th pctile	4,173	10.24	1,584	4.01	53,605	122.5
75th pctile	17,006	38.76	13,763	31.26	130,984	297.3
90th pctile	53,342	118.6	49,859	108.12	247,585	612.3
No. Obs.	22,112	15,315	19,711	12,432	19,711	19,711

Notes: The first column of each pair is real wealth holdings; the second is wealth relative to the after-tax last quarter wage.

ing role of UI, since take-up of UI, even among those eligible, is much less than full. For example, Blank and Card (1991) estimated take-up rates of roughly 2/3 among eligibles. An alternative that addresses this issue is to use actual UI received during the spell in place of potential benefits. I do so by replacing UI*max(D,26) in equation (1) with UI received during the spell. This measure is not ideal either, however, since receipt of public assistance has generally been found to be understated in survey data sets. Moreover, take-up of UI may itself be endogenous to wealth holdings.[13]

Thus, I present most results below for all three measures of income loss during the unemployment spell, in order to bound the true "wealth replacement rate." Ignoring UI clearly understates wealth adequacy, while using potential UI clearly overstates it; the expected loss using actual UI receipt lies somewhere in-between.

[13]This will be true, for example, if there is some fixed cost (such as stigma) to UI take-up, so that individuals who have other sources of consumption-smoothing that are sufficient do not take up.

Ex-Ante Wealth Holdings

The Distribution of Wealth Holdings

Table 1 presents the distribution of wealth holdings of unemployed searchers. The first column presents the distribution of real wealth holdings, in 1994 dollars. The second column presents the distribution of wealth normalized by post-tax weekly earnings before the separation.

There are several noticeable features of the distribution of wealth holdings. First, financial wealth holdings are quite low, on average: roughly 17% of the sample has zero gross financial wealth, and the median person has only $1,171. Moreover, if unsecured debt is excluded, the median person in this sample of searchers has zero financial wealth. Second, there is a very wide distribution; 25% of the sample has gross financial wealth of more than $7,052, and net financial wealth of more than $4,352. Third, when illiquid assets are included the sample appears much wealthier: only 12.3% of the sample has zero or negative net worth, and the median person has almost $22,000. Thus, for thinking about UI ad-

equacy, it is critical to consider how easily the unemployed can tap into these other forms of assets during their jobless spells.

The next set of rows normalizes these wealth holdings by earnings; negative values of net assets are set to zero. Once again, there is a wide distribution of wealth adequacy here, and the findings differ dramatically according to the type of wealth measure employed. In terms of gross financial assets, the median person has assets that are sufficient to cover 5.4 weeks of unemployment; since, in this sample, the median spell of unemployment is 11 weeks, such assets fall far short of what would be required to cover an entire spell. This is even more true for net financial assets, although total net worth is certainly sufficient at the median to cover even much longer spells. Once again, for a large share of the sample, both gross and net financial wealth are sufficient to cover a typical spell.

One interesting question that is raised by this analysis is whether these unemployed searchers have disproportionately low wealth holdings. This is addressed in Table 2, which performs comparable calculations for separators who do not become unemployed and for those who remain employed. For each of the three wealth definitions, the first column shows absolute wealth in 1994 dollars; the second shows wealth relative to net weekly earnings.

In both absolute value and as a share of weekly earnings, the wealth holdings of these two groups are substantially higher than are those of the unemployed searchers. For both groups, median gross financial assets are sufficient to weather the loss of 10 or more weeks of earnings. Even for these groups, however, net financial assets are quite low at the median. Interestingly, while the wealth holdings of the employed are higher in absolute value, those of labor force leavers are actually higher as a share of earnings, reflecting the much lower earnings of this group. Thus, the wealth holdings of the unemployed do seem lower than for other groups, but even for others net financial wealth at the median is quite low.

