THE SURVEY OF INCOME AND PROGRAM PARTICIPATION

SPELL DURATIONS OF FOOD STAMP AND AFDC PARTICIPATION: SIPP 1987

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Martina Shea
Kathleen Short
U.S. Census Bureau

U.S. Department of Commerce U.S. CENSUS BUREAU

ABSTRACT

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In this paper we present different estimates of spell durations in the Food Stamp and Aid to Families with Dependent Children programs, based on data from the 1987 panel of SIPP. We represent 4 types of duration estimates: a) estimates based on spells that started during the 28 months of the panel, b) estimates based on spells that started during observation periods of varying lengths ("subpanels" of the 1987 SIPP panel), c) point-in-time estimates, and d) estimates based on all spells,
left-censored as well as non left-censored. Our purpose is to ascertain the robustness of duration estimates to various changes in sample design.

We find that estimates of spell distributions vary considerably for different types of samples. As an illustration, the median duration of food stamp participation is significantly higher for spells in progress at a point in time than for spells with observed beginnings, 8 years as compared to 6 months. However, estimates based on spells with observed beginnings did not differ greatly for different panel lengths. Thus, this study suggests that if the main point of interest is to investigate the distribution of the majority of spells into narrowly defined intervals, even panels shorter than the 1987 panel seem adequate.

SPELL DURATIONS OF FOOD STAMP AND AFDC PARTICIPATION

Martina Shea and Kathleen Short

Bureau of the Census, Washington, DC 20233

KEY WORDS: Spell durations, Food stamps, AFDC Left-censored spells

A large body of study has been devoted to the estimation of the dynamic aspects of program participation. In this paper we present different estimates of spell durations in the Food Stamp program and in Aid to Families with Dependent Children (AFDC), based on data from the 1987 panel of SIPP. We will compare 4 types of duration estimates: a) estimates based on spells that started during the 28 months of the panel, b) estimates based on spells that started during observation periods of varying lengths ("subpanels" of the 1987 SIPP panel), c) point-in-time estimates, and d) estimates based on all spells, left- censored as well as nonleft-censored. Our purpose is to ascertain the robustness of duration estimates to the types of spells chosen for analysis.

SIPP 1987 ESTIMATES

Survival Analysis

The SIPP is a longitudinal survey that follows individuals over a period of approximately two and a half years, collecting monthly information on participation in social programs. using longitudinal data on individuals, we can estimate distributions of spell duration for individuals with different characteristics. We use a survival analysis technique to derive these distributions and the resulting estimates of median spell durations, since this technique allows one to utilize information on spells which are right-censored.

In order to obtain weighted estimates, we considered only individuals who were present in the

survey for all 28 months. A program spell is defined as a period of participation with a known beginning. The spell is observed either until it ends or until it is right- censored. The probability of leaving a given program in month t, given that the person was participating in the beginning of that month, is defined as

$$h(t) = \frac{exits(t)}{prog(t)-(rcens(t)/2)}$$

where exits(t} denotes the number of spell exits in month t. We assume that a spell exit occurs in month t if we observe participation on month t and non- participation in month t+l. The number of spells that were in progress in the beginning of month t is denoted by prog(t) and rcens(t) is the number of spells which were right-censored in month t. We assume that a spell is exposed to the risk of exiting for an average of one-half of a month before right-censoring occurs.

The survival rate in month t, which is the probability that a spell lasts longer than t months, can then be written as

$$S(t) = \prod (1-h(k))$$

The survival function evaluated at t gives the probability that an entrant into a program is still participating t time periods later.

The median survival time or spell duration M can be estimated by linear interpolation. Let [t, t+l) be the interval such that S(t)>=.5 and S(t+l)<.5. Then

$$M = t + \frac{S(t)-1/2}{S(t)-S(t+l)}$$

We use the above model to estimate spell durations under four different scenarios.

Panel estimates of duration

In this section, a program spell is defined as a period of participation which was preceded by one or more months of nonparticipation.

Food stamps

During the 1987 panel, 18.9 million spells of food stamp participation were observed. Roughly

41 percent of these spells were right censored. As can be seen in Table 1, the median spell duration was 5.8 months. While the majority of spells (56percent) lasted less than 9 months, 28 percent lasted longer than 2 years. The majority of observed spells, 63 percent, were experienced by Whites, while 33 percent of spells were experienced by Blacks.

