The Use of Profiling to Target Services in State Welfare-to-Work Programs: *An Example of Process and Implementation*

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ABSTRACT

The purpose of this paper is to provide preliminary information about the design of a pilot project to test the efficacy of profiling and referring welfare-to-work participants. Welfare reform requires welfare recipients, with few exceptions, to participate in work activities and ultimately become economically self-sufficient. Welfare recipients possess a wide variation in job readiness skills, ranging from those who are ready and able to work to those who face significant barriers to employment. The challenge of the local administrator of welfare-to-work programs is to target services to those who need them the most. Yet, most programs provide the same services to all participants, regardless of their past work history or skills. Profiling is a management tool that statistically identifies individuals as to the probability that they will obtain employment. The probability is derived from a statistical model using information commonly collected at enrollment interviews. The model estimates the relationship between an individual's propensity to find and hold a job and that person's attributes, work and welfare histories, and local labor market conditions. The paper describes the model and shows how it can be incorporated into existing welfare-to-work programs that emphasize work-related activities.

INTRODUCTION

States face a significant challenge resulting from either their own initiatives to reform welfare or the recent passage of federal welfare reform. A state-run program using a federally funded block-grant entitled Temporary Assistance for Needy Families has replaced Aid to Families with Dependent Children (AFDC). While the federal government has transferred control of support for the poor to the states, states must adhere to tough federally mandated work requirements. Some states have imposed even more stringent requirements on themselves through their own efforts to reform welfare. With some exceptions, each adult receiving welfare support financed by the federal block grant must participate in work activities after receiving benefits for 24 months, and each recipient is entitled to a cumulative lifetime maximum of five years of benefits. Only 20 percent of the total state caseload has been exempted from this five-year lifetime limit. If the state chooses to extend benefits beyond this time frame, the federal government will not finance these extended benefits.

In the next few years, federal spending on the new welfare program is expected to be significantly less than under the previous program. Furthermore, states will be faced with welfare recipients who have a more difficult time finding jobs, because presumably those still on welfare are those who are consistently unsuccessful in obtaining or retaining qualified work. Therefore, states are confronted with the dilemma of moving large numbers of harder-to-employ welfare recipients into jobs without the additional funds to provide reemployment assistance to participants of the welfare-to-work programs.

Risking gross oversimplication of the welfare population, it is convenient for expository purposes to think of three groups of welfare recipients: short-term recipients, long-term recipients, and those in between. Short-term recipients, who comprise a large share of welfare recipients, can typically find jobs on their own and thus leave the welfare rolls fairly quickly without significant assistance. Long-term recipients, on the other hand, typically stay on the welfare rolls continuously without intermittent episodes of work. While long-term welfare recipients account for fewer than one-quarter of all new recipients, they consume a disproportionately large share of welfare expenditures. It is unlikely that they will find employment without intervention. Those welfare recipients in between these two groups are characterized by some attachment to the work force, but typically do not have enough work experience or skills to find jobs on their own.

Evaluations of welfare-to-work demonstrations suggest that increased service intensity improves employment rates of clients and that spreading resources too thinly reduces program effectiveness (Gueron and Pauly, 1991, pp. 28-29). Since caseloads typically outstrip the resources available to provide reemployment services, states would be well advised to consider implementing a system that identifies the three groups of welfare recipients in order to target employment resources more effectively. Providing a variety of services to welfare-to-work participants, instead of the current one-size-fits-all system that is typically in place, could improve the employment rates of welfare-to-work programs without increasing the total resources devoted to the program.

We propose that a system of profiling welfare-to-work participants as to their likelihood of finding jobs be established within existing state programs. By identifying individuals at intake as to their need for reemployment services, local agencies can tailor programs to meet the varied needs of welfare-to-work participants and thus use scarce public dollars more effectively. This document describes the profiling and referral process. To illustrate the proposed procedure, we show how profiling could be incorporated into Michigan's welfare-to-work program, called Work First.

This paper 1) relates the welfare-to-work profiling proposal to the existing Worker Profiling and Reemployment Services (WPRS) system, 2) describes Michigan's Work First program, 3) explains the profiling statistical model, 4) outlines the procedure by which welfare-to-work participants are profiled and referred to services, 5) relates profiling to the delivery of reemployment services and the allocation of resources among services, and 6) discusses how profiling furthers the goals of the new welfare reform.

Worker Profiling and Reemployment Services System

The proposed system has its conceptual roots in the Worker Profiling and Reemployment Services (WPRS) system, which was mandated by Congress (PL 103-152) in 1993 and has been implemented by every state. The WPRS identifies unemployment insurance beneficiaries who are most likely to exhaust benefit entitlements and refers them to required reemployment services as soon as possible. The purpose of the WPRS initiative is to focus UI beneficiaries on finding jobs quickly by tailoring reemployment services to meet their specific needs.

UI profiling has provided a strong and proven precedent for welfare-to-work profiling. Only a few years ago, such a method of allocating public assistance would have been met with considerable scepticism. Now, most states have successfully implemented a profiling and referral system that uses a statistical model to identify individuals who are most likely to exhaust UI benefits.

The same key elements that contributed to the success of the WPRS system are present in welfare-to-work programs. First, participants in welfare-to-work programs vary widely in their dependency on welfare and their response to reemployment services. Second, not enough funds are available to provide sufficient levels of reemployment services to all welfare recipients who could benefit from the programs. Third, the means are available to identify those individuals most likely to benefit from reemployment services. Fourth, the goals of the welfare reform program can be better met by tailoring programs to the specific needs of individuals, and thus incentives are present for state and local service providers to pursue a more targeted delivery of services.

We propose that a similar system of profiling and referring participants could be developed for state welfare-to-work programs. States vary in the design and administration of their welfare-to-work programs. In some states, the welfare-to-work program is administered by the social service agency responsible for welfare services and public assistance payments. In other states, welfare-to-work is administered by a separate agency. Profiling can be easily incorporated into most of these existing programs.

Michigan's Work First Program

To illustrate how profiling can be designed and administered, we will use the general framework of Michigan's Work First welfare-to-work program. Work First is administered locally by the Service Delivery Areas (SDAs), which were originally created by the Job Training Partnership Act to administer and deliver job training programs to dislocated adults and economically disadvantaged individuals. The State of Michigan has expanded the responsibility of the SDAs to include the administration of the Work First program. Work First is administered separately from the Family Independence Agency (FIA), which determines welfare eligibility and issues welfare payments. While the two entities are independent, they work together to make the referrals from FIA to Work First and to coordinate the flow of information necessary to determine eligibility for each program.

The purpose of Work First is to move welfare recipients into employment opportunities that have long-term retention to help achieve economic self-sufficiency. The program pursues four goals to help welfare recipients: 1) make their first connection to work, 2) gain work experience, 3) learn transferable skills, and 4) move on to new training and employment opportunities. FIA refers welfare recipients to the Work First program, where they receive an initial assessment and orientation to the Work First program, receive short-term job search assistance, are encouraged to seek and obtain employment at their earliest possible opportunity, and have access to training if they need it to obtain a job.

All applicants for public assistance through FIA are required to participate in Work First, with the following exceptions: 1) persons less than 16 or older than 65 years of age, 2) the mother of a child under the age of three months, 3) one parent or other caregiver of a child with a disability, 4) a person who is the full-time caregiver for his or her spouse suffering from a disability, 5) a child 16-17 years of age who is a full-time student in elementary or high school, 6) a minor parent attending full-time elementary or high school, 7) an individual employed or self-employed 20 hours or more a week at the minimum federal wage, and 8) a person suffering from a long-term physical or mental disability.