Wealth Holdings Relative to Expected Income Loss

I now extend this analysis by normalizing wealth holdings by the three measures of the expected income loss during the unemployment spell (Table 3). In each case, I show the median ratio of wealth to expected income loss, using both last quarter and high quarter earnings. I then display the distribution of the sample across adequacy categories: wealth holdings that are less than 10% of the expected loss, 25% of the expected loss, 50% of the expected loss, and 100% of the expected loss. These categories are defined cumulatively, so that 1 minus the final row gives the share of the sample having wealth higher than the expected loss.

Note that one disadvantage of using realized ex-post durations to normalize ex-ante wealth holdings is that the duration of unemployment is itself likely to be a function of wealth. I attempted to correct for this by predicting unemployment durations and using them to normalize wealth, but I was unable to fit the distribution of durations with any accuracy, so that any calculations based on predicted duration were quite misleading. It is therefore important to note that if spell duration is a function of wealth, these calculations will overstate ex-ante adequacy to some extent. I address this point more explicitly below by cutting the sample by ex-post durations.

The first two cells of the table repeat the lesson of Table 1: the wealth holdings of the typical unemployed person are sufficient to replace roughly one-half of lost after-tax earnings during the unemployment spell. One-third of the sample can replace less than 10% of the loss, and about 40% of the sample can replace the entire loss.

The next two columns show how this answer changes when we account in two different ways for the role of UI. Using UI eligibility, wealth holdings appear much more adequate; wealth exceeds the expected loss for the median person in the sample. Using UI receipt, the results are between the first two columns, with gross

Table 3. Wealth Holdings of the Unemployed Relative to Income Loss.

	Gross Financial Assets			*Net Financial Assets*			*Net Worth*		
Percentage Loss	*Earnings*	*UI Eligibility*	*UI Receipt*	*Earnings*	*UI Eligibility*	*UI Receipt*	*Earnings*	*UI Eligibility*	*UI Receipt*
Median	0.56	1.19	0.73	0.00	0.00	0.00	8.73	18.22	11.65
<10% of Loss	0.33	0.28	0.30	0.57	0.58	0.57	0.17	0.16	0.16
<25% of Loss	0.41	0.34	0.38	0.61	0.62	0.60	0.19	0.18	0.18
<50% of Loss	0.49	0.41	0.45	0.65	0.66	0.64	0.22	0.21	0.21
<100% of Loss	0.59	0.48	0.54	0.70	0.71	0.68	0.26	0.25	0.25

Notes: The first row shows median values for the ratio of wealth to income loss; the remaining rows present the distribution of wealth/income loss. Income loss is defined in three ways: ignoring UI income; accounting for UI benefits for which the worker is eligible; and accounting for UI benefits receipt.

assets sufficient to replace roughly three-quarters of lost income. But the distribution across adequacy categories is fairly similar regardless of the denominator used, with between one-half and 60% of the sample having wealth lower than their expected income loss from unemployment.

Subtracting unsecured debt makes wealth holdings appear much less adequate, as in Table 1. According to the second panel, 60% of the sample has net financial assets that are lower than 10% of the expected income loss from unemployment. Only 25–30% of the sample has net financial assets exceeding the expected income loss. And net worth is once again quite large relative to the expected income loss, with only 25% of the sample having net worth below their expected loss from the unemployment spell.

To summarize, the data present a mixed picture of wealth adequacy. The typical worker has gross financial assets that can replace 73% of realized income loss from unemployment. But almost one-third of workers cannot even replace 10% of their income loss, and the proportion of workers in this unenviable category rises to three-fifths if debt is subtracted from financial assets. On the other hand, if all assets, and not just financial assets, are included, three-quarters of workers can replace all of their unemployment-related income loss.

Heterogeneity by Demographics and Spell Type

The results thus far have not distinguished at all among the different types of persons becoming unemployed. But there are a number of dimensions along which adequacy might vary. Several of these are explored in Table 4. Each row in this table presents the analysis for a separate group. There are columns for the median wealth holdings in dollars; the median ratio of wealth to expected income loss, where expected loss is defined using the UI receipt concept; and the distribution of wealth/expected loss.