Blacks and Whites had substantially different spell distributions. As shown in Table 1, almost one-half of White spells were shorter than 5 months, compared to 29 percent of Black spells. Similarly, Blacks were more likely than Whites to have long spells. While less than one-fourth of White spells lasted longer than 2 years, over 40 percent of Black spells did. The median spell duration for Whites was 4.4 months, less than half as long as the median spell duration of 10.9 months for Blacks. About 37 percent of White spells were right- censored, compared to 52 percent of Black spells, reflecting the fact that Blacks had comparatively longer spells

Table 1: Spells with an Observed Beginning Food Stamp Distributions by Race

	Total	White	Black
Total Number of Spells	18,933,539	11,967,409	6,240,271
Spell Length			
< 5 Months	0.42	0.48	0.29
5-8 Months	0.14	0.13	0.15
9-12 Months	0.10	0.11	0.07
>12 Months	0.34	0.28	0.48
13-16 Months	0.03	0.02	0.05
> 16 Months	0.31	0.25	0.44
17-24 Months	0.03	0.03	0.03
> 24 Months	0.28	0.22	0.41
Median Spell Duration	5.8	4.4	10.9
Percent Right-Censored	41	37	52

AFDC

Roughly 7 million spells of AFDC participation started during the 1987 panel, 42 percent of which were still in progress at the end of the panel. As shown in Table 2, the median spell duration was 7.3 months. The majority of spells (54percent) lasted less than 9 months, and

28 percent lasted longer than 2 years. Sixty-one percent of the spells were experienced by Whites, compared to 36 percent of spells experienced by Blacks.

Table 2: Spells with an Observed Beginning AFDC Spell Distributions by Race

	Total	White	Black
Total Number of Spells	7,225,396	4,424,654	2,614,345
Spell Length			
< 5 Months	0.40	0.39	0.42
5-8 Months	0.14	0.19	0.07
9-12 Months	0.09	0.10	0.08
>12 Months	0.37	0.33	0.43
13-16 Months	0.05	0.02	0.09
> 16 Months	0.32	0.31	0.33
17-24 Months	0.04	0.04	0.03
> 24 Months	0.28	0.27	0.31
Median Spell Duration	7.3	7.0	9.2
Percent Right-Censored	42	42	42

The median spell duration was 7.0 months for Whites and 9.2 months for Blacks. Both groups had a similar proportion of spells which were still in progress at the end of the panel, about 42 percent.

Panel estimates of durations varying the length of the panel.

Questions have been raised in the past about the effect of panel length on analyses of the dynamics of program participation in general, and statistics such as median spell duration specifically. While a 28-month panel is of little help in determining median spell lengths in excess of 28 months (as is, for example, the case for SSI spells of the aged population), it might be quite adequate for studying a wide variety of topics related to program participation. In this section we look at the effects of panel length on the duration distributions of food stamps and AFDC, by restricting the 1987 panel's 28 month window of observation to the last 25, 21, and 17 months of the panel, respectively.

Food stamps

A decrease in the window of observation generally led to an increase in the median spell duration, as can be seen in Table 3. The sole exception occurred when the window was decreased from 21 to 17 months and the median spell duration consequently fell from 7.4 to 7.2 months. All increases were significant, although they were not always substantial. Moreover, this negative relationship between length of observation period and median spell duration was observed independent of race.

Looking at all races combined, the majority of spells (52to 56 percent, depending on length of observation) lasted less than 9months, and 34 to 37 percent of all spells lasted longer than one year. The significant differences between Whites and Blacks observed in the above section

Table 3: Spells with an Observed Beginning Food Stamp Spell Distributions for Different Panel Lengths- All Races

	Panel Length			
	28 Months	**25 Months**	**21 Months**	**17 Months**
Total Number	18,933,539	16,853,938	3,803,755	10,417,136
Spell Length				
< 5 Months	0.42	0.42	0.39	0.40
5-8 Months	0.14	0.12	0.13	0.15
9-12 Months	0.10	0.10	0.11	0.08
>12 Months	0.34	0.36	0.37	0.37
13-16 Months	0.03	0.03	0.03	-
> 16 Months	0.31	0.33	0.34	-
17-24 Months	0.03	-	-	-
> 24 Months	0.28	-	-	-
Median Spell Duration	5.8	6.2	7.4	7.2
Percent Right-Censored	41	44	48	53

existed independent of panel length, as can be seen in Tables 4 and 5. Between 58 and 61 percent of spells experienced by Whites lasted less than 9 months, compared to only 41 to 47 percent of Black spells. Likewise, while 48 to 53 percent of all Black spells surpassed one year, only 27 to 29 percent of

White spells did.-Blacks had a higher percentage of right-censored spells than Whites for any given window size.

