Title

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The Impact of the Zebley Decision on Transitions into SSI in California

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Introduction

The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) enacted major changes in both Aid to Families with Dependent Children (AFDC) and Supplemental Security Income (SSI) that will affect families with disabled children. The time limits in the new Temporary Assistance for Needy Families (TANF) program that replaces AFDC will make TANF both less attractive and less accessible to disabled families. At the same time, the changes in SSI, a federally administered program that provides cash benefits to needy aged, blind, and disabled persons, have made it harder for children with some kinds of disabilities to receive SSI. From a public policy perspective, it will be important to know what happens to these children and their families as TANF and the changes in SSI are implemented.

This paper describes a method for identifying the impact of these changes. The California Medi-Cal Eligibility Data System (MEDS) database is used to track transitions into Supplemental Security Income from 1987 to 1995. Special attention is paid to the impact of the 1990 *Sullivan v. Zebley* decision which broadened eligibility for children to receive SSI. We show that the MEDS database can clearly identify the impacts of Zebley and that it is especially useful for determining how many children moved from AFDC to SSI. (We find, for example, that a large fraction of the "Zebley" entrants to SSI came from AFDC.) We argue that the same methodology should be useful for identifying the movement of children starting in 1997 from SSI to TANF or to other programs because of the 1996 reforms. This should provide a method for tracking their well-being and the overall impacts of PRWORA.

The Zebley Decision and Its Aftermath

During the early 1990s there were two major policy changes in the eligibility of children for SSI . One of these policy changes was the Supreme Court's 1990 decision in Sullivan v. Zebley. The seond was the implementation of the new childhood mental impairment regulations. Together these changes had a substantial impact on the SSI caseload.

The Zebley case centered on the inconsistency between eligibility determination of adults and children for SSI. The adult determination process has two steps at which an adult could qualify for benefits. The first few step involves determining whether the applicant has several listed medical impairments or has an impairment that is equally restrictive for gaining employment.

During the second step of the adult determination process an adult can qualify based on a functional assessment of his or her ability to engage in work given age, education, and work experience. Until 1990, the child determination process only considered listed medical impairments and did not allow for any further functional assessment that would allow for unlisted comparable impairments. In the decision, the Court affirmed that a listings only approach did not allow for children to qualify based on "comparable severity," that the existing child standard was stricter than the standard for adult disability cases, and that it was possible to do functional assessments of children based on their ability to perform age-appropriate activities.

Following the February 1990 Supreme Court decision in *Sullivan v.* Zebley, several policy changes occurred in the determination of children's eligibility for SSI. In May 1990, the Social Security Administration developed interim regulations to implement the changes due to the Court's decision. This interim standard no longer allowed children, who were previously denied based on not having an impairment equal to a listed impairment, to be denied benefits without first being given a functional assessment. Any child who previously qualified under the listings only approach would still be eligible, but the interim standard added an eligibility determination process that was more lenient and more similar to the adult determination process.

In December, 1990 new childhood mental impairment regulations were implemented. These were not directly the result of the Zebley decision, but they had a similar impact. These changes included expanding the list of mental impairments that would allow for using a child's age appropriate activities in the determination of their disability status. These changes were very similar in nature to the interim Zebley eligibility rules but were particularly focused on expanding the eligibility of children with mental impairments.

In February 1991, the final regulations in response to the Zebley decision were adopted. The Social Security Administration conducted nationwide staff training in the new regulations from February through April 1991. In March 1991 the terms of the specific Zebley court case settlement were agreed upon. The key element of the settlement was a major outreach program to children whose SSI claims were denied for medical reasons from January 1980 through February 1991. Denied applicants would be offered the opportunity to have their cases redetermined. In July 1991 notices to these denied cases were sent out. Almost forty percent of these cases responded to these notices by September 1991. The Social Security Administration estimated that by December 1992 all of these previously denied cases should have been reprocessed.

In September 1993 the final rules implementing the changes in the Zebley decision were published in the Federal Register. These rules were a revision of the rules from February 1991, but were not substantively different.

Past Literature on This Subject

Because these changes are relatively recent, there is only a small scholarly literature on Zebley's impact. The growth in SSI caseload in the early part of the 1990's has been well documented. Most reports on the increasing caseload point to the Zebley decision and the expansion of the mental impairment listings as the major sources of this growth. (For examples, see Social Security Administration, 1995 and Green Book, 1996.) Several studies have investigated the relative importance of these two policy changes on the increase in caseload. In a study by U.S. DHHS(1994) it is estimated that 69% of the caseload increases were from changes in the mental impairment regulations and the Zebley decision accounts for the remaining 31% of growth. A report from the General Accounting Office (1994)finds that 59% of the growth was from the mental impairment listings and 41% from the Zebley decision. We shall refer to these as the Zebley impacts, although strictly speaking, the changes in the mental impairment regulations were separate from the Zebley decision.

There is much less work that links together SSI with AFDC. In her testimony to the U.S. Senate's Finance Committee, Jane L. Ross suggests that state governments have an incentive to move recipients away from other welfare programs to SSI. This incentive arises because states share the cost of providing benefits to AFDC recipients as opposed to the completely federally funded SSI program. She has evidence that some states even fund programs to channel recipients towards SSI.

Kubik (1997) finds that states who have fiscal problems tend to have higher AFDC caseloads and therefore pay a higher percentage of AFDC benefits. He shows that states that pay a higher share of AFDC benefits are more likely to attempt to move welfare recipients towards SSI.

Garrett and Glied (1997) look towards individual level incentives to participate in SSI as opposed to AFDC. They find that Zebley had a greater impact in states that have lower AFDC payments. This suggests that families choose SSI over AFDC based on the difference in the benefit levels of the two programs. They also find a negative effect of unemployment on child SSI participation. This is contrast to Rupp and Stapleton (1995) who find that unemployment has a positive effect on both applications and awards of SSI.

All of these studies look at the impact of Zebley by comparing across states using yearly data. They do not look at any individual level data that could provide insight on any individual characteristics, such as age. Yearly data does not allow for a complete analysis of each stage of Zebley implementation. Nor is it possible to consider where the increases in SSI caseload came from. They do not look at the difference of SSI accessions that are transitions from AFDC or not. Hence, their results are only circumstantial. What is really needed is some data that overcomes these problems.

Data Used in this Analysis

This analysis uses data from the California Work Pays Demonstration Project Statewide Longitudinal Database Persons 10% Sample. These data contain monthly participation information from 1987 through 1995 for 10% of California's Medi-Cal eligible population. These data come from the California MEDS MEDS is a state-level data system used to administer Medi-Cal in California. MEDS provides information about a variety of public assistance programs including AFDC and SSI. Having information about many forms of assistance allows us to track transitions between programs. These data are unique in this respect.

Our data contain historical program participation back to 1987. This allows us to accurately obtain baseline information to analyze the impact of Zebley, which was decided in February 1990. We can continue to examine monthly the changes through to the end of our data period, December 1995. As implementation of Zebley took place over several months we can watch as the population of children now eligible for SSI were processed.