The first four rows distinguish the sample by sex and then by marital status. On average, the wealth holdings of men who become unemployed are slightly higher than those of women, but wealth holdings relative to earnings are somewhat lower for men. Wealth holdings are even lower for married men. This is consistent with the notion that married men have another form of insurance on which they can rely if they lose their jobs: their wives' labor supply (Cullen and Gruber 2000). This pattern is not apparent for women, which likely reflects the fact that roughly 90% of their husbands are working in any case, so that there is little scope for a reverse "added worker effect." Nevertheless, across all of the first four rows there is little difference in terms of the distribution of wealth holdings relative to expected loss.

Table 4. Gross Financial Wealth Holdings Relative to Income Loss.
(By Subgroup—Income Loss Includes UI Receipt)

Group	*Median Dollars*	*Relative to Income Loss*	*<10% of Loss*	*<25% of Loss*	*<50% of Loss*	*<100% of Loss*
Men	1,206	0.67	0.31	0.39	0.46	0.55
Women	1,128	0.82	0.29	0.37	0.44	0.52
Married Men	1,048	0.54	0.33	0.41	0.48	0.58
Married Women	1,195	0.82	0.28	0.36	0.43	0.52
Men < 45	972	0.58	0.33	0.40	0.47	0.56
Men ≥ 45	2,868	1.15	0.24	0.32	0.39	0.48
Whites	1,470	0.94	0.27	0.34	0.42	0.50
Non-Whites	269	0.10	0.49	0.57	0.64	0.72
Job Separations	1,088	0.58	0.32	0.40	0.48	0.56
Temp. Layoffs	1,494	1.80	0.23	0.29	0.34	0.42

Notes: Data are for gross financial wealth holdings of different subgroups. The first column shows the median of absolute wealth; the second shows the median of wealth to income loss, including UI receipt; the remaining columns show the distribution of wealth/loss.

Splitting the sample of men by age, there is much more adequate savings for older men. This likely reflects life cycle savings, which also provide more of a buffer for older workers losing their jobs. The most dramatic difference arises when the sample is split by race. Non-whites have very inadequate savings relative to whites; almost half of non-whites have gross financial assets that are less than 10% of the expected income loss, and only 28% have gross assets that are more than the expected loss. This finding suggests important racial heterogeneity in wealth adequacy.

The final row redoes the analysis dividing the sample into those who are on temporary layoff and those who are without a job. The findings here are striking: savings is much more adequate for those on temporary layoff. This is true both because absolute wealth holdings are higher for temporary layoffs and because spells are much shorter. This higher wealth adequacy for temporary layoffs is consistent with the notion that temporary layoff is an expected event for which workers can prepare by increasing savings, as reflected in the smaller consumption-smoothing role of UI for temporary layoffs (Gruber 1997).

Heterogeneity by Spell Duration

The last result in Table 4 suggests the value of exploring further the distribution of wealth adequacy by spell duration. I do so in Table 5 for five groups divided by spell length: one month or less; 2–3 months; 4–6 months; 7–12 months; and more than one year. I once again show median gross financial assets, the median relative to income loss, and the distribution of wealth/income loss. As a basis of comparison, I also show in the final columns the median wealth and wealth/income loss for labor force leavers. Income loss for this group is defined analogously to that for the unemployed.

The results in Table 5 are striking. For the unemployed, ex-ante absolute wealth holdings actually *fall* with realized unemployment duration, so that adequacy drops very rapidly with duration. For the shortest duration group, wealth is much more than adequate to finance the spell at the median, and 2/3 of the group has wealth that is larger than the expected income loss. But for the longest duration group, wealth only finances 7% of the expected income loss at the median, and over one-half of the group has wealth that is less than 10% of the expected

Table 5. Gross Financial Wealth Holdings Relative to Income Loss by Duration of Spell.