Table 4: Spells with an Observed Beginning Food Stamp Spell Distributions for Different Panel Lengths- White				
	Panel Length			
	28 Months	25 Months	21 Months	17 Months
Total Number	11,967,409	10,757,653	8,839,532	6,638,440
Spell Length				
< 5 Months	0.48	0.46	0.44	0.42
5-8 Months	0.13	0.13	0.14	0.17
9-12 Months	0.11	0.13	0.14	0.11
>12 Months	0.28	0.28	0.27	0.29
13-16 Months	0.02	0.03	0.01	-
> 16 Months	0.25	0.25	0.26	-
17-24 Months	0.03	-	-	-
> 24 Months	0.22	-	-	-
Median Spell Duration	4.4	4.6	5.4	5.8
Percent Right-Censored	37	38	43	49

Table 5: Spells with an Observed Beginning Food Stamp Spell Distributions for Different Panel Lengths- Black				
	Panel Length			
	28 Months	25 Months	21 Months	17 Months
Total Number	624,027	5,582,650	4,641,058	3,600,815
Spell Length				
< 5 Months	0.29	0.31	0.31	0.35
5-8 Months	0.15	0.12	0.10	0.12
9-12 Months	0.07	0.06	0.06	0.02
>12 Months	0.48	0.51	0.53	0.51
13-16 Months	0.05	0.04	0.05	-
> 16 Months	0.44	0.47	0.48	-
17-24 Months	0.03	-	-	-
> 24 Months	0.41	-	-	-
Median Spell Duration	10.9	13.4	13.8	-
Percent Right-Censored	52	56	59	60

Table 6: AFDC Spell Distributions for Different Panel Lengths- All Races				
	Panel Length			
	28 Months	25 Months	21 Months	17 Months
Total Number	7,225,396	6,463,736	5,153,143	4,071,517
Spell Length				
< 5 Months	0.40	0.39	0.39	0.42
5-8 Months	0.14	0.15	0.13	0.10
9-12 Months	0.09	0.10	0.10	0.07
>12 Months	0.37	0.36	0.37	0.40
13-16 Months	0.05	0.06	0.00	-
> 16 Months	0.32	0.30	0.37	-
17-24 Months	0.04	-	-	-
> 24 Months	0.28	-	-	-
Median Spell Duration	7.3	7.4	7.6	7.7
Percent Right-Censored	42	43	50	54

AFDC

As shown in Tables 6, 7, and 8, much of the same trends that were observed for food stamps could also be observed for AFDC. Looking at all spells, the median spell duration increased steadily from 7.3 to 7.7 months with decreases in the window from 28 to 17 months. Looking at Blacks and Whites separately, no consistent correlation between window size and median spell duration existed.

Table 7: Spells with an Observed Beginning AFDC Spell Distributions for Different Panel Lengths- Whites				
	Panel Length			
	28 Months	**25 Months**	**21 Months**	**17 Months**
Total Number	4,424,654	4,016,578	3,181,070	2,485,425
Spell Length				
< 5 Months	0.39	0.39	0.35	0.37
5-8 Months	0.19	0.19	0.19	0.14
9-12 Months	0.10	0.11	0.10	0.07
>12 Months	0.33	0.31	0.35	0.41
13-16 Months	0.02	0.03	0.01	-
> 16 Months	0.31	0.30	0.35	-
17-24 Months	0.04	-	-	-
> 24 Months	0.27	-	-	-
Median Spell Duration	7.0	7.3	7.4	7.8
Percent Right-Censored	42	43	49	56

With a window size of 21 months, for instance, 47 percent of Black spells lasted less than 5 months, compared to only 35 percent of White spells.