Time -Line and Our Expectations

The time-line suggests a number of points at which we might expect the Zebley decision to have an impact on SSI caseloads. The following table, Table 1, summarizes the Zebley policy changes and tracks the various components of implementation according to the Social Security Administration. Because we have monthly data, we can determine the exact point at which caseloads in California began to increase.

TABLE 1
Zebley Policy Time-line

Calendar Date	**Policy change**
1990	
February 1990	Supreme Court decision *Sullivan v. Zebley*
	Processing of denials and cessations stopped
May 1990	Interim regulations developed
December 1990	New childhood mental impairment regulations
1991	
February 1991	Final regulations
	Training of Zebley regulations begins
March 1991	Zebley court settlement - all claims denied 1/80-2/11/91 redone
	Zebley court settlement - major outreach begins
April 1991	Training of Zebley regulations completed
July 1991	452,000 notices sent to previously denied kids
August 1991	Re-adjudicated cases go out to field offices for interviews for determination
September 1991	175,000 of the 452,000 previously denied cases responded the notices
1992	
January 1992	200,000 of the 452,000 previously denied cases responded to notices
	133,000 of the 452,000 notices returned as undeliverable
December 1992	SSA estimated time of finishing the processing of the backlog of previously denied cases
1993	
September 1993	Final rules (Zebley) published in Federal Register

Source: Disability Notes (various issues), Social Security Administration, Office of Disability.

The earliest point at which we can see any impact from Zebley would be immediately following the Supreme Court Decision in 1990. We would expect that at this time the SSI caseload would begin to increase because the Social Security Administration stopped processing denials that could be eligible under the more lenient Zebley rules. Interim standards would also be in effect after this date. We expect to see that the number of SSI accessions would slowly increase during this time until the interim standards were fully implemented.

The first quarter of 1991 would be the next period of interest. Several policy changes went into effect at this time. These policy changes included implementation of the new mental impairment regulations, adoption of final Zebley regulations, and the beginning of training of disability determination workers in using the functional assessment standard. It is also around this time that previously denied cases were notified that they could be reevaluated. We expect that all of these policies would increase the number of SSI accessions in our Zebley age group of school aged children. The accessions would come from children now qualifying under the expanded mental impairment listings as well as from previously denied cases that were now eligible as a direct result of functional assessment method of determining eligibility. These new policies should lead to an even higher number of accessions than what we would see just after the Supreme Court decision. In fact, we believe that after this period we should see a substantial increase in accessions.

This increase should continue until the end of 1992. Social Security Administration estimated that this was the point at which they would have finished processing the backlog of previously denied cases. After this point we would expect the rate of increase of accessions to decrease. The SSI caseload should begin to stabilize around a new higher level that includes children who are now eligible under the Zebley standards.

We believe that the largest impact of Zebley can be observed in the group of previously denied cases that were redetermined following the settlement of the Zebley case. This group of poor and disabled children who were denied SSI would still have been in need of assistance following the denial of SSI benefits. These children would very likely have gotten assistance under other public assistance programs like AFDC. We believe that if we break down SSI accessions based on whether or not they were transitioning from AFDC, we expect to observe that many of the previously denied cases that became eligible under the Zebley regulations did in fact come from AFDC. We particularly expect to see this in the time period in which the denied cases were re-adjudicated, February 1991 through December 1992.

Definitions of SSI Accessions and Transitions from AFDC

We define an SSI start as the first month in which a person has an SSI aid code not preceded by any SSI aid code in the previous 3 months. For example, an SSI start would have occurred in June 1990 if we observed participation in SSI in June 1990, but not in any of the months March 1990 through May 1990. Allowing for this three-month break ensures that we are truly observing an accession to SSI, as opposed to some kind of administrative churning. We defined SSI by blind and disabled categories of SSI and excluded aid to the aged categories of SSI. Excluding aged categories is natural since we are interested in childhood disability. Starts during January 1987 - March 1987 are left censored because we have used a three month break. In our analysis we use only the non-left censored starts from April 1987 through December 1995. No accessions, however, can be found during May 1987 because of an administrative difficulty with that month's data.

One of the difficulties with working with these data are that they come from annual extracts pulled in the early part of the subsequent year. Data are active on the system for 18 months and can be updated at any time during those 18 months. As a result data for the earlier months of the year are more accurate than data near the end of the year. We therefore observe that we have many fewer starts in the last 2 to 3 months of the year than we would expect and that we find a large number of starts in January. Starts that we observe in January may actually have occurred in the later part of the previous year. Our multivariate analysis will adjust for this.

In our analysis we break down accessions to SSI based on whether or not the people were transitioning from AFDC. We defined an SSI start as being a transition from AFDC, if we identified the child as being on AFDC in any of the four months prior to the month in which we first observe SSI. For example, if an accession occurred in June 1990, and we observed AFDC participation in any of the months February 1990 through May 1990 then we would say that this person was transitioning from AFDC.

A Model of Zebley's Impact

Basic Accounting Equations -- We have several basic goals. First, we want to investigate the dynamics of movement to SSI after Zebley. We are especially interested in identifying the crucial points at which movements occurred. Second, we want to determine how much of the increase in SSI caseload was due to movements from AFDC to SSI. Third, we want to develop a method that will allow us to determine how these movements vary by geographic areas. To answer these questions, we are especially interested in how the "take-up rate," the rate at which people move from a group onto SSI, varies between groups such as those on AFDC or those not in AFDC or among geographic areas. The following provides a basis for understanding what is going on, and it forms the basis for our statistical work.

Assume that we observe units “i” over time periods “t.” The units could be geographical areas or age groups in the population. Assume that the non-Zebley SSI eligible disabled population on AFDC is represented by d_{it}^{A} (where the superscript “A” refers to AFDC) and the take-up rate into SSI by τ_{it}^{A}. Then the number of non-Zebley disabled people going into SSI from AFDC in that unit and in that month will be given by $\tau_{it}^{A}\, d_{it}^{A}$ and the number of non-Zebley disabled people going into SSI from the non-AFDC population (represented by the superscript “N”) will be $\tau_{it}^{N}\, d_{it}^{N}$. In addition, if the Zebley eligible disabled population on AFDC is represented by z_{it}^{A} (this could be zero for some groups) and the take-up rate is θ_{it}^{A} then the number of Zebley disabled people going into SSI from the AFDC population will be $\theta_{it}^{A}\, z_{it}^{A}$. Similarly, the number of Zebley eligible disabled people going into SSI from the non-AFDC population will be $\theta_{it}^{N}\, z_{it}^{N}$. With this notation and accounting framework, we can then say that the total number of people going on to SSI from the AFDC population will be:

(1) $\rho_{it}^{A} = \tau_{it}^{A}\, d_{it}^{A} + \theta_{it}^{A}\, z_{it}^{A}$,

and the total number of people going on to SSI from the non-AFDC population will be:

(2) $\rho_{it}^{N} = \tau_{it}^{N}\, d_{it}^{N} + \theta_{it}^{N}\, z_{it}^{N}$.