Under Work First, each person develops a résumé and receives instruction on the proper techniques for completing applications and interviewing for jobs. After clients complete the core services, they are expected to search intensively for work and accept offers that provide at least 20 hours of work per week at or above minimum wage. More extensive assessment and skill training is available through the local JTPA program, but only for those who have extreme difficulty finding a job. Participants are expected to obtain a job within 90 days or risk a reduction in benefits. For example, if a single parent does not participate in 20 hours per week in a Work First activity or employment, then sanctions are imposed by reducing welfare benefits and food stamps. Two-parent families are subject to similar requirements and sanctions. As an incentive for finding work, participants are allowed to keep the first $200 earned each month and 20 percent over that without reducing benefits. Participants also receive transportation, child care, and Medicaid for a limited time.

Work First is a stand-alone program with a specific set of activities in which each welfare recipient referred to the program by FIA must participate. Allowable work activities include 1) unsubsidized employment, 2) subsidized private sector employment, 3) subsidized public sector employment, 4) on-the-job training, 5) job search and job readiness training and activities up to six weeks, 6) community service programs, and 7) no more than 12 months of vocational educational training.

All Work First participants are referred to the program through the FIA. The process begins when an individual files for public assistance. All applicants, except for those exempted as described above, are referred to Work First for a joint orientation and initial assessment within 10 days of applying to FIA for benefits. Joint orientation includes an introduction to the Work First programs, specification of the roles and responsibilities of the program and client, and a brief assessment of client situation and immediate needs, including supportive services. In-depth assessment and counseling are offered only to those in considerable need. In most cases, all referrals are required to participate in the same job search and job readiness workshops regardless of their past work histories or qualifications. Job search/job club workshops provide training in appropriate skills in seeking, locating, applying for, and obtaining employment. Training is typically conducted in group settings. Work First, in turn, conveys information about each client's level of participation and employment outcomes to FIA in order to determine an individual's eligibility for benefits.

Because of the limited assessment and counseling at intake, profiling offers an effective means to assess the propensity of an individual to find a job and thus for the local Work First administrative agencies to tailor programs according to the needs of their clients. Therefore, profiling can be incorporated into the Work First program at the intake process.

The purpose of profiling is to identify through a statistical methodology those welfare recipients referred to Work First who are most likely to find jobs with minimal, if any, intervention. Since those identified as such will not use as many publicly supported services to find jobs, it is possible to reallocate resources to provide more intensive services to those who may have more difficulty finding a job.

Profiling Statistical Model

Profiling is a statistical methodology that assigns to each Work First participant a probability of quickly finding a job. The probability is derived from a statistical model, which is estimated using information about the pool of welfare recipients who are eligible for Work First. The model estimates the relationship between an individual's propensity to find and hold a job and that person's characteristics, his/her work and welfare histories, and the local labor market conditions. The likelihood of finding a job can be measured by the person's work history. Several different measures of a person's attachment to the workforce are possible, and the one that provides the best predictive power will be used. Measures include the number of months of continuous employment during the last two years, the length of time since last holding a job, and the number of jobs held during the last two years.

A statistical model, called a logit model, can be used to transform a discrete outcome (whether or not an individual can find work quickly) into the continuous probability of being a long-term welfare recipient. Estimated probabilities are derived in two steps. First, benchmark results are calculated using a sample of individuals who entered the welfare system in the recent past. The time frame needed for the estimation is based on the definition of "quickly finding a job," or conversely "long-term" recipiency. Second, the estimated coefficients are applied to the characteristics of each welfare recipient, which yields predicted probabilities for each individual. These predicted probabilities distinguish between individuals with different likelihoods of finding employment and thus can be used to refer individuals to specific services.

Preliminary analysis using national data from the Survey of Income and Program Participation (SIPP) shows that variables similar to the ones collected at intake into the Work First program explain the propensity to find a job with reasonable precision. Appendix A contains the results of the preliminary analysis using the SIPP. The important point from this analysis is that the model is able to distinguish with reasonable precision among individuals according to their likelihood of finding a job.

Variables collected at intake into the Work First program include:

- Address, zip code, race, sex, age, AFDC receipt for 36 of last 60 months;
- Do you have a medical problem that limits work/training?
- Marital status;
- Educational attainment: currently enrolled in high school full-time, highest grade finished, highest diploma, GED;
- Have you ever been convicted of a crime?
- Are you currently in drug treatment?
- Have you been diagnosed with mental problems (previous hospitalization or current medication)?
- Can you get to work or training?
- Are you currently employed more than 20 hours? at or above minimum wage?
- What is the age of youngest child? Do you need child care to work/train?

In order to estimate the model, work history data must be constructed using the wage records collected and maintained to administer the Unemployment Insurance program. However, once the model is estimated, work history data are not required to assign estimated probabilities to each client entering the Work First program; only the bulleted variables listed above are necessary.

The model can be estimated periodically for the local SDA or for the entire state with variables included that reflect differences across SDAs. As with the UI profiling model, states and local SDAs may need technical assistance to estimate these models.

Based on the profiling model, a local Work First agency can be reasonably assured that people with different probabilities have different propensities to find employment and thus require different

services. For example, a person with a calculated probability of 90 percent is in less need of reemployment services than a person with a probability of 20 percent. Therefore, the person with the 90 percent calculated probability can be assigned to minimal services at intake, whereas the person with the 20 percent probability should be assigned to more intensive services right away. Without profiling, both individuals would be assigned to the same set of services under the existing program.

The Profiling and Referral Process

Once the relationship between the probability of finding a job and personal characteristics, histories, and local labor market conditions is estimated, the model can be used to predict the probabilities of those individuals entering Work First. Assigning probabilities to individuals can be performed by the local SDA by incorporating the model into existing information systems. If the program is implemented statewide, the probabilities can be assigned at the state level, and lists with the individuals' names and probabilities can then be sent to the local offices.

The existing program of UI profiling, as administered in Michigan, is conducted at the state level. Once a week, each local office receives a list of ranked eligible UI recipients who reside in the office's jurisdiction. The list includes the individual's name, social security number, and the assigned probability of exhausting UI benefits. The ranking of eligible UI recipients on the list is derived from the statewide estimation of the probability of exhausting UI benefits. The number of UI recipients notified to report for services at any specific local offices depends upon the amount of resources received by that office to provide services for profiling clients.

The following example of the process of profiling Work First participants uses the statewide approach, as described for UI profiling. The starting point is the referral of welfare recipients by the FIA to Work First. From that point on, the Work First agency can use the following steps to identify, rank, and refer Work First participants.

1) Individuals eligible for Work First are interviewed, and information about their personal characteristics and work history is collected.

2) Individuals who are eligible for welfare benefits and meet the Work First program criteria are profiled.

3) Selected local labor market information is entered into the computer database and matched to recipients eligible for profiling who live in that local area.

4) Based on an individual's personal characteristics and the corresponding labor market information, the probability of finding a job is estimated for each participant. Profiling occurs on a weekly basis.

5) Each local office draws from the statewide ranking of profiled welfare recipients who live in their jurisdiction. For each local office, the selected individuals are arrayed from highest to lowest probability of finding a job.

6) Each provider (or coordinating organization) determines the number of claimants who can be served in a given period, based on the funds each office receives to run the program.

7) Profiled welfare recipients are referred to different sets of services based on their probabilities, and the referral agreement describes the set of services determined most likely to meet the needs of the individual.

8) The service provider (or coordinating organization) collects and relays information about the recipient's participation and employment outcomes back to the local and state office. Follow-up information about the individual's employment situation is obtained from state wage records.