	Unemployed						*Labor Force Leavers*	
Period	*Median Dollars*	*Relative to Income Loss*	*<10% of Loss*	*<25% of Loss*	*<50% of Loss*	*<100% of Loss*	*Median Dollars*	*Median Relative. to Last Qtr.*
≤1 Month	1,320	3.74	0.19	0.23	0.26	0.33	2,505	7.81
2–3 Months	1,283	0.92	0.27	0.34	0.41	0.51	3,281	2.09
4–6 Months	1,173	0.39	0.34	0.44	0.53	0.63	3,208	1.07
7–12 Months	963	0.18	0.43	0.54	0.63	0.72	3,665	0.62
>12 Months	676	0.07	0.54	0.65	0.73	0.80	2,665	0.30

Notes: Data are for gross financial wealth holdings across the distribution of unemployment durations. The first six columns present data for the unemployed: the first column shows the median of absolute wealth; the second shows the median of wealth to income loss, including UI receipt; and the next four columns show the distribution of wealth/loss. The final two columns repeat the first two columns for the sample of labor force leavers.

loss.[14] Thus, there is a clear negative relationship here between duration and adequacy. Along with the results for temporary layoffs, this has important implications for the design of UI benefit payout streams, which I discuss further in the concluding section.

This finding stands in contrast to the results for labor force leavers. For that group, wealth is roughly constant across the distribution of durations. The ratio of wealth to income loss does fall for this group as well, but not nearly as precipitously.[15]

[14]Note that this also suggests that there is unlikely to be an important effect of ex-ante wealth on durations; while the negative correlation does not prove that there is no wealth effect, it certainly shows that it is not very large relative to other factors determining durations.

[15]One possible explanation for this finding is a correlation between unemployment durations and the length of previous employment spells. Individuals who have longer unemployment spells may be the ones with the weakest attachment to the labor force, and may have had another recent spell of unemployment, so that they had drawn down their wealth before the most recent spell began. In fact, however, in results not reported here, I find that there is not a strong relationship between previous employment duration and wealth adequacy. If anything, adequacy is lower for those with longer previous employment durations; despite the fact that wealth holdings are higher, previous wages are higher as well, so more wealth is needed to replace lost earnings.

Wealth Use during the Unemployment Spell

The results thus far have explored the adequacy of savings relative to income risk from unemployment. But the underlying presumption in this discussion is that individuals will use their savings to finance consumption during unemployment. This pattern of dissavings would be consistent with any precautionary savings model. But there is much about individual savings behavior that is not well understood by economists, particularly with reference to the lower parts of the income distribution. If savings is serving some purpose other than as a precautionary buffer, individuals may be reluctant to access it during their unemployment spells. In that case, it is inappropriate to interpret the earlier results as suggesting that a large fraction of workers, particularly in some subgroups such as those with short unemployment durations, can easily maintain their consumption during unemployment spells.

In order to investigate this issue, I turn to a different type of analysis: an estimation of the impact of UI generosity on wealth use during spells. If individuals are saving for precautionary purposes, then as UI generosity rises, there will be less drawdown of own wealth to finance unemployment spells. On the other hand, if individuals are reluc-

tant to use their existing wealth stocks to finance consumption during unemployment, then there will be no relationship between UI generosity and wealth changes.

To assess this issue, I estimate regression models of the form

$$\Delta\log(W_i) = \alpha + \beta_1 \mathrm{UIRR}_i + \beta_2 X_i + \beta_3 \delta_j + \beta_4 \tau_t + \varepsilon_i, \quad (2)$$

where W_i is individual i's wealth holdings, UIRR is the potential UI replacement rate, X is a vector of individual characteristics, δ_j is a full set of state dummies, and τ_t is a full set of panel dummies. In this model, the change in log wealth is regressed on the replacement rate and a set of controls for individual characteristics, state dummies, and time (panel dummies). If more generous UI causes individuals to use their wealth less during unemployment spells, then the coefficient β_1 will be positive. That is, a higher replacement ratio leads to a smaller drawdown of wealth from unemployment, so that relative to other unemployed workers there is a positive change in wealth for the high replacement rate worker.