The majority of all spells as well as spells experienced by Whites lasted less than 9 months, independent of the length of observation. A significantly smaller proportion of Black spells lasted less than 9 months for all panel lengths except 17 months. However, Blacks were more likely than Whites to have experienced spells lasting less than 5 months independent of window size, as can be seen in Tables 7 and 8.

Table 8: Spells with an Observed Beginning AFDC Spell Distributions for Different Panel Lengths- Blacks				
	Panel Length			
	28 Months	**25 Months**	**21 Months**	**17 Months**
Total Number	2,614,345	2,289,505	1,835,041	1,463,203
Spell Length				
< 5 Months	0.42	0.40	0.47	0.51
5-8 Months	0.07	0.08	0.03	0.03
9-12 Months	0.08	0.10	0.09	0.06
>12 Months	0.43	0.43	0.41	0.40
13-16 Months	0.09	0.12	0.00	-
> 16 Months	0.33	0.30	0.41	-
17-24 Months	0.03	-	-	-
> 24 Months	0.31	-	-	-
Median Spell Duration	9.2	9.4	9.1	4.0
Percent Right-Censored	42	42	49	50

Unlike spells of food stamp participation, there exists no correlation between the likelihood of being right-censored and race.

To summarize, the length of the SIPP panel does not appear to substantially influence distributions of spell durations. The disadvantage of a relatively short window (e.g. 17 months) is that one cannot determine the proportion of spells longer than, say, 2 years. A 17 month window in fact will only allow us to determine the proportion of spells longer than 15 months. As a result, if one is interested primarily in the characteristics of persons with the longest spells, a short window is of little use. On the other hand, even a 17 month window seems adequate for the purpose of investigating length of spells for the majority of all spells, and for the majority of spells by race.

Cross Section duration estimates using retrospective data with interrupted spells of participation in AFDC and food stamps

Dynamic analyses of program experiences are hampered to some degree by the presence of left-censored observations. Observations are left-censored when the beginning of a spell of interest is not observed, that is, a spell began at some time before the reference period.

While dynamic estimates may be unbiased for spells with observed beginnings in the reference period, there remains concern about the deletion of left-censored spells from su h analyses. Swartz et al., in a study of spells without health insurance, include uninsured spells that began prior to the start of the SIPP panel. They included such spells because they were concerned that people with chronically long spells without coverage, or persons who in fact were never covered (e.g.those working in an industrial sector that has traditionally not had health insurance benefits) may not be proportionately represented in a sample restricted to spells with observed beginnings. These authors suggest that the inclusion of left-censored spells could add important information for persons with particular characteristics associated with spells of very long duration.

In terms of program participation, it is possible that an analogous situation exists. That is, there may be particular characteristics of persons, associated with very long spells, that precludes their inclusion in our sample. For example, in our analysis, which is restricted to persons in the sample the entire period, selecting spells with observed beginnings leads to a sample without those persons who participated from the first month of life onward. Even if one defines the spells of those--"born into participation" as-spells with observed beginnings, the problem of unavailable appropriate weights make their inclusion all but impossible. Studies of spells with observed beginnings might result in reasonable estimates of spell distribution and median duration for such spells with observed beginnings, but it might result in downward biased estimates of the median duration of all spells.

In SIPP, a history of recipiency is collected for all individuals who report program participation in the first wave of the survey. This set of questions ascertains a beginning date for each spell of program participation and thus provides a bounding date for left-censored observations.

In this section we will look at a matched 1987 panel file which contains topical module information about

recipiency history. The estimated durations presented in this section are obtained by attaching the retrospectively reported dates of spell beginnings to those spells which were in progress in the first month of the survey. Only left-censored spells are included in this section of the paper, that is spells that are in progress at the beginning of the interview period. Since the likelihood of being included in a cross- section of spells rises with the length of a spell, cross-sectional estimates of spell durations are likely to be substantially longer than estimates based on all spells that start during the 28 month of the panel but do not occur necessarily at the same point in time.

Food stamps

In the 1987 panel file there were 16 million persons participating in the food stamp program as of the first month of interview. Of these spells, interrupted while in progress by our interview, slightly under half, 47 percent, were also right censored, that is, they were not completed by the end of the panel.