Reemployment Services

Work First offers an array of services, as described in a previous section, that are designed to help welfare recipients find work quickly. Currently, most Work First recipients receive the same set of services, regardless of their background. Profiling provides an opportunity to tailor services to meet the varied needs of participants. Consequently, profiling can serve as a means of allocating resources more efficiently among the various clients.

A variety of options are available to allocate resources more effectively to meet the individual needs of clients. The simplest approach is to consider two types of clients, those who have a high calculated probability of finding jobs on their own because of their past work history (and other characteristics) and those with a low calculated probability. The local agency could determine a cutoff level of the calculated probability at which those above the cutoff level would receive few, if any, services and those below would receive more intensive services than are typically provided under the current system. (Services would still have to comply with state and federal requirements, unless waivers are granted.)

More intensive services can be provided without an additional increase in the overall budget, because the reduction in services to those with high probabilities frees up resources. The reallocation of services should improve the overall performance of the program with respect to employment rates because those individuals with high probabilities presumably can find jobs on their own, according to the profiling model. The exact cutoff point of calculated probabilities may vary over time and by local areas depending upon the characteristics of people coming through Work First and the local labor market conditions at that time. Budgetary constraints will also determine the cutoff points.

Since the calculated probabilities provide a continuous assessment of individuals' likelihoods of finding jobs, other service arrangements can be established. The variety of services offered to meet

individual needs is constrained more by the "lumpiness" of the group settings for many of these services than by the ability to distinguish among people within a range of probabilities of finding a job.

Meeting the Goals of the New Welfare Legislation

Incorporating a profiling system of client referral into an existing welfare-to-work program, such as Michigan's Work First program, could provide a valuable tool for allocating scarce public welfare dollars more efficiently and for accomplishing the goals of the new welfare reform. The explicit goal of the new Federal welfare legislation is to move welfare recipients into work, thereby making welfare a means of temporary assistance rather than long-term dependency. To achieve the broad goal of economic self-sufficiency of former welfare recipients, local service providers must meet three objectives:

1) Reduce the duration of individual episodes of welfare receipt;
2) Reduce welfare recidivism;
3) Reduce the rate of initial welfare entry.

Achieving each of these objectives has the related outcome of ultimately reducing welfare expenditures. However, these objectives can be achieved more efficiently by providing different levels of expenditures on programs targeted to different groups. Profiling promises to provide a simple and inexpensive means to make these allocation decisions.

KALAMAZOO-ST. JOSEPH WORK FIRST

Work First has been in operation for three years, beginning in October 1994. During the first few quarters of operation, a large portion of the individuals who entered the program had been receiving welfare payments for some time. More recently, and particularly during the period covered in the analysis, individuals are referred to Work First by FIA when they first file for welfare payments. In either case, participation in Work First is required to receive cash payments.

Once referred to the Work First program, individuals are then referred to one of several subcontractors who provide the job readiness and job search assistance services, among other activities. The Upjohn Institute administers the Work First program for a two-county area encompassing the Service Delivery Area as defined under JTPA. The Institute subcontracts with several agencies to provide services. Three agencies, Goodwill, Behavioral Foundation, and Youth Opportunities Unlimited (YOU), serve the greater Kalamazoo area. Currently, participants within the Greater Kalamazoo area are randomly assigned to the service providers. Participants in outlying areas are served by a single but different subcontractor in each of three locations: Sturgis, Comstock, and Three Rivers.

Data Requirements and Availability

Data are obtained from the intake forms and the tracking system developed and maintained by the Kalamazoo-St. Joseph SDA to administer Michigan's Work First program in that two-county area. All SDAs in Michigan collect demographic and educational information and the most current work history at intake. The intake process takes place after the Family Independence Agency (FIA) refers welfare recipients to Work First and before those enrollees report to the subcontractors for services. FIA collects additional information about the client, such as health problems that may limit work or training activities, current drug treatment, or prior convictions. However, this information is not necessarily shared with SDAs as they administer Work First. Participants are successfully terminated if they have maintained a qualified job for 90 consecutive days (with a grace period of no longer than a week if they changed jobs). A qualified job must offer at least minimum wage and 20 hours a week for a single parent. Other termination types include exemption for reasons such as health or medical problems (occurring or revealed after intake), family care responsibilities, no child care, noncompliance, and inappropriate referral. For those who participate in the program, a detailed log is kept of their activities (and dates). These activities include job readiness training, job development and/or job placement services, assessment and employability planning, longer-term training, and unsubsidized employment. Wages and hours worked per week are recorded for each employment spell included in the files.

The records also include information about a participant's unsubsidized employment immediately prior to first assignment. An individual in this category was in unsubsidized employment when referred, or obtained unsubsidized employment prior to reporting to the first activity. Individuals who may have entered the program more than once may have two or more employment spells included in the files. Hourly wages and hours worked are also recorded for each employment spell.

For most participants, multiple activities are recorded. The type of activity, the number of hours engaged in each activity, and the starting and ending dates of each activity are included in the files. Consequently, it is possible to piece together a sequence of activities from the time participants enter the program until they are terminated.

Profiling Model

The purpose of the profiling model is to use information commonly collected at intake to identify Work First participants who are likely to obtain employment with minimal intervention (or conversely, to identify individuals who need the most assistance in finding and maintaining employment). Therefore, for purposes of putting this model into operation, only information that is known about the participant at the time of intake is relevant. For instance, at intake we would not know anything about the activities the individual engaged in while participating in Work First, nor would we know the employment history after entering Work First. This information, while it may be important for controlling for the effects of the intervention on employment outcomes, cannot be considered intake information. What we do know is the participant's employment history prior to

intake, demographic information, educational background, and prior AFDC recipiency. Furthermore, since our SDA has randomly assigned Kalamazoo area participants to the three local subcontractors, we could also consider the referral agency to be known at intake.

The following intake information is available:

- Race*
- Age*
- Gender*
- Parental status
- Educational attainment
- AFDC history
- Target group (long-term welfare recipient, older children, little or no work experience or education)
- Subcontractor
- Employment prior to first assignment
- Compliance history in previous Work First enrollments.

It may be the case that individual information about those factors marked with an asterisk may not be used directly in estimating an individual's probability of employment. The preferred model includes age but does not include race or gender (see Table 6).

Characteristics of Work First Participants

Table 1 displays the characteristics of Work First participants who enrolled in the program in 1996. More recent information is available and will be discussed later on, but we focus on this group since they will be used to estimate the profiling model. Participants are predominantly white, female, single parents who have not completed high school and who have been on welfare for less than 36 months during the last 5 years. Some of the participants have completed a GED, but few have received vocational training.

Reasons for Leaving Work First

Table 2 lists the various types of termination from the program recorded for participants who entered the program during 1996. Twenty-six percent found employment for 90 consecutive days. Roughly 6 percent were terminated because of personal issues such as health problems or family responsibilities. Another 5 percent of the participants had their case closed by the FIA because they earned too much money to be eligible after working or they did not fill out the appropriate paperwork on time. Twelve percent were found to be ineligible, or FIA referred them inappropriately to Work First.