The sum, ρ_{it}, of ρ_{it}^{A} and ρ_{it}^{N} will be the total number of people going on to SSI.

Two Period Model -- For simplicity, let us assume a two-period model in which in the first period Zebley is not implemented. Then at t=1, $\theta_{i1}^{A} = 0$ and $\theta_{i1}^{N} = 0$. That is, the take-up rate of Zebley cases is zero to begin with before Zebley is implemented. In the second period, Zebley has been implemented and θ_{i1}^{A} and θ_{i1}^{N} do not necessarily equal zero. Our goal will be to determine their values.

We make a number of assumptions.

(A) <u>Take-Up Rates Equal Over Time</u> - The take-up rates among the non-Zebley SSI eligible disabled are similar across the two periods for the AFDC and non-AFDC groups (although they might differ across the two groups). Thus we have $\tau_{i1}^A = \tau_{i2}^A = \tau_i^A$ and $\tau_{i1}^N = \tau_{i2}^N = \tau_i^N$. Over a short time period this seems like a very reasonable assumption.

(B) <u>Non-Zebley SSI Eligibles Equal Across Units</u> - The number of non-Zebley SSI eligible disabled is the same for each unit across the two time periods. Thus we have that $d_{i1}^A = d_{i2}^A = d_i^A$ and $d_{i1}^N = d_{i2}^N = d_i^{N.}$ Over a short time period this also seems like a very reasonable assumption.

(C) <u>Zebley SSI Eligible Proportional to Non-Zebley SSI Eligible</u> - The number of Zebley SSI eligible disabled is proportional to the number of non-Zebley SSI eligible disabled in the the subpopulations at each point in time.

$$z_{it}^A = \psi_i d_i^A \quad \text{and } z_{it}^N = \psi_i d_i^N.$$

Note that ψ_i can vary by unit and it might be zero for some i, such as older age groups that are not eligible for Zebley SSI. This assumption seems more problematic than the other two. It requires that non-Zebley SSI eligibles be indicative of the number of Zebley SSI eligibles. If, however, non-Zebley SSI eligibles are different in important socio-economic characteristics from Zebley SSI eligibles, then this might not hold. Nevertheless, it is a reasonable starting place for analysis.

With these assumptions and the basic accounting framework, we have the following four equations:

(3) $\rho_{i1}^A = \tau_i^A d_i^A$ for the first period for those from AFDC.

(4) $\rho_{i1}^N = \tau_i^N d_i^N$ for the first period for those not from AFDC.

(5) $\rho_{i2}^A = \tau_i^A d_i^A + \theta_{i2}^A \psi d_i^A$ for the second period for those from AFDC.

(6) $\rho_{i2}^N = \tau_i^N d_i^N + \theta_{i2}^N \psi d_i^N$ for the second period for those not from AFDC.

Testing for the Impacts of Zebley

These equations provide us with a number of ways to test for the effects of Zebley. To start with, consider the total number of people going on to SSI by dropping the superscripts in the equations above:

(7) $\rho_{i1} = \tau_i d_i$ for the first period.

(8) $\rho_{i2} = \tau_i d_i + \theta_{i2} \psi_i d_i$ for the second period.

If we have data for Zebley eligible age groups over a number of months for the first and second periods, then we would expect a noticeable rise in ρ_{it} for the second set of months. If we also have data over different age groups some of whom are not Zebley eligible, (so that $\psi_i =0$ for these groups) then we would not expect to see any rise in ρ_{it} for these groups, but we would expect to see a rise for Zebley eligible groups. Thus we have comparisons over time and across age groups.

Because the ρ_{it} are counts (often with many zero values for smaller units i), it makes sense to use Poisson regression models. We think of the ρ_{it} as the means in a Poisson model and we assume that we actually observe counts y_{it}. Then if these counts are produced by a Poisson process with mean ρ_{it}:

(9) $\text{Prob}\ (Y_{it} = y_{it}) = [\ \exp(-\rho_{it})\ \rho_{it}\ \{\exp[y_{it} \ln(\rho_{it})]\}\ ] / y_i!\ ,\ y_{it} = 0,1,2,...$

The standard econometric specification is to relate ρ_{it} to covariates X_{it} through a linkage function:

(10) $\ln(\rho_{it}) = \beta' X_{it}$

specifically, we assume that:

(11) $\ln(\rho_{it}) = \beta' X_{it} = \beta_1 X_{1it} + \beta_2 X_{2it}$

where $X_{1it} = 1$, all t , and

$X_{2it} = 0$, all t before Zebley,

$= 1$, all t after Zebley.

But we have assumed (7) and (8) above so that:

(12) $\ln(\rho_{it}) = \ln(\tau_i d_i + \theta_{it} \psi_i d_i)$

and for the first period:

(13) $\ln(\rho_{i1}) = \ln(\tau_i d_i)$

and for the second period:

(14) $\ln(\rho_{i2}) = \ln(\tau_i d_i + \theta_{it} \psi_i d_i)$.

We can use (11) to show how the parameters in the estimated model relate to our formal model:

(15) $\beta_1 = \ln(\tau_i d_i)$

(16) $\beta_1 + \beta_2 = \ln(\tau_i d_i + \theta_{it} \psi_i d_i)$.

Hence we can see that

(17) $\beta_2 = \ln(\tau_i d_i + \theta_{it} \psi_i d_i) - \ln(\tau_i d_i)$

$= \ln[(\tau_i d_i + \theta_{it} \psi_i d_i) / (\tau_i d_i)]$

$= \ln[1 + ((\theta_{it} \psi_i) / \tau_i)]$

An obvious measure of the impact of Zebley is the difference between ρ_{i2} and ρ_{i1} which is the following using (7) and (8):

(18) $\rho_{i2} - \rho_{i1} = \tau_i d_i + \theta_{i2} \psi_i d_i - \tau_i d_i = \theta_{i2} \psi_i d_i$

This is the number of new entrants to SSI due to Zebley.

Another obvious measure is the percent increase in entrants to SSI due to Zebley:

$$(19)\ (\rho_{i2} - \rho_{i1}) / \rho_{i1} = (\theta_{i2}\ \psi_i\ d_i)/ (\tau_i\ d_i) = (\theta_{i2}\ \psi_i) / \tau_i$$

We can estimate (18) and (19) from β_1 and β_2 using the results above. From (17) we can see that the percent increase to SSI due to Zebley is:

$$(20)\ (\rho_{i2} - \rho_{i1}) / \rho_{i1} = (\theta_{i2}\ \psi_i) / \tau_i = \exp(\beta_2) - 1$$

and by using (15) and (16) we get that the number of new entrants to SSI due to Zebley is:

$$(21)\ \rho_{i2} - \rho_{i1} = \theta_{i2}\ \psi_i\ d_i = [\exp(\beta_2) - 1][\exp(\beta_1)]$$

Thus, by getting estimates of β_1 and β_2 we can get estimates of the impact of Zebley.