For all persons with ongoing spells of food stamp participation in the initial month of the reference period, the median spell duration was 94.7 months or nearly 8 years (see Table 9). This constitutes a 16 fold increase from the median spell duration based on spells with observed beginnings. Only 3 percent of spells lasted less than 5 months, while almost 70 percent lasted longer than 3 years, and 44 percent lasted longer than 10 years. An F-statistic rejects homogeneity with respect to race, and one should therefore concentrate on the separate duration distributions for Whites and Blacks. Over half of the persons with interrupted spells observed in the first month were White. Of the spells experienced by Whites, 44 percent were also right censored. A higher percentage of spells experienced by Blacks were right censored, 52 percent.

Table 9: Cross Sectional Spells Food Stamp Spell Distributions by Race			
	Total	**White**	**Black**
Total Number of Spells	6,202,538	8,775,467	6,359,064
Spell Length			
< 5 Months	0.03	0.04	0.02
5-8 Months	0.06	0.07	0.04
9-12 Months	0.05	0.05	0.05
>12 Months	0.86	0.84	0.89
13-16 Months	0.04	0.05	0.03
> 16 Months	0.82	0.79	0.86
17-24 Months	0.06	0.05	0.05
> 24 Months	0.76	0.74	0.81
> 36 Months	0.69	0.66	0.76
> 48 Months	0.64	0.59	0.72
>120 Months	0.44	0.34	0.58
Median Spell Duration	94.7	69.3	147.1
Percent Right-Censored	47	44	52

Estimated spell durations differed significantly by race. Median food stamp spell duration was over twice as long for Blacks than for Whites, 12 years versus 6 years. While 34 percent of White spells lasted longer than 10 years, almost 60 percent of Black spells did so.

AFDC

In the 1987 panel file there were 8 million

Table 10: Cross Sectional Spells AFDC Spell Distributions by Race			
	Total	**White**	**Black**
Total Number of Spells	8,008,920	4,010,691	3,370,182
Spell Length			
< 5 Months	0.02	0.03	0.01
5-8 Months	0.04	0.04	0.06
9-12 Months	0.02	0.03	0.00
>12 Months	0.92	0.91	0.93
13-16 Months	0.04	0.03	0.05
> 16 Months	0.88	0.88	0.88
17-24 Months	0.03	0.04	0.01
> 24 Months	0.86	0.84	0.87
> 36 Months	0.78	0.73	0.85
> 48 Months	0.70	0.61	0.81
>120 Months	0.46	0.32	0.62
Median Spell Duration	107.3	71.9	153.4
Percent Right-Censored	51	42	60

persons participating in the AFDC program as of the first month of interviewing (see Table 10). Of these spells, interrupted while in progress by our interview, one half were also right censored, that is they were not completed by the end of the panel.

For all persons participating in AFDC in the first month of the reference period, median duration of that spell was estimated to be nearly 9 years in length. While only 30 percent of AFDC spells lasted 4 years or less, 46 percent lasted longer than 10 years. Again, homogeneity with respect to race was rejected.

One half of the persons with interrupted spells observed in the first month were White. Of the spells experienced by Whites, 42 percent were also right censored. A higher percentage of spells experienced by Blacks were right censored, 60 percent. There were significant differences by race in estimated durations. The median

AFDC spell duration for Whites was 6 years. For Blacks the median spell duration was over twice as long, almost 13 years. Blacks also were almost twice as likely than Whites to experience AFDC spells longer than 10 years, 62 percent versus 32 percent. The duration estimates based on spells in progress during the first month were very long relative to those based on spells with observed beginnings. There is a length bias inherent in the observations of ongoing spells at a point in time due to the fact that the probability of a spell being captured in a cross section of spells is proportional to its length.

Resulting median spell durations are therefore likely to be upward biased estimates of the median duration of all spells. Cross sectional sampling of a stationary point process generate observations with length biased densities, as discussed in Cox and Oakes (1984). As described in Swartz et al, it is possible to adjust the length-biased spells, thus allowing these spells to be included in the analyses of all spells. Let f(x)be the probability density function of spells with observed beginnings with failure time x and mean u. Assuming that cross sectional spells are generated by the same underlying process, their probability density function can be written as xf(x)/u. Swartz et. al. combine spells with observed beginnings and left-censored spells after adjusting for their length bias. In the case of time spent without health insurance, results were not substantially changed by including left-censored spells.