Thirty-two percent terminated the program either as a no-show, noncompliant, or attended only orientation. Some of the participants recorded as unknown (55) may have been no shows or

Table 1. Variables Used in Work First Profiling Model

Name	Description	Mean
sglprnt	=1 if single parent	0.827
age	age at time of enrollment	29.7
age2	age squared	
noschl	no formal schooling	.038
grlt9	grade level completed less than 9th grade	.056
gr9	completed 9th grade	.056
gr10	completed 10th grade	.089
gr11	completed 11th grade	.191
gr12	completed 12th grade (omitted from analysis, thus reference)	.387
post1	completed one year of postsecondary	.012
post2	completed two years of postsecondary	.016
post3	completed three years of postsecondary	.004
post4	completed four years of postsecondary	.001
ged	earned ged certification	.161
YOU	Youth Opportunities Unlimited	.189
Goodwill	Goodwill Industries	.179
foundat	Behavioral Foundation	.303
comstock	Comstock	.045
sturgis	Sturgis	.040
rivers3	Three Rivers	.240
voced	attended postsecondary vocational education program	.014
notarget	not a target group, which includes AFDC received any 36 of preceding 60 months, youngest child 16-18, or custodial parent under 24 and who has not completed high school or with little or no work experience	.528
AFDC36	Received AFDC any 36 of preceding 60 months	.343
code20_1	qualified unsubsidized employment prior to assignment	.190
code20_2	qualified unsubsidized employment prior to assignment in previous enrollment	.003
nocmpl	terminated as noncompliant in previous enrollment (code 59, 60, or 61)	.057
employed	terminated as employed in qualified unsubsidized job	.427
Observations		1546

minimal participants, but because these individuals did not participate in Work First or left without some type of exit interview, no specific termination type is recorded in their files. For these four groups, we do not know the activities, if any, in which they participated, and we do not know whether they had unsubsidized employment prior to the first assignment. The latter information is critical, since prior employment is considered important to attachment to the work force and future labor market success. The importance of prior employment to the predictive power of the model is an empirical issue, and we wish to estimate the profiling model both ways. The need to have prior employment history, which is included in the person's activities file, dictates that we use only those individuals with activity information to estimate the profiling model.

Table 2. Termination Types

	Termination type	Frequency	Percent	Cumulative
40	Employed 90 days	1030	26.18	26.18
50	Institutionalized	9	0.23	26.40
51	Health/medical	202	5.13	31.54
52	Family care	43	1.09	32.63
53	Lacks transport	21	0.53	33.16
54	Cannot locate	84	2.13	35.30
55	Other	517	13.14	48.44
57	No child care	12	0.30	48.74
59	Attended orientation only	287	7.29	56.04
60	No-show	430	10.93	66.96
61	Noncompliance	543	13.80	80.76
64	Out of county	57	1.45	82.21
65	Case closure	188	4.78	86.99
66	Inappro. referral	218	5.54	92.53
67	Ineligible	277	7.04	99.57
70	Other parent excused	17	0.43	100.00
	Total	3935	100.00	

Termination type 61, noncompliance, is different from the other two codes (59 and 60) in that some individuals terminated as such do have activities while enrolled. The reason is that a person can be considered out of compliance for three reasons: 1) disruptive behavior; 2) the client threatened or physically abused FIA/MWA staff; and 3) the client quit or was dismissed from a job. Those separating from a job held while enrolled in Work First, will have other activities recorded (such as employment in an unsubsidized job). Unfortunately, we do not know which of the three reasons actually pertain to a person being terminated as non- compliant. However, we do know that 63 percent of those terminated as noncompliant were recorded as having an unsubsidized job while enrolled (code 01), which suggests that the same percentage was recorded as noncompliant because they quit or were dismissed from that job.

Work First Activities

Work First participants engage in a variety of activities as part of their requirement for successfully participating in Work First and, consequently, for receiving cash assistance.

Most participants begin with assessment and employability planning (code 12). As shown in Table 3, 83 percent of all participants received these services in 1996. The percentage was higher for those who were not

Table 3. Selected Activities of Work First Programs

Activity	Code	Mean	Standard deviation	Minimum	Maximum
Unsubsidized employment	(01)	0.53	0.50	0	1
Job readiness	(10)	0.09	0.28	0	1
Assessment and employability planning	(12)	0.83	0.37	0	1
Job search	(13)	0.55	0.50	0	1
Part-time employment	(19)	0.06	0.24	0	1
Employment prior to assignment	(20)	0.19	0.39	0	1
Community service	(33)	0.01	0.11	0	1
Voc ed training	(34)	0.01	0.09	0	1

Table 4. Distribution of Hours Engaged in Assessment and Employability Planning

Hours	Frequency	Percent	Cumulative
1	64	4.96	4.96
2	700	54.26	59.22
3	8	0.62	59.84
4	14	1.09	60.93
5	2	0.16	61.09
6	2	0.16	61.24
8	5	0.39	61.63
10	2	0.16	61.78
11	6	0.47	62.25
12	3	0.23	62.48
14	2	0.16	62.64
15	41	3.18	65.81
16	80	6.20	72.02
20	361	27.98	100.00
Total	1290	100.00	

employed prior to entering Work First, about 90 percent. Around half the participants engaged in group or individual job-search assistance, which includes counseling, job-seeking skills training, and may include support on a one-to-one basis (code 13). These activities are designed to help participants become familiar with general workplace expectations and learn behavior and attitudes necessary to compete successfully in the labor market (Glossary of Terms and Definitions, *Work First Management Information Guide*, Issued 2/97). Fifty-two percent were employed in a job (code 1) that pays minimum wage or more and the employment was for 20 hours or more per week (or 35 hours if a working spouse). Another 6 percent were employed in unsubsidized employment that did not meet the requirements of code 1. Nineteen percent of the participants were in unsubsidized employment when referred, obtained subsidized employment meeting the requirements of code 1 prior to reporting, or obtained the appropriate employment prior to reporting to the first activity. Only a handful of participants (2 percent) were referred to community service programs or vocational educational training.

The length of time that Work First enrollees engaged in activities varied by type of activity and by subcontractor. For example, half of the participants spent 2 hours in the assessment and employability planning activity (code 12), while nearly 30 percent spent 20 hours in the same activity (Table 4). Of the three subcontractors within the Kalamazoo area, one averaged 6 hours, another 11 hours, and the third 16 hours in this activity. Hours spent in groups or individual job-search activities were much more uniform (Table 5). Ninety-five percent of the participants spent 20 hours, and there was no significant difference in the amount of hours the three subcontractors devoted to this activity.

Table 5. Distribution of Hours Engaged in Job Search Activities

Hours	Frequency	Percent	Cumulative
1	7	0.83	0.83
2	9	1.07	1.89
3	1	0.12	2.01
4	3	0.36	2.37
5	1	0.12	2.49
6	2	0.24	2.72
7	1	0.12	2.84
8	1	0.12	2.96
10	6	0.71	3.67
12	1	0.12	3.79
15	4	0.47	4.26
20	803	95.03	99.29
35	6	0.71	100.00
Total	845	100.00	

Participant Flow

Participants enroll in the program each week. Figure 1 shows the weekly flow of participants starting the first week of March 1997 and running through the end of June. During this period, nearly 1500 welfare recipients enrolled in Work First. Weekly enrollment averaged about 90 people, with a range of 60 to 140. The Institute subcontracts with several agencies to provide services. Three agencies, Goodwill, Behavioral Foundation, and Youth Opportunities Unlimited (YOU), serve the greater Kalamazoo area. The outlying areas are served by three different contractors. The three Kalamazoo facilities served 79 percent of the applicants. The number of participants terminating the program declined over time, as the time required to successfully complete the program increasingly exceeds the time horizon for which the data are collected. Approximately 80 percent of the participants enrolled in job search and job readiness activities, as previously described. These activities include job clubs, counseling, and job-seeking skills training. Participants spend between 2 and 35 hours in this activity, but the vast majority, 86 percent, devote 20 hours.