Comparing AFDC Take-Up with Non-AFDC Take-Up

One of the goals of this analysis was to identify the differences, if any, between take-up rates for SSI from those on AFDC versus those not on AFDC. To do this, consider equation (19) for those from AFDC and those not from AFDC:

$$(22)\ (\rho_{i2}^A - \rho_{i1}^A)/\rho_{i1}^A = (\theta_{i2}^A\ \psi_i d_i^A)/ (\tau_i^A\ d_i^A) = (\theta_{i2}^A\ \psi_i) / \tau_i^A$$

$$(23)\ (\rho_{i2}^N - \rho_{i1}^N)/\rho_{i1}^N = (\theta_{i2}^N\ \psi_i d_i^N) / (\tau_i^N\ d_i^N) = (\theta_{i2}^N\ \psi_i) / \tau_i^N\ .$$

The ratio of these is:

$$(24)\ [(\rho_{i2}^A - \rho_{i1}^A)/\rho_{i1}^A]/[(\rho_{i2}^N - \rho_{i1}^N)/\rho_{i1}^N] = [(\theta_{i2}^A\ \psi_i)/\tau_i^A]/[(\theta_{i2}^N\ \psi_i)/\tau_i^N]=[\theta_{i2}^A /\tau_i^A]/[\theta_{i2}^N/\tau_i^N]$$

Thus, we can retrieve from the sample quantities on the left, the ratio of the theoretical quantities on the right. With some rearrangement, we can write:

$$(25)\ [(\rho_{i2}^A - \rho_{i1}^A)/\rho_{i1}^A]/[(\rho_{i2}^N - \rho_{i1}^N)/\rho_{i1}^N] = [\theta_{i2}^A/\theta_{i2}^N]/[\tau_i^A/\tau_i^N]$$

so that we can estimate the ratio of Zebley take-up rates in the two groups in terms of the ratio of the non-Zebley take-up rates. The non-Zebley take-up rates $[\tau_i^A/\tau_i^N]$ provide a good baseline notion of how much welfare offices try harder to get cases moved from welfare to SSI. We might expect that τ_i^A would be greater than τ_i^N, and this ratio would be much greater than one. If (25) produces a ratio of $[\theta_{i2}^A/\theta_{i2}^N]$ to $[\tau_i^A/\tau_i^N]$ that is also greater than one, then this means that welfare offices tried even harder than usual (i.e., than with non-Zebley cases) to move Zebley cases from welfare to SSI. This would mean that Zebley cases come disproportionately from the AFDC caseload.

We can estimate (25) by estimating separate Poisson regressions for those coming from AFDC and those not coming from AFDC. This provides us with the analogy of (20):

(26) $(\rho_{i2}^A - \rho_{i1}^A) / \rho_{i1}^A = (\theta_{i2}^A \psi_i^A) / \tau_i^A = \exp(\beta_2^A) - 1$

(27) $(\rho_{i2}^N - \rho_{i1}^N) / \rho_{i1}^N = (\theta_{i2}^N \psi_i^N) / \tau_i^N = \exp(\beta_2^N) - 1$

and the ratio of these produces:

(28) $(\theta_{i2}^A/\theta_{i2}^N) / (\tau_i^A / \tau_i^N) = [\exp(\beta_2^A) - 1]/[\exp(\beta_2^N) - 1]$

.**Impacts of Zebley**

Overall Increase in Accessions--Figures 1- 4 plot the number of SSI accessions for four age groups. The plots are for the population of these age groups, regardless of their previous state, on AFDC or not. We plot both the actual accessions for each month as well as an overall trend line.

The figures all show an increase in the number of accessions during our Zebley impact period beginning in February 1990 and a leveling off at the end of our data window, 1995. We do however see a marked difference between children and adults.

Figure 1 is for the first age group of 0-6 year olds. These are very young children, who are impacted by Zebley, but to a smaller extent than older school age children based on the difficulty of judging such young children in terms of other children the same age. The probability of a diagnosis of disability increases when the child can be observed in a school environment with other children. We see an increase in the number of SSI accessions after the Zebley decision, but the increase is gradual.

The next age group of 7-12 year olds is shown in Figure 2. We see the most pronounced impact from Zebley in this group. Accessions increase slowly following the decision. As cases are reprocessed under Zebley eligibility requirements, they increase substantially until the processing of previously denied cases has finished. Once the previously denied cases have been re-adjudicated we see that the number of accessions begins to fall but is still higher than prior to the Zebley decision.

The next age group of 13-18 year olds is shown in Figure 3. We still observe an increase in the number of accessions, but not as high as we see for the 7-12 year olds. These children are much older. They are about to lose their eligibility for childhood disability and may be less inclined to have their cases redetermined. The increase in the number of accessions in the post Zebley period are gradual and we see the same leveling off that we expect to find after the backlog of denied cases have been processed.

Figure 4 plots the number of SSI accessions for working age adults from 19 to 64 years old. There are not the increases that we see in the children age groups. We attribute the difference to the Zebley eligibility changes that directly addressed childhood disability. In fact, it seems that for the adults the Zebley take-up rates will be zero. The increase we see during the post Zebley period is small, and we do not see any marked difference between the number of accessions at the end of our data period and the number at the beginning of our data period.

These figures provide some strong evidence for Zebley's impact, but these results may be confounded by other events. One of the most important is the condition of the economy. Although Garrett and Glied (1997) found that unemployemnt decreased accessions to SSI, we would expect to find what Rupp and Stapleton (1995) found - an increase in accessions to SSI as unemployment increases. This should occur for both children and adults because increased unemployment should increase the number of people eligible for SSI. Figure 5 plots unemployment in California[1] from 1987-1995. Note that unemployment increased in 1991-1993 just as Zebley was being implemented. This might explain the results in Figure 4 for those aged 19-64. Clearly we must control for the unemployment rate. This leads us to a multivariate approach.

Estimation and Results

Method - As we noted earlier, the observed data are counts for which Poisson regression is appropriate. In fact, the Negative Binomial is an even better model. This generalizes the Poisson by assuming for the linkage function:

$$(29)\ \ln(\rho_{it}) = \beta' X_{it} + \epsilon_{it},$$

where $\exp(\epsilon_{it})$ has a gamma distribution with mean 1.0 and variance α^2. This differs from the basic Poisson formulation by allowing the variance of the process to differ from the mean. Specifically,

$$(30)\ \mathrm{Var}[y_{it}] = E[y_{it}]\{1+\alpha\, E[y_{it}]\},$$

where α is the overdispersion parameter. If we allow α to equal 0 then this is identical to the basic Poisson model. This leads to a formulation of this distribution which is similar to (9) but

[1]Source: Bureau of Labor Statistics, Seasonally Adjusted Unemployment Rate

instead is:

$$(31)\ \text{Prob}\ (Y_{it} = y_{it}) = \Gamma\ (\zeta + y_{it}) / [\Gamma\ (\zeta)\ y_{it}!]\ u_{it}^{\zeta}\ (i\text{-}u_{it})^{\ y}{}_{it}\ ,$$

where $u_{it} = \zeta / (\zeta + \rho_{it})$ and $\zeta = 1/\alpha$, and Γ is gamma function.