We combined the two types of spells and the results are discussed in the next section. However, unlike Swartz et. al., we were not yet able to correct for the length bias inherent in the cross sectional spells, which will be the focus of subsequent work.

Combined panel and cross sectional estimates

Tables 11 and 12 contain estimates of durations that include the length biased retrospective left censored spells in the calculations along with all spells for which the beginning was observed across the panel life. These estimates are contaminated by the length bias of the left-censored spells which are included. As expected, estimates of median spell durations were lower than those found for left-censored spells but higher than those for spells with observed beginnings.

Food stamps

Table 11 shows estimates o+ median duration of food stamps by race of person. While the median spell duration of all spells was 32 months, it was over 6 years for Blacks as compared to less than one and one- half years for Whites. Over 60 percent of all spells lasted longer than one year, and 31 percent lasted longer than 10 years.

Table 11: Combined Panel and Cross Sectional Spells Food Stamp Spell Distributions by Race			
	Total	**White**	**Black**
Total Number of Spells	5,136,007	20,742,876	12,599,335
Spell Length			
< 5 Months	0.24	0.29	0.15
5-8 Months	0.09	0.10	0.09
9-12 Months	0.06	0.07	0.06
>12 Months	0.61	0.54	0.70
13-16 Months	0.03	0.03	0.03
> 16 Months	0.57	0.51	0.67
17-24 Months	0.04	0.03	0.04
> 24 Months	0.53	0.48	0.63
> 36 Months	0.48	0.43	0.60
> 48 Months	0.44	0.38	0.56
>120 Months	0.31	0.22	0.45
Median Spell Duration	31.8	17.6	77.2
Percent Right-Censored	44	39.9	52.4

AFDC

As can be seen in Table 12, Blacks had a substantially higher median spell duration than Whites, 100 months (over 8 years) versus 37 months (three years). Moreover, Blacks were twice as likely than Whites to have very long spells, those lasting longer than 10 years. However, the likelihood of having short spells (those lasting less than 5 months), was about 20 percent, independent of race.

It was shown that the SIPP recipiency history module allows one to include left-censored spells in dynamic analyses. The results suggest that there are differences in the characteristics of

Table 12: Combined Panel and Cross Sectional Spells AFDC Spell Distributions by Race			
	Total	**White**	**Black**
Total Number of Spells	15,234,316	8,435,345	5,984,527
Spell Length			
< 5 Months	0.19	0.21	0.18
5-8 Months	0.08	0.10	0.06
9-12 Months	0.04	0.05	0.03
>12 Months	0.68	0.63	0.73
13-16 Months	0.04	0.02	0.06
> 16 Months	0.65	0.61	0.67
17-24 Months	0.02	0.03	0.01
> 24 Months	0.62	0.58	0.65
> 36 Months	0.57	0.50	0.64
> 48 Months	0.51	0.42	0.61
>120 Months	0.34	0.22	0.47
Median Spell Duration	51.50	36.9	99.9
Percent Right-Censored	47	42	52

groups in each typeof data,interrupted spellsversus.,thosewith observed beginnings, as illustrated here interms of the different experiences by race. Inthe future we hope to apply themethods employed by Swartz et al to testthe importance of including these interrupted long spells inour analyses of program participation. conclusion

We have found that estimates of spell distributions vary considerably fordifferent types of samples, and within sample for Blacks and Whites. However, estimates based on spells with observed beginnings within race groups did not differ greatly for different panel lengths. Thus, this study would suggest that if the main point of interest is to investigate the distribution of the majority of spells into narrowly defined intervals, even panels shorter than the 1987 panel seem adequate.

We were not able to establish whether left-censored spells should be included in studies of AFDC and food stamp spell durations, since we have not yet corrected for the length bias contained in the density of cross sectional spells. It is possible that estimates of these distributions, after including length adjusted spells, are not significantly different from estimates of distributions based solely on spells with observed

beginnings. Swartz et.al. have found that inclusion of left censored spells did not influence greatly the distribution of spells without health insurance. The focus of our future work will be to investigate the impact of inclusion of length-adjusted left-censored spells on distributions of AFDC and food stamp duration.

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