About half the Work First participants who enrolled in the program between March 1 and June 30 of 1997 found unsubsidized employment sometime during their enrollment in Work First. Hourly wages ranged from $4.25 to $13.60, with the highest percentage (19.1 percent) reporting $5.00. The average hourly wage of those reporting work activity was $5.95. The average hours worked per week was 30.6, with 31 percent reporting 20-hour work weeks and 34 percent reporting working 40 hours per week.

Seventeen percent of Work First participants were employed in an unsubsidized job prior to entering the Work First program. Hours worked per week ranged from 20 to 47 with an average of 27.8. However, one-third of those holding jobs worked only 20 hours per week, while 17 percent worked 40 hours per week. Hourly wages ranged from $4.25 to $16, with 21 percent of participants reporting a wage of $5.00 per hour. The average wage was $5.70.

Employment Outcomes

The goal of Work First, and other similar welfare-to-work programs, is to move welfare recipients off the welfare rolls into jobs so that they can become economically self-sufficient. Employment success can be measured in several ways: whether or not a participant holds a job, the length of time a participant holds a job, the hours worked, or the hourly wage received. The positive outcome for Work First is for the participant to obtain unsubsidized employment in a qualified job and to remain employed for 90 consecutive working days (with a short grace period of no more than a week between jobs if they change jobs). Some enrollees may experience periods of unemployment. Others may have had a job when they entered the program and continue with this job throughout the program, ending with a successful termination.

In estimating the profiling model, we tried two measures of employment outcomes. The first was whether or not a Work First participant remained in a qualified job for 90 consecutive days and was terminated as having been employed for 90 days. The second measure was whether or not the

participant held any unsubsidized employment during the time they were enrolled (activity code 01). This measure is less of a hurdle to overcome, but it does show some attachment to the workforce even if it does not terminate in 90 consecutive days of employment. In experimenting with the profiling model, the factors for which we had information were better able to predict the 90-day employment than the more general measure of employment. Welfare recipients have work experience. According to estimates of welfare recipients in the Survey of Income and Program Participation, 45 percent reported working at least once during a 2-year period. However, only 30 percent reported working three or more months for 20 hours a week or more and receiving at least minimum wage. We find the same behavior with Work First participants. During 1996, 52 percent worked during their enrollment in Work First, but only 43 percent worked 90 consecutive days for more than 20 hours a week in a job that pays at least minimum wage. Therefore, the models that we present in this paper use 90-day employment as the outcome.

Estimating the Profiling Model

A logistic statistical procedure was used to estimate the effects of a Work First participant's personal characteristics on the likelihood of finding qualified employment for 90 consecutive days, which is indicated by termination code 40. Since the logistic model explains an outcome with only two events—employed or not employed—the dependent variable in this regression is discrete, taking on the value of 1 (if employed) or 0 (if not employed). The probability of employment lies between 0 and 1 (that is, 0 percent and 100 percent), and the logistic function provides a smooth functional form bounded by 0 and 1.

Estimates are based on a sample of Work First participants from the Kalamazoo-St. Joseph SDA who enrolled in the program during 1996. The 1996 period is used because all who enrolled in Work First during that time have completed the program. (Individuals can and do enroll in Work First several times. However, only about 8 percent of those who enrolled during 1996 enrolled more than once.) We included each enrollee only once in the sample and included their latest appearance so that we could use any previous history in the analysis. The variable definitions and sample means are displayed in Table 1 (shown on a previous page).

Results of the logit estimation are shown in Table 6. Focusing on the signs of the statistically significant coefficients, Work First participants are more likely to complete 90 consecutive days of employment if they had completed 12th grade (the omitted variable in the equation), were older, were referred to YOU, were employed prior to first assignment, enrolled in the program earlier in the year rather than later, and were not out of compliance if they had previously enrolled in Work First.

The only variable that may need an explanation for its inclusion in the model is the date of admission into Work First. The coefficient on this variable is negative and statistically significant. Therefore, those who enroll in Work First in more recent periods experience a lower probability of finding and maintaining employment for 90 consecutive days. The percentage of Work First participants reaching this status has steadily declined since the first quarter of 1996, when our sample began. During the first and second quarters of 1996, 53 percent of participants in the sample were

Table 6. Logit Estimates of Basic Profiling Model

Logit Estimates — Number of obs=1546; chi2(23)=213.10; Prob > chi2=0.0000; Log Likelihood = -948.47621; Pseudo R2=0.1010

Employed	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
sglprnt	.223	.156	1.429	0.153	-.083	.528
age	.115	.041	2.790	0.005	.034	.196
age2	-.002	.001	-2.602	0.009	-.003	-.000
noschl	-1.801	.555	-3.244	0.001	-2.889	-.713
grlt9	-.454	.304	-1.495	0.135	-1.049	.141
gr9	-.167	.252	-0.662	0.508	-.661	.327
gr10	-.775	.218	-3.553	0.000	-1.203	-.348
gr11	-.431	.157	-2.744	0.006	-.739	-.123
ged	.174	.162	1.074	0.283	-.143	.492
voced	-.591	.487	-1.212	0.225	-1.546	.364
post1	.079	.501	0.159	0.874	-.903	1.062
post2	.162	.438	0.371	0.711	-.695	1.020
post3	.011	.884	0.013	0.990	-1.721	1.744
goodwill	-.463	.187	-2.485	0.013	-.829	-.098
foundat	-.560	.164	-3.406	0.001	-.883	-.238
sturgis	.005	.300	0.017	0.986	-.582	.593
comstock	.127	.302	0.421	0.673	-.465	.719
rivers3	-.454	.172	-2.641	0.008	-.791	-.117
notarget	.064	.116	0.555	0.579	-.163	.292
addate	-.003	.001	-5.424	0.000	-.004	-.002
code20_1	1.107	.144	7.683	0.000	.825	1.390
code20_2	-.393	1.055	-0.373	0.709	-2.46	1.674
nocmpl	-.750	.281	-2.672	0.008	-1.301	-.200
_cons	36.921	7.260	5.086	0.000	22.693	51.150

employed for 90 days, after which the percentage dropped to 50 percent during the third quarter, 31 percent during the fourth quarter, and 24 percent during the first quarter of 1997. The admission date variable can be interpreted as a proxy for attributes of Work First participants that are not captured in the characteristics included in the model. Work First staff observed that as the pool of welfare recipients going through the program diminishes, enrollees are increasingly less qualified to find and hold jobs. The variable may also capture changes in the program and changes in local labor market conditions over time.

These results are consistent with previous studies that examine the employment prospects of welfare recipients. Estimates based on the national SIPP survey found that education and prior

employment history were important determinants of the likelihood of leaving welfare for employment (see the appendix). A study for the State of Texas also found these factors to be important (Schexnayder, King, and Olson, 1991). The Texas study also found that the number of children, the age of the welfare recipient, the duration on welfare, and the use of the employment service and participation in job training programs also affected the likelihood of employment in the expected direction. The employment- and training-related results from Texas are consistent with our results from Work First that prior employment and compliance with previous Work First enrollment positively affect the likelihood of qualified employment.

Applying the estimated coefficients to the characteristics associated with each Work First participant yields predictions of the probabilities of employment for each individual. Consequently, each Work First enrollee can be ranked according to this estimated probability. One criterion for judging the utility of the model is its ability to distinguish among Work First participants as to their likelihood of finding employment. This ability can be measured in two ways: 1) the relative steepness of the logit function and, 2) the width of the confidence intervals. If the function is flat throughout the range of individuals, then its ability to differentiate among participants is minimal. On the other hand, if the function increases throughout the range of individuals, then its ability to distinguish between participants with different employment propensities improves.