I use the change in log wealth since the distribution of wealth is highly skewed. The disadvantage of this approach is that there is a non-trivial share of the sample with zero wealth holdings; roughly 17% of the sample in each period has zero gross financial wealth, and a total of 30% of the sample has zero wealth in one of the two periods. If there is a correlation between UI and having zero wealth holdings in either period, this will lead to a sample selection bias to the estimates. In order to address this problem, I estimate, in addition to the model above, a "heckit" sample selection correction model that uses the effect of UI on having zero wealth to correct for any selection bias to the estimates.[16] For this reason as well, I only estimate models for gross financial wealth, since there are relatively few non-positive values; this selection is much more of a problem for net financial wealth. Moreover, the sample of changes for both net financial and net total wealth is much smaller, due to the fact that data are available only for 1984–86.

The most important regressors in X are a trilinear spline in base period wage, high quarter wage, and 1/weekly wage. These three variables jointly determine eligibility and benefits entitlement for UI, and they may be independently correlated with wealth accumulation decisions. Moreover, they determine benefits in a joint fashion, for example because the replacement rate (which is a ratio of a function of the high quarter wage to the weekly wage) only enters for those determined to be eligible (which is a function of base period wage and the distribution of earnings inside and outside the high quarter). To form the trilinear spline, I choose as knot points the 10th, 25th, 50th, 75th, and 90th percentiles of the wage distribution of searchers. The trilinear spline then controls for each segment of the spline for each of the three variables, as well as interactions of these segments across variables.[17] The other controls in X include age and its square, sex, marital status, race, and education.

The results of this regression analysis are presented in Table 6. The first panel shows

[16]Since I do not have any excluded instruments that affect having zero wealth holdings but not the level of wealth holdings, this selection correction is identified solely from the assumption of joint normality between the error terms in the selection and Δlog wealth equations.

[17]More precisely, I measure the 10th, 25th, 50th, 75th, and 90th percentiles of the distributions of 1/weekly wage (average over base period), high quarter earnings, and annual earnings. These three variables represent the set of earnings controls that determine UI benefits and eligibility; 1/weekly wage is used since the replacement rate is a function of this inverse. For each of these earnings concepts, besides using the actual earnings level Y, I form five variables of the form $\max(0, Y - X)$, where Y is one of the earnings concepts above and X is each of the percentile points. I then fully interact all 18 of these variables with each other, to control for not only the distribution of each earnings concept, but also the full joint distribution of the set of earnings concepts that jointly determine UI benefits and eligibility. The programs for making the splines and running these regressions are available upon request.

Table 6. Regression Results: Determinants of Changes in Wealth among the Unemployed. (Standard Errors in Parentheses)