Specification

As suggested earlier, we assume two periods - one in which Zebley was not implemented and one in which it was implemented. For the monthly MEDS data we assume that Zebley was implemented starting February 1991 when final regulations were adopted and we include a dummy variable with value zero before that date (t=50) and one afterwards. We also consider several age groups, indicated by the subscript i, and stack them into the same regression model. To allow for differences in the age groups that are are not attributable to Zebley we allow for separate base levels for each age group. This is incorporated into the model by using age group dummies in the regression. Figures 1 - 4 indicate differential affects for each age group, and we therefore add separate Zebley dummy variables for each age group. To deal with an artifact of the administrative data described above we include month dummies. This will account for the spikes we observe during certain calendar months in Figures 1 - 4. This serves as our base model. As we indicated earlier, we would like to control for the condition of the economy. We do this by including unemployment rate in our regression model, allowing the effect to vary by age group.

Results

Zebley Impacts on Children and Adults — Our initial results on the impacts of Zebley by age group are in Table 2 which shows the result of running the Negative Binomial regression for all data, regardless of the previous AFDC status of the SSI entrants.

In Table 2 we show the results of running Model 1 without including unemployment rate and Model 2 with unemployment rate included. In Model 1 we see that the Zebley effect is much larger for children than for adults although the statistical significance of the Zebley variables for adults is somewhat surprising. The larger coefficients for children is expected given that the rule changes specifically applied to children. We observe the largest impact in the age group of 9-11 year olds. All the coefficients for the children's age groups are significant and larger than the coefficients for the adults.

After controlling for the unemployment rate in Model 2 the Zebley effect is less pronounced. We find fewer significant coefficients and they are considerable smaller than in the model without the unemployment rate, but the coefficients for all the children's groups are positive and four of six are significant at the 0.05 level or higher. Moreover, the coefficients for the adult groups are almost all near zero, statistically insignificant (except one case), and in five of seven cases of the wrong sign. The coefficients of the unemployment rate variables are almost always positive, with the exception of the age group of 18 to 20 year olds where the coefficient is very small. This is similar to the results of Rupp and Stapleton (1995) who found that an increase in the unemployment rate increases accessions to SSI. The unemployment rate seems to have a bigger effect on children than on adults. The significance of the overdispersion parameter, α , confirms that the Negative Binomial is a better specification than the basic Poisson.

<u>Differences Between Accessions From AFDC and Other Sources</u> -- Figure 6 plots the number of children (ages 0-18) going from AFDC to SSI (ρ_{it}^{A}) or going from the non-AFDC population to SSI (ρ_{it}^{N}) versus months for all California zipcodes in which there was at least one transition to

SSI during the entire period of our study. The data were smoothed by defining data for a particular month as being the monthly average of the six months period ending at that month. For example, we define the number of SSI transitions from AFDC during June 1990 as being the number of SSI transitions from AFDC from January 1990 through June 1990 divided by 6. We use the last month of our six-month window because this would be the earliest month in which we could observe any impact for that month. In addition, the data are fitted using Locally Weighted Scatterplot Smoothing (LOWESS) which provides a relatively smooth fit to "noisy" data. The counts for those moving from AFDC to SSI have been multiplied by ten to make them fit on this graph, but the reader should remember that the movements from the AFDC population to SSI are about an order of magnitude smaller than the movements from the non-AFDC population to SSI. This, of course, is not surprising given the relative sizes of these two populations.

The figure clearly shows that entrants to SSI from both the AFDC and the non-AFDC population increased with the implementation of Zebley. The Zebley decision of February, 1990 (the first reference line on the graph) appears to have led to an immediate increase in SSI recipients among those on AFDC and those not on AFDC as well, although the later increase appears smaller. The biggest impact, however, occurred starting in February, 1991 when the final regulations were published and when training for implementing the regulations began. (The new childhood mental impairment regulations were also promulgated around the same time in December, 1990.)[2] The rise in recipients among those on AFDC is extremely fast between

[2] Several studies find that the mental impairment regulations had a larger impact than Zebley.

February, 1991 and it peaks around December, 1992 when the Social Security Administration estimated that the backlog had been processed. After this date, there appears to be a new, and much higher, equilibrium level for those coming from AFDC. For those not coming from AFDC, the number of SSI recipients seems to be slowly falling off.

These data provide very strong evidence of differences in the way Zebley was implemented in the AFDC and non-AFDC populations. It seems obvious that SSI recipients were recruited disproportionately from AFDC. Indeed, if we consider the months from November, 1987 to June, 1989 inclusive as a baseline period and the months from March, 1991 to December, 1992 inclusive as the "second" period as in the model described above, then the values of equation (21) are 453 children moving from AFDC to SSI per month and 2693 children moving from the non-AFDC population to SSI per month. If we "normalize" these figures by dividing them by the baseline numbers of movements to SSI in each group (that is, by estimating equations (22) and (23)), then we get 1.40 for AFDC to SSI and .32 for non-AFDC to SSI. Finally, the ratio of these numbers, which is equation (24), is 4.375. This indicates that the Zebley take-up rate in the AFDC group compared to the Zebley take-up rate in the non-AFDC group is substantially greater than the ratio of the non-Zebley take-up rates for the AFDC versus the non-AFDC group. In the two-period model, this would mean that much more effort was made to move Zebley cases from AFDC to SSI than the usual effort by welfare offices to move disability cases from welfare to SSI. This seems to us to be the most likely explanation of what is going on, but another possibility is that there is a much smaller stock (and probably flow, as well) of Zebley cases in the non-AFDC population compared to the fraction of those who are disabled. This would mean that equivalent efforts in each population would yield much fewer cases in the non-AFDC population. This may be true, but the greater rate of fall-off in SSI recipients from the non-AFDC population from December, 1992 onwards suggests that there might be much less effort, past the mandated outreach, to recruit these children. Another possibility is that this result is spurious because we have not controlled for the unemployment rate and other factors.

Tables 3 and 4 show the results of running similar models for data categorized by prior AFDC status. Models 3 and 4 are for the group who were observed to be on AFDC in any of the four months preceding an accession to SSI. Models 5 and 6 are for the group who were not on AFDC during those same months. Models 3 and 5 do not control for the unemployment rate but models 5 and 6 do.

In considering the effects of Zebley we allowed for two age groups - children (aged 0 to 17) and adults (aged 18+). We continue to observe that the effect of Zebley is larger for children than adults in all Models 3 - 6. Again, with few exceptions, we see that unemployment has a positive effect on SSI accessions. The exceptions are suspicious because for the most part we find them only significant for the oldest adults aged 66 and above. We find that the Zebley effect is much more significant in the group that had prior AFDC assistance. In the group that came from AFDC, we see that like the overall Model 2, unemployment has a larger effect on children than adults. The effect of unemployment in Model 6 for the group that did not come from AFDC is less clear and less significant. Once again, the significance of the overdispersion parameters in Models 3 -6 indicate that there is in fact a difference between the mean and variance and that the Negative Binomial is a better specification than the Poisson.