One can think of the graph as representing participants lined up to enter the Work First program according to their probabilities of finding employment. If the door is envisioned to be on the left side of the graph in Figure 2, then those with the least propensity to find a job are at the front of the line and the participants with the highest propensity are at the end of the queue. According to our model, the estimated probabilities of employment range from a high of 0.90 percent to a low of 0.016. Therefore, the person at the head of the line has almost no likelihood of finding a job and would need considerably more assistance than the person at the end of the line, who is almost certain to find employment without much help. Although 43 percent of the Work First participants in the sample found employment, the model did not assign anyone a probability of 100 percent. However, the spread is quite large, spanning most of the range from 0 to 1. As shown in Figure 2, the estimated probabilities gradually increase throughout the low probability range. The slope begins to increase at an increasing rate when the predicted probability surpasses 0.3 and becomes fairly steep after a probability of 0.7.

A second, and related, criterion is the width of the confidence interval. A confidence interval shows the range of probabilities that are statistically indistinguishable. The wider the confidence interval for any point on the logit function, the less able the model is to differentiate with any degree of statistical confidence. Also included in Figure 2 are the upper and lower 95 percent confidence intervals for each point on the logit function. The band is relatively tight along most of the curve, with the narrowest part of the band at the steepest segment to the far right. Figure 2 shows the bands more distinctly by collapsing the 1546 observations into 50 relatively equally-sized groups of about 30 people. Accordingly, an individual with a 70 percent probability (0.7 in the figure) of finding employment is indistinguishable from the 60 people to her right in the queue and the 210 people to her left. A band of roughly 210 individuals on either side of a specific person is maintained

Table 7. Characteristics of Participants with Low and High Probabilities

Characteristics	Person A	Person B	Person C
single parent (=1)	1	1	1
age	22	35	38
male (=1)	0	0	0
black (=1)	1	0	1
no formal schooling	1	0	0
9th grade or less	0	0	0
9th grade	0	0	0
10th grade	0	0	0
11th grade	0	0	0
12th grade	0	0	1
one year post secondary	0	0	0
two years post	0	0	0
secondary	0	1	0
ged	0	0	0
voced			
notarget	1	0	0
prior employment	0	1	1
non compliance	1	0	0
admission date	10/17/96	3/5/96	1/17/96
Predicted probability	0.035	0.884	0.880
employed 90 consecutive days (=1)	0	1	1

throughout much of the graph, except at the two tails. Consequently, according to the model, anyone standing in the queue has a 95 percent chance of being significantly different from a person 210 places up or down the queue from him or her.

Figure 3 shows the relatively close relationship between the predicted probability and the percentage of participants employed within each of the 50 groups of 30 people. If the sample were larger within each group, the percentage employed would be tighter and closer to the average predicted probabilities for each group.

Table 7 illustrates how the estimated coefficients are combined with an individual's specific characteristics to generate a predicted probability of exhaustion of benefits. Note that most of the explanatory variables are binary, that is, the value of one is recorded when the characteristic describes the recipient. Three examples are given in Table 7. The first person described (column 2) is a black, single mother with no formal schooling and no employment immediately prior to being assigned to Work First. She entered the Work First program in mid-October 1996. She also was enrolled in Work First previously, but left because of non- compliance. She was not employed for 90 days, and her probability of finding a job was estimated to be 3.5 percent. Persons B and C, on the other hand, are single parents, one white and the other black, in their mid-thirties. One has a 12th grade education and the other her GED. Both were employed prior to assignment to Work First, and neither was terminated from previous enrollment in Work First as noncompliant. They entered the program in the first quarter of 1996, and both have been employed for at least 90 days. Each has a probability of employment of 88 percent.

We can observe the differences in characteristics of people along the logit function by dividing the 1546 participants into five groups containing equal numbers.

One can see from this table the effect of education (particularly completing 12th grade and obtaining a GED) prior employment, and noncompliance on the predicted probability and the percentage employed. Figures 4, 5, 6 and 7 show these relationships graphically relative to the predicted probability.

Table 8. Characteristics by Quintiles of Predicted Probabilities

Characteristics	Group 1	Group 2	Group 3	Group 4	Group 5
single parent (=1)	0.789	0.787	0.830	0.86	0.862
age	28.2	28.8	30.7	29.6	31.0
male (=1)	0	0	0	0	0
black (=1)	0.321	0.337	0.323	0.333	0.340
no formal schooling	0.120	0.003	0	0	0
9th grade or less	0.077	0.050	0.023	0.033	0.012
9th grade	0.070	0.077	0.057	0.033	0.043
10th grade	0.244	0.067	0.083	0.043	0.017
11th grade	0.268	0.217	0.183	0.203	0.098
12th grade	0.144	0.453	0.437	0.423	0.464
one year	0.010	0.020	0.017	0.013	0.003
postsecondary	0.007	0.020	0.030	0.007	0.017
two years	0.013	0.053	0.140	0.233	0.337
postsecondary	0.040	0.007	0.013	0.01	0.003
ged					
voced					

Table 8 also shows that the average predicted probability of employment generated by the model is reasonably close to the percentage employed for each of the five groups, with perhaps the exception of the first group. Overall, the model classifies 66.24 percent of the cases correctly. A person is classified as "employed" and the variable is given a value of 1 if the predicted probability is greater than or equal to 0.5. As shown in Table 9, 79.12 percent of the cases in which employment does not occur are classified accordingly, whereas 48.94 percent of the cases that are true are classified as such. As a means of comparison, the Michigan's UI profiling model classifies 59 percent of the true exhaustions as exhaustions and 67 percent of true non-exhaustions as such. These percentages can be changed depending upon the cutoff level chosen for classifying the event. Figure 8 (available in hard copy only) shows the tradeoff between the two probabilities when different probability cutoffs are chosen to determine the classification of the event. In this graph, sensitivity refers to the event being classified as one, in our case, the event of employment. Specificity refers to the event being classified as zero, that is, not employed.

Table 9. Relationship between Actual and Classified Events

Dependent Variable: 90-day Employment=1

	True		
Classified	D	~D	Total
+	323	185	508
-	337	701	1038
Total	660	886	1546
Classified + if predicted Pr(D) >= 0.5			
True D defined as employed ~= 0			
Sensitivity		Pr (+| D)	48.94%
Specificity		Pr (- |~D)	79.12%
Positive predictive value		Pr (D|+)	63.58%
Negative predictive value		Pr (~D| -)	67.53%
False + rate for true ~D		Pr (+|~D)	20.88%
False - rate for true D		Pr (-| D)	51.06%
False + rate for classified +		Pr (~D|+)	36.42%
False - rate for classified -		Pr (D| -)	32.47%
Correctly classified			66.24%

Assigning Probabilities on a Weekly Basis

The purpose of the model is to distinguish between participants according to their likelihood of finding and holding a job. Probabilities will be assigned to individuals as they enroll in Work First on a weekly basis. Using the model estimated from the sample of

Table 10. Assigned Predicted Probabilities by Weekly Intake

Week	Number of persons	Predicted probability		
		Mean	Minimum	Maximum
1	55	0.280	0.071	0.642
2	73	0.270	0.072	0.603
3	77	0.247	0.054	0.571
4	52	0.246	0.045	0.619
5	71	0.256	0.026	0.596
6	60	0.244	0.038	0.597
7	59	0.244	0.029	0.667
8	62	0.229	0.030	0.583
9	51	0.218	0.032	0.506
10	61	0.247	0.030	0.534
11	63	0.243	0.052	0.552
12	113	0.212	0.023	0.590
13	85	0.223	0.034	0.584

1996 Work First participants, Table 10 displays the range of predicted probabilities by week starting in April 1997 and ending in June.