Independent Variable	*Unemployed*		*Labor Force Leavers*		*Employed*	
Replacement Rate	0.785	1.284	–0.519	–0.517	0.183	0.109
	(0.330)	(0.474)	(0.231)	(0.258)	(0.201)	(0.224)
Age	0.042	0.094	0.003	0.004	0.008	–0.003
	(0.013)	(0.038)	(0.009)	(0.022)	(0.008)	(0.018)
Age Squared/100	–0.052	–0.122	–0.001	–0.003	–0.007	0.006
	(0.017)	(0.051)	(0.011)	(0.032)	(0.010)	(0.021)
Married	0.093	–0.039	0.050	0.046	0.084	0.172
	(0.051)	(0.103)	(0.039)	(0.105)	(0.028)	(0.131)
White	0.034	–0.351	–0.018	–0.031	0.107	0.187
	(0.070)	(0.271)	(0.052)	(0.273)	(0.037)	(0.264)
Sex	–0.086	–0.226	0.066	0.063	–0.008	0.081
	(0.046)	(0.106)	(0.035)	(0.073)	(0.025)	(0.134)
Less Than HS Education	0.038	0.767	–0.029	–0.003	0.061	–0.209
	(0.078)	(0.502)	(0.056)	(0.525)	(0.047)	(0.396)
HS Graduate Only	0.004	0.450	–0.061	–0.045	0.021	–0.121
	(0.065)	(0.311)	(0.044)	(0.331)	(0.030)	(0.208)
Some College	0.164	0.315	–0.061	–0.055	0.011	–0.040
	(0.067)	(0.122)	(0.044)	(0.146)	(0.030)	(0.078)
Mills Ratio		1.055		0.031		–0.388
		(0.718)		(0.628)		(0.564)
No. Obs.	9,048	9,048	14,244	14,244	20,641	20,641
Selection Probit Coefficient	0.614		0.235		0.201	
	(0.209)		(0.182)		(0.218)	
No. Obs.	12,411		17,859		22,884	

Notes: The dependent variable is the change in log real wealth. The first set of columns shows results for the unemployed; the second set, for labor force leavers; and the third set, for the employed. The first column in each set presents OLS regression results; at the bottom of these columns are coefficients on the replacement rate from a selection probit for having zero wealth in either period. The second column in each set presents selection-corrected regressions. Regressions include a trilinear spline in the base period wage, the high quarter wage, and 1/weekly wage.

the results for the unemployed. The first column presents the regression for change in log wealth with no correction for sample selection. In the final row of that column I show the coefficient on the replacement rate from a probit regression of the sample selection dummy (which is 1 if there is zero wealth in either period and 0 otherwise) on the right-hand-side variables in equation (2). In the second column, I then include the sample selection correction; the coefficient on the included mills ratio is shown at the bottom of the second column.

The results in these first two columns are supportive of a role for UI in affecting the use of wealth during unemployment spells. In both columns, the coefficient on the replacement rate is positive and statistically significant, indicating that individuals draw their wealth down less rapidly as UI benefits are more generous. This is consistent with the evidence in Engen and Gruber (1996) that wealth is accumulated by employed persons differentially in response to UI generosity. The coefficient in the first column indicates that for every 10 percentage point rise in the replacement rate, the reduction in wealth holdings during an unemployment spell is 7.9%; the key point is that wealth would be falling in the absence of UI, and the role played by UI is to mitigate that fall. That is, at the sample

average replacement rate of roughly 45 percentage points, wealth holdings rise by 36% during unemployment spells relative to how much they would fall if there were no UI. In other words, UI is playing a significant role in reducing the drawdown of wealth during unemployment spells.[18]

The final row of the first column shows that, in fact, there is a statistically significant relationship between being in the sample (having non-zero wealth in both periods) and the potential UI replacement rate. This suggests the potential for sample selection bias. The results in the second column are from an analysis that tries to account for this bias by incorporating a sample selection correction (the mills ratio). This raises somewhat the coefficient on the replacement rate.

The remaining columns of Table 6 assess the robustness of this conclusion by rerunning these regressions for the control samples, labor force leavers and the employed. If there is a causal relationship between UI and wealth changes, there should be no effect on these groups, who cannot avail themselves of UI benefits. However, if the results are driven by some spurious correlation between the construction of potential UI benefits and wealth changes, then I may find a similarly positive relationship for these samples.

In fact, there is no evidence of a sizeable positive effect of UI on wealth changes for either sample, either with or without selection corrections. In fact, the results for labor force leavers are negative, and the estimates for the employed are small and statistically insignificant. Thus, the conclusions for the unemployed do not appear to be driven by some omitted factor.