We can use Models 3 - 6 to estimate the differential effects of Zebley in the two groups -

from AFDC and not from AFDC. If we use the estimates from Tables 3 and 4 along with equation (28), we can determine if in fact, Zebley cases come disproportionately from the AFDC caseload than not. Recall that if we find that the result of equation (28) is larger than one we observe that in fact Zebley cases come more often from AFDC than not. If we use the results of Models 3 and 5 and do not include unemployment in the model we find that for children equation (28) is estimated to be 2.184 This indicates that SSI accessions came disproportionately more from AFDC than not. Using the results of Models 4 and 6 which include the unemployment rate we find much smaller results. We estimate equation (28) to equal 1.081 for children. This would indicate that only by a very small amount did SSI accessions come disproportionately from AFDC.

We suspect that in all the models including the unemployment rate that we may be crowding out the Zebley effect by overcorrecting for economic conditions. This could be true because changes in the unemployment rate tend to mirror changes in the eligibility requirements under Zebley. This makes it very hard to separate out Zebley from unemployment effects. Given this, the actual result probably lies somewhere between the two found above. In future work we hope to improve our ability to separate the Zebley effect from the impacts of unemployment by improving our specification and adding more data from 1996 and 1997.

Conclusions and Future Work

[To be included.]

Figure 1
Children Aged 0 to 6 years Entering SSI

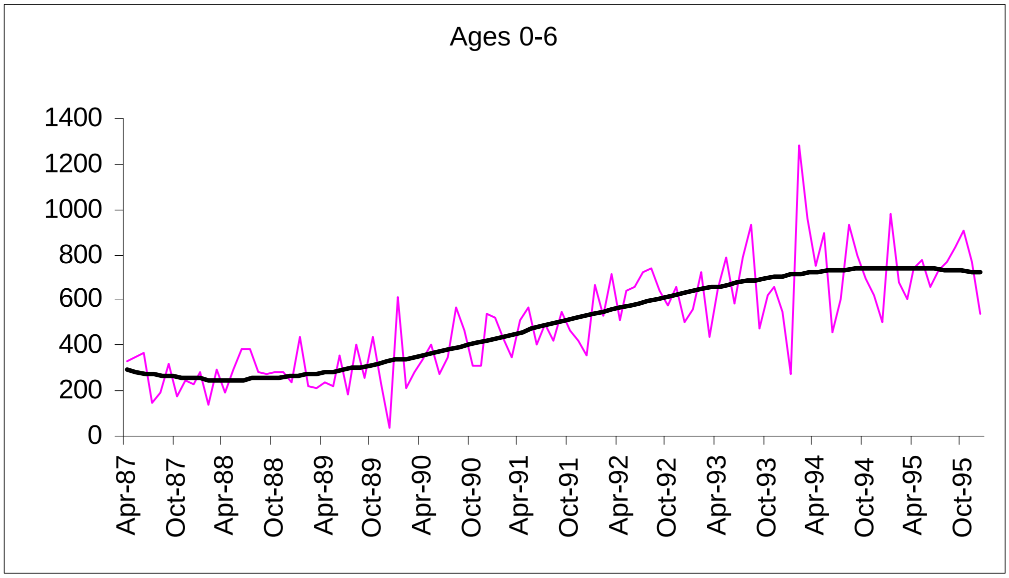

Figure 2
Children Aged 7 to 12 years Entering SSI

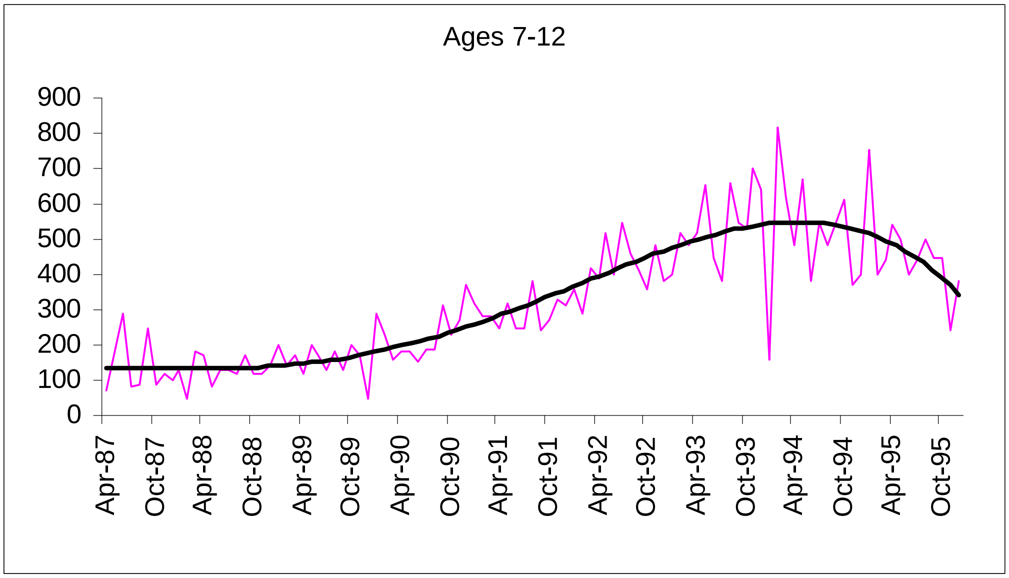

Figure 3
Children Aged 13 to 18 years Entering SSI

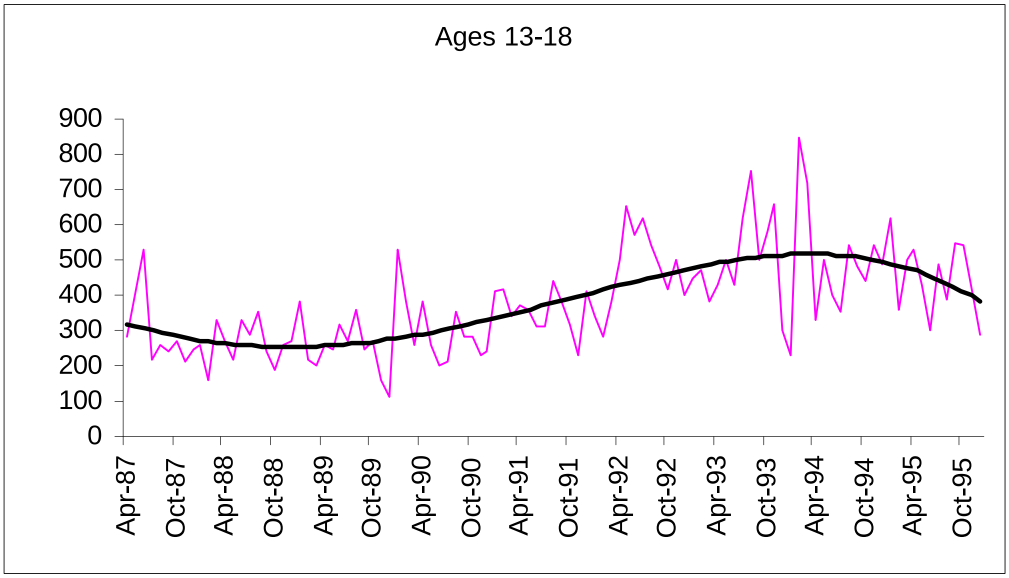

Figure 4
Working Age Adults Aged 19 to 64 years Entering SSI

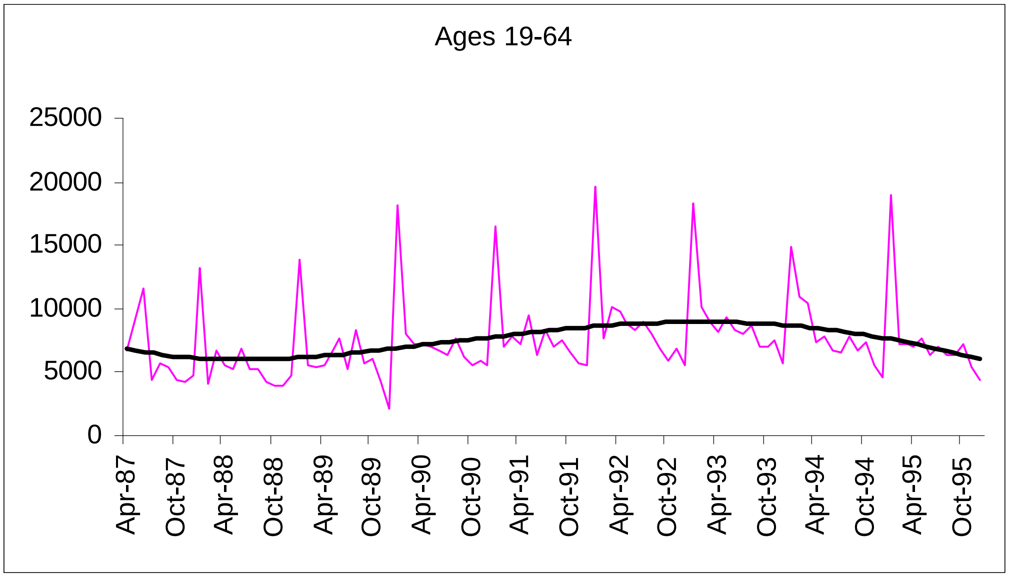

Figure 5
California Unemployment Rate

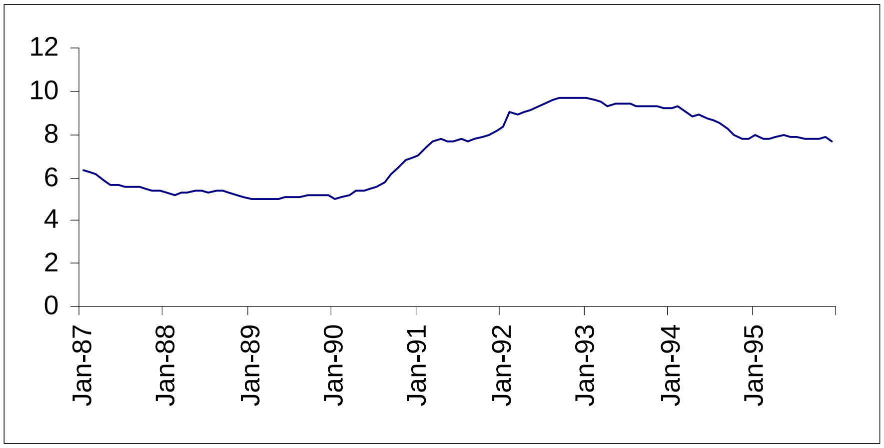

Figure 6
Impacts of Zebley: Children (0-18 years) Entering SSI by Prior AFDC Status by Month from April 1987 to November 1995
(Movements from AFDC to SSI have been multiplied by ten;
Data have been smoothed using LOWESS)