Alternative Specifications

We tried several variations of the model previously presented. The first variation was to exclude the prior employment variables, code 20_1 and code 20_2. The results are in column A of Table 11. As indicated by the pseudo R^2, the percentage of the variation explained in the occurrence of employment is smaller without the prior employment variable. Another issue to consider is whether different model specifications change the ranking of individuals according to the predicted probability. Figure 9 (available in hard copy only) plots the predicted probabilities derived from the model with the prior employment variables (pempq4) and without the prior employment variables (pempq4b). The predicted probabilities were sorted in ascending order using pemp4q, so the triangles located off the well-defined curve indicate the predicted probabilities of the alternative model. Notice that the predicted probabilities are higher at the low- to mid-range of probabilities and a large percentage is lower at the higher probabilities. We also computed the correlations between predicted probabilities generated by the two models. The correlation between pempq4 and pempq4b is 0.844, which is consistent with what we saw in the graph (see Table 12).

Since including age in the profiling model may be a concern, we have excluded it from the basic model but left in the prior employment variables (code 20_1 and code 20_2). Figure 10 (available in hard copy only) shows a tighter relationship between the predicted probabilities generated by the basic and noage model specifications. The correlation between the two probabilities is 0.98, which is consistent with the graph (Table 12).

In addition, we estimated the basic model using only participants who enrolled during the first quarter of 1997. This sample includes 822 participants who enrolled in and terminated the program and for whom we also have activity information. According to the R^2, the predictive power of this model is somewhat higher (Table 11). The importance of some of the variables differ between the two models. While the coefficients on prior employment and the assignment to various subcontractors have the same sign and are statistically significant in both models, the education variables and the noncompliance variables in the 1997 model are not statistically significant.

Table 11. Logit Model Specifications

	Basic model, 1996		Basic model, 1996 minus prior empl.		Basic model, 1996 minus age		Basic model, 1997Q1	
	coef.	t-ratio	coef.	t-ratio	coef.	t-ratio	coef.	t-ratio
sglprnt	.223	1.49	.171	1.13	.209	1.35	-.061	.249
age	.115	2.79	.115	2.66			.123	1.50
age2	-.002	2.60	-.0016	2.47			-.002	1.48
noschl	-1.80	3.24	-1.74	3.18	-1.80	3.25	.036	.060
grlt9	-.454	1.50	-.497	1.67	-.481	1.61	.119	.235
gr9	-.167	.66	-.156	.635	-.190	.756	-.214	.270
gr10	-.775	3.55	-.743	3.48	-.780	3.59	-.486	1.58
gr11	-.431	2.74	-.429	2.79	-.475	3.04	-.392	1.37
ged	.174	1.07	.185	1.17	.209	1.30	-.322	1.02
voced	-.591	1.21	-.643	1.34	-.539	.486	-.680	1.28
post1	.079	.159	-.017	.034	.115	.230	.098	.258
post2	.162	.371	.248	.587	.202	.460	.667	1.64
post3	.011	.013	-.218	.246	.051	.058	-.529	.637
goodwill	-.463	2.49	-.480	2.65	-.467	2.51	-.792	2.71
foundat	-.560	3.41	-.642	3.98	-.569	3.47	-.809	2.77
sturgis	.005	.017	-.237	.797	.024	.080		
comstock	.127	.421	.088	.296	.139	.461		
rivers3	-.454	2.64	-.534	3.18	-.438	2.56	.048	.184
notarget	.064	.055	.071	.625	.090	.782	-.296	1.59
addate	-.003	5.42	-.003	5.38	-.003	5.60	-.019	5.19
code20_1	1.11	7.68			1.10	7.65	1.36	6.84
code20_2	-.394	.373			-.294	.278	1.06	1.18
nocmpl	-.750	2.67	-.804	2.92	-.721	2.57	-.234	.741
constant	36.92	7.26	36.05	7.09	39.97	7.17	259.03	5.14
R^2	.101		.072		.096		.128	

What's Next?

We have estimated a profiling model for Work First participants using administrative data that identifies individuals who are most likely to find and hold a job. According to various measures and comparisons, the model appears to predict employment with reasonably good

Table 12. Correlations of the Predicted Probabilities of Different Model Specifications

	pnoage	pempq4	pempq4b
pnoage (no age variables)	1.0000		
pempq4 (basic model)	0.9787	1.0000	
pempq4b (no prior employment variables)	0.8141	0.8440	1.0000

reliability. The model's predictive power is comparable to that of Michigan's UI profiling model, which has been in operation for a few years. The results of the Work First model are also consistent with previous studies on welfare recipients' propensity to leave welfare and maintain employment.

All variables used in the model are collected and maintained by the SDA, which administers the program in Michigan. Additional data are collected by the FIA, but they are not entered into the model since the FIA does not readily share this information with Work First agencies. Information on the health, physical, and mental ability to find and hold a job would be useful and could help to improve the model. Some of this information is probably reflected in the information on prior employment.

The next steps should include estimating the model using administrative data from other states and to continue to prepare to implement the Work First model at the Kalamazoo-St. Joseph SDA.

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APPENDIX A
EXAMPLE OF A STATISTICAL PROFILING MODEL USING NATIONAL SURVEY DATA

To explore the feasibility of a statistical profiling model for welfare recipients, we used the 1987 panel of the national Survey of Income and Program Participation (SIPP). The sample used to estimate the model comprises mothers receiving welfare at the start of the panel. This group is examined for the following two years to determine who has worked during that two-year period, which is consistent with the new federal goal of working within two years of joining the welfare rolls. While the model is only preliminary, it is reasonably successful in correctly predicting who will work or not work within the two-year time frame. We also extended this outcome goal (work within two years) to encompass a variety of permutations, including working for at least three months within two years, and working at the minimum wage or higher for at least three months.

The explanatory variables included in the model were selected to match as closely as possible the information likely to be available to local service providers for use in profiling. Also, the variables are similar in construction to the regressors used by Ellwood (1986), and those implied by an underlying behavioral model of work and welfare recipiency. These variables include age categories, education categories, a 0-1 indicator variable for race,[1] disability status, currently in school, preschool children in the family, marital status categories, the number of AFDC spells, and the number of months the individual worked in the previous 11 years. Missing from the list of explanatory variables are local labor market conditions. These variables are not available from the SIPP but could be collected for local SDA offices and matched to welfare recipients if profiling were implemented.

The results of the welfare profiling exercise using the SIPP are given in the attached tables and figures. The variable definitions are given first, followed by logit estimates. The dependent variables that relate to greater than three months of work tend to perform somewhat better than the other outcome measures, producing more reasonable and precise coefficient estimates. Using the model evaluation criteria of the lowest log-likelihood value, the dependent variable that performs the best is the one that records whether an individual ever worked for more than three months, for more than 20 hours per week, and at greater than the minimum wage, while not receiving AFDC benefits. Overall, there is reasonable consistency across dependent variables, particularly with respect to coefficient signs. Nonwhites and those with a disability are less likely to attain work, as are those with lower education levels, never married, or with preschool children. Recipients in school or with more of a work history are more likely to attain work.