Conclusions and Implications

The adequacy of UI benefits is a key consideration for reform of the UI system, and that adequacy will be directly tied to the ability of the unemployed to insure their spells by drawing down their own wealth. This paper has considered both the ex-ante adequacy of wealth holdings of the unemployed, and how those wealth holdings are used during unemployment spells.

I find that there is substantial heterogeneity in the extent of ex-ante wealth holdings among the unemployed. For the median worker who becomes unemployed, ex-ante gross financial asset holdings are sufficient to replace 5.4 weeks of earnings, and roughly three-quarters of the realized income loss from unemployment spells. But older and white workers have wealth holdings that are roughly equal to their income loss during unemployment spells, and those on temporary layoff have ex-ante wealth holdings that substantially exceed their ex-post income loss. At the other extreme, almost one-third of workers cannot even replace 10% of their income loss. And ex-ante wealth holdings decline precipitously with realized unemployment durations, *both* absolutely and (especially) relative to ex-post income loss.

I also find strong evidence that individuals who are eligible for more generous UI draw down their wealth more slowly during unemployment spells. This demonstrates that wealth is used as a consumption-smoothing device alongside UI to cope with the income loss from unemployment.

An important question is how these results can inform the debate over the optimal structure of the UI system. As nicely reviewed by Karni (1999), a number of articles in recent years have considered theoretically the optimal design of UI, and the findings here inform two conclusions of that literature. The first, originally from Baily (1977), is that the optimal level of UI benefits will be a function of the private resources that individuals have to smooth their consumption during unemployment spells. This analysis shows that many unemployed workers have substantial assets to supplement their UI benefits in smoothing consumption over the unemployment spell, and that they appear to use those assets in combination with UI for consumption-

[18]Note that I do not incorporate actual unemployment durations into the regression model. This is because durations are endogenous both to wealth holdings and to UI.

smoothing purposes. This is consistent with the finding of Gruber (1997) that only a minority of UI income is translated to additional consumption during unemployment spells.

The second conclusion concerns the optimal time pattern of UI benefits. The general conclusion of analyses such as Shavell and Weiss (1979) and Hopenhayn and Nicolini (1997) is that UI benefits should decline over time: to provide incentives for the unemployed to find jobs, being unemployed must become less attractive over time. At the same time, Davidson and Woodbury (1997) concluded that the optimal UI program would have low benefits that never expire.

As Shavell and Wise noted, however, the optimal time pattern becomes indeterminate if individuals have wealth holdings at the start of their unemployment spells, since the efficiency gains of a declining profile must be weighed against the rising marginal utility of consumption as individuals run through their wealth holdings. Moreover, these theoretical analyses impose a representative agent assumption. In reality, the unemployed population is quite diverse, particularly in wealth holdings. If, as is shown above, those with longer unemployment spells have lower ex-ante wealth holdings, this can offset the efficiency arguments for a declining profile. For example, models such as Shavell and Weiss's might imply, given this heterogeneity, that benefits should even increase over some interval, or that there should be a non-trivial waiting period before UI benefits begin, with the savings to the UI system passed on to those with longer spells.

In summary, the optimal time pattern will trade off the efficiency properties of a declining benefits profile against the insurance loss of such a decline when individuals have limited wealth, and particularly when that wealth is much lower ex-ante for those with longer spells. An important direction to take the theoretical literature in this area is to consider wealth heterogeneity in determining optimal time patterns.

There are also much less adequate wealth holdings for important subgroups of the population, such as minorities. While it is difficult to conceive of a racial or age-targeted UI system, these results do raise the larger issue of further means- or asset-testing UI benefits. Asset testing would most directly address the issues raised in this paper, but could have detrimental effects on asset accumulation; as Powers (1996) and Gruber and Yelowitz (1999) showed, savings is very responsive to asset testing through social insurance programs. The administrative issues associated with asset testing are also somewhat daunting. Further income testing could indirectly address these issues, as asset holdings are strongly correlated with income, and the UI system has precise measures of ex-ante income.

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