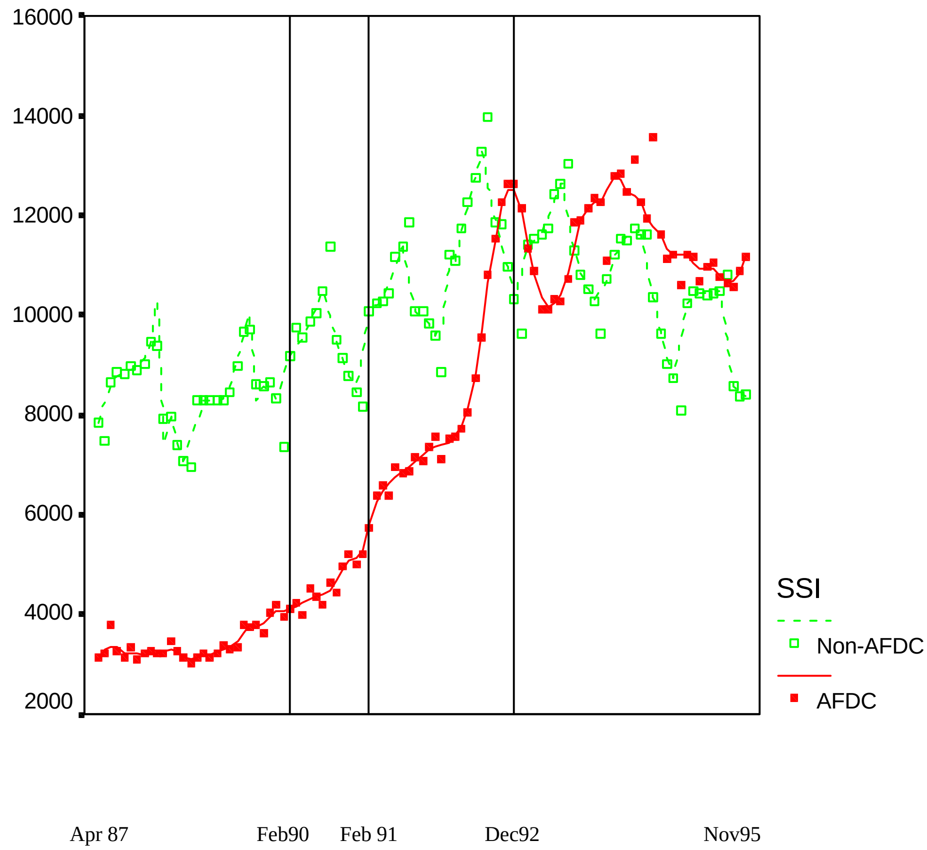

Table 2
Negative Binomial Models 1 and 2

	MODEL 1 Negative Binomial Model without Unemployment Rate	MODEL 2 Negative Binomial Model with Unemployment Rate
Constant	2.7491 (0.056)***	2.4334 (0.208)***
Age Group Dummy Variables		
Aged 3 – 5	-0.4140 (0.073)***	-0.7868 (0.316)*
Aged 6 – 8	-0.4671 (0.088)***	-1.0243 (0.327)**
Aged 9 – 11	-0.6786 (0.089)***	-1.7911 (0.338)***
Aged 12 – 14	-0.7731 (0.090)***	-1.4522 (0.344)***
Aged 15 – 17	-0.6710 (0.087)***	-1.1573 (0.369)**
Aged 18 – 20	0.7434 (0.079)***	1.1446 (0.356)**
Aged 21 – 30	1.9278 (0.067)***	1.6685 (0.319)***
Aged 31 – 40	2.2524 (0.068)***	1.9054 (0.330)***
Aged 41 – 50	2.1531 (0.069)***	1.9955 (0.321)***
Aged 51 – 60	2.4042 (0.067)***	2.2812 (0.348)***
Aged 61 – 65	1.7130 (0.074)***	1.5584 (0.333)***
Aged 66 +	0.7757 (0.074)***	0.7934 (0.310)**
Zebley * Age Group Dummy Variables		
Zebley*aged 0 – 2	0.7193 (0.053)***	0.5373 (0.123)***
Zebley*aged 3 – 5	0.8214 (0.076)***	0.4229 (0.157)**
Zebley*aged 6 – 8	0.8692 (0.064)***	0.3605 (0.154)*
Zebley*aged 9 – 11	1.0367 (0.066)***	0.2102 (0.159)
Zebley*aged 12 – 14	1.0034 (0.072)***	0.4312 (0.146)**
Zebley*aged 15 – 17	0.7206 (0.072)***	0.2477 (0.199)
Zebley*aged 18 – 20	0.0359 (0.059)	0.0855 (0.184)
Zebley*aged 21 – 30	0.1291 (0.052)*	-0.2087 (0.145)
Zebley*aged 31 – 40	0.3217 (0.052)***	-0.0625 (0.160)
Zebley*aged 41 – 50	0.3591 (0.059)***	0.0838 (0.156)
Zebley*aged 51 – 60	0.1829 (0.058)**	-0.0705 (0.169)
Zebley*aged 61 – 65	0.0574 (0.052)	-0.2175 (0.149)**
Zebley*aged 66 +	-0.1775 (0.054)**	-0.3540 (0.132)
Unemployment Rate * Age Group Dummy Variables		
UER*aged 0 – 2		0.0583 (0.036)
UER*aged 3 – 5		0.1264 (0.044)**
UER*aged 6 – 8		0.1611 (0.045)***
UER*aged 9 – 11		0.2615 (0.046)***
UER*aged 12 – 14		0.1822 (0.046)***
UER*aged 15 – 17		0.1481 (0.056)**
UER*aged 18 – 20		-0.0158 (0.052)
UER*aged 21 – 30		0.1062 (0.044)*
UER*aged 31 – 40		0.1219 (0.047)**
UER*aged 41 – 50		0.0875 (0.045)
UER*aged 51 – 60		0.0810 (0.050)
UER*aged 61 – 65		0.0870 (0.047)
UER*aged 66 +		0.0554 (0.041)
overdispersion parameter	.0440 (.002)***	.0385 (.002)***
log likelihood	-5193.928	-5134.731

Note: Regression coefficients with standard errors in parentheses.
* Coefficient is significant at .05 level. ** Coefficient is significant at .01 level.
*** Coefficient is significant at .001 level.

Table 3
Negative Binomial Models 3 and 4

	MODEL 3 Negative Binomial Model without Unemployment Rate From AFDC	MODEL 4 Negative Binomial Model with Unemployment Rate From AFDC
Constant	1.5411 (0.080)***	0.4400 (0.151)**
Age Group Dummy Variables		
Aged 18 +	1.1248 (0.091)***	1.7638 (0.213)***
Zebley * Age Group Dummy Variables		
Zebley*aged 0 – 17	1.0643 (0.078)***	0.4002 (0.093)***
Zebley*aged 18 +	0.3622 (0.051)***	0.0180 (0.101)
Unemployment Rate * Age Group Dummy Variables		
UER*aged 0 – 2		0.2261 (0.028)***
UER*aged 3 – 5		0.2012 (0.028)***
UER*aged 6 – 8		0.2226 (0.028)***
UER*aged 9 – 11		0.2088 (0.028)***
UER*aged 12 – 14		0.1961 (0.028)***
UER*aged 15 – 17		0.1627 (0.028)***
UER*aged 18 – 20		-0.0435 (0.030)
UER*aged 21 – 30		0.0739 (0.028) **
UER*aged 31 – 40		0.1800 (0.028)***
UER*aged 41 – 50		0.1742 (0.028)***
UER*aged 51 – 60		0.1445 (0.028)***
UER*aged 61 – 65		-0.0376 (0.029)
UER*aged 66 +		-0.6313 (0.050)***
overdispersion parameter	0.3537 (0.016)***	0.0716 (0.006)***
log likelihood	-4416.545	-3725.760

Note: Regression coefficients with standard errors in parentheses.
* Coefficient is significant at .05 level. ** Coefficient is significant at .01 level.
*** Coefficient is significant at .001 level.

Table 4
Negative Binomial Models 5 and 6

	MODEL 5 Negative Binomial Model without Unemployment Rate Not from AFDC	MODEL 6 Negative Binomial Model with Unemployment Rate Not from AFDC
Constant	1.6212 (0.062)***	1.2061 (0.144)***
Age Group Dummy Variables		
Aged 18 +	2.8804 (0.070)***	2.8165 (0.173)***
Zebley * Age Group Dummy Variables		
Zebley*aged 0 – 17	0.6257 (0.061)***	0.3753 (0.084)***
Zebley*aged 18 +	0.1416 (0.035)***	-0.1153 (0.059)
Unemployment Rate * Age Group Dummy Variables		
UER*aged 0 – 2		0.1413 (0.025)***
UER*aged 3 – 5		0.0795 (0.026)**
UER*aged 6 – 8		0.0632 (0.026)*
UER*aged 9 – 11		0.0608 (0.025)*
UER*aged 12 – 14		0.0417 (0.026)
UER*aged 15 – 17		0.0498 (0.026)
UER*aged 18 – 20		-0.0723 (0.018)***
UER*aged 21 – 30		0.0868 (0.018)***
UER*aged 31 – 40		0.1365 (0.018)***
UER*aged 41 – 50		0.1262 (0.018)***
UER*aged 51 – 60		0.1537 (0.018)***
UER*aged 61 – 65		0.0666 (0.018)***
UER*aged 66 +		-0.0690 (0.018)***
overdispersion parameter	0.1873 (0.009)***	0.0409 (0.002)***
log likelihood	-5324.377	-4711.205

Note: Regression coefficients with standard errors in parentheses.
* Coefficient is significant at .05 level. ** Coefficient is significant at .01 level.
*** Coefficient is significant at .001 level.

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