The figures (available in hard copy only) show the distribution of predicted probabilities for each dependent variable. For example, Figure 1 shows the range of predicted probabilities for ever working during the two years after first receiving welfare benefits. Predicted probabilities range from around 90 percent to slightly above 4 percent. The figures also show upper and lower 95 percent

[1]Federal civil rights legislation prohibits the use of race, age, gender, and national origin in the UI statistical profiling model, and similar restrictions would most likely apply to welfare profiling.

confidence intervals to indicate the precision of the estimates. Given the relatively small sample size (262), the intervals seem reasonably tight. Therefore, it is possible to use these results to distinguish between different groups of recipients. The confidence intervals should be tighter when larger numbers of welfare recipients are used to estimate the model.

Welfare Profiling Models - Variable Definitions

Independent variables:

AGELT25	= 1 if age at start of panel was < 25.
AGE25_40	= 1 if age at start of panel was between 25 and 40.
NONWHITE	= 1 if race is nonwhite.
DISAB	= 1 if disabled.
EDUCLT9	= 1 if had < 9 years of education at start of panel.
EDUC9_11	= 1 if had between 9 and 11 years of education at start of panel.
EDUC12	= 1 if had 12 years of education at start of panel.
INSCHL	= 1 if were attending school at start of panel.
SINGLE	= 1 if single, never married at start of panel.
NOTMARRY	= 1 if divorced, separated, widowed, or married (spouse not present) at start of panel.
KIDLT6	= 1 if had own children under 6 years old at start of panel.
AFDCSPLS	# of spells on AFDC at start of panel and before.
LFP11YRS	# of months worked in the 11 years before the start of panel.

Dependent variables:

EVERWORK	= 1 if ever worked during the two-year period.
EVERFULL	= 1 if ever worked > 20 hrs/wk while not receiving AFDC during the 2 years.
EVER3MO	= 1 if ever worked 3 or more consecutive months during the 2 years.
FNOW3MO	= 1 if ever worked 3 or more consecutive months, more than 20 hrs/wk while not receiving AFDC during the 2 years.
FULL3MO	= 1 if ever worked 3 or more consecutive months, more than 20 hrs/wk during the 2 years (no requirement to be off AFDC).
W3MOMIN	= 1 if ever worked 3 or more consecutive months at minimum wage or better during the 2 years.
F3MOMIN	= 1 if ever worked 3 or more consecutive months at minimum wage or better for more than 20 hrs/wk (no requirement to be off AFDC).
FNO3MIN	= 1 if ever worked 3 or more consecutive months at minimum wage or better for more than 20 hrs/wk while not receiving AFDC during the 2 years.

The two-year period of these data extends from January 1987 to January 1989.

Welfare Profiling Results
(standard errors in parenthesis)

Dependent variable:	EVERWORK	EVER3MO	EVERFULL	FULL3MO	FNOW3MO	W3MOMIN	F3MOMIN	FNO3MIN
	Ever work during the two-year period	*Ever work 3+ months*	*Ever work > 20 hrs/wk, no AFDC*	*Ever work 3+ months, > 20 hrs/wk*	*Ever work 3+ months, > 20 hrs/wk, no AFDC*	*Ever work 3+ months, at GE minimum wage*	*Ever work 3+ months, > 20 hrs/wk, at GE minimum wage*	*Ever work 3+ months, > 20 hrs/wk, no AFDC, at GE minimum wage*
Independent variables:								
INTERCPT	0.6186	0.2962	0.7741	0.3908	0.000434	0.3442	0.4614	0.0884
	(0.7144)	(0.7261)	(0.7464)	(0.7178)	(0.7985)	(0.7185)	(0.7171)	(0.8118)
AGELT25	0.1674	-0.0964	0.5490	-0.0806	0.1806	-0.0144	-0.1038	0.0740
	(0.5945)	(0.6263)	(0.6460)	(0.6341)	(0.7243)	(0.6236)	(0.6373)	(0.7403)
AGE25_40	-0.3709	-0.2217	-0.0635	-0.2527	-0.1683	-0.1334	-0.2306	-0.2874
	(0.4523)	(0.4656)	(0.4944)	(0.4668)	(0.5499)	(0.4640)	(0.4709)	(0.5603)
NONWHITE	-0.2464	-0.4469	-0.5536	-0.3205	-0.6635	-0.2871	-0.1879	-0.5156
	(0.2928)	(0.3058)	(0.3173)	(0.3080)	(0.3525)	(0.3044)	(0.3098)	(0.3593)
DISAB	-1.2603	-1.0209	-1.2485	-0.8491	-1.0887	-0.7712	-0.7659	-1.2303
	(0.4007)	(0.4117)	(0.4514)	(0.4132)	(0.4956)	(0.4068)	(0.4185)	(0.5279)
EDUCLT9	-0.9681	-0.9885	-1.4966	-0.9814	-1.3976	-1.1635	-1.2074	-1.6148
	(0.5760)	(0.5959)	(0.6097)	(0.5889)	(0.6785)	(0.5979)	(0.5979)	(0.7162)
EDUC9_11	-0.5600	-0.6720	-1.4110	-0.9432	-1.3018	-0.6686	-1.0386	-1.3279
	(0.5119)	(0.5150)	(0.5148)	(0.5106)	(0.5527)	(0.5051)	(0.5043)	(0.5575)
EDUC12	0.0333	0.3248	-0.5791	0.0898	-0.0979	0.1042	-0.2032	-0.1598
	(0.4911)	(0.4887)	(0.4733)	(0.4755)	(0.4908)	(0.4761)	(0.4666)	(0.4913)
INSCHL	0.7795	0.9364	0.1570	0.7590	0.6558	0.8894	0.5844	0.6309
	(0.3988)	(0.4074)	(0.4077)	(0.4009)	(0.4247)	(0.4006)	(0.3999)	(0.4323)
SINGLE	-0.6734	-0.9513	-1.0550	-1.0110	-0.9871	-0.9359	-0.8814	-0.8806
	(0.4337)	(0.4522)	(0.4641)	(0.4532)	(0.5079)	(0.4494)	(0.4519)	(0.5219)

Dependent variable:	EVERWORK	EVER3MO	EVERFULL	FULL3MO	FNOW3MO	W3MOMIN	F3MOMIN	FNO3MIN
	Ever work during the two-year period	*Ever work 3+ months*	*Ever work > 20 hrs/wk, no AFDC*	*Ever work 3+ months, > 20 hrs/wk*	*Ever work 3+ months, > 20 hrs/wk, no AFDC*	*Ever work 3+ months, at GE minimum wage*	*Ever work 3+ months, > 20 hrs/wk, at GE minimum wage*	*Ever work 3+ months, > 20 hrs/wk, no AFDC, at GE minimum wage*
NOTMARRY	-0.1798 (0.3975)	-0.2266 (0.4064)	-0.2779 (0.4081)	-0.4248 (0.4040)	-0.3501 (0.4441)	-0.5668 (0.4054)	-0.5860 (0.4057)	-0.4651 (0.4601)
KIDLT6	-0.1170 (0.1711)	-0.0490 (0.1804)	-0.00199 (0.1801)	-0.0595 (0.1824)	-0.0653 (0.1995)	-0.1582 (0.1819)	-0.0973 (0.1837)	-0.0578 (0.2112)
AFDCSPLS	0.0819 (0.1187)	-0.0255 (0.1128)	0.0857 (0.1110)	-0.0491 (0.1139)	0.0966 (0.1149)	0.0420 (0.1129)	0.00683 (0.1127)	0.1320 (0.1176)
LFP11YRS	0.0126 (0.00378)	0.0117 (0.00371)	0.00316 (0.00362)	0.0100 (0.00360)	0.00771 (0.00377)	0.0104 (0.00361)	0.00859 (0.00356)	0.0092 (0.00383)
-2LOG L	312.269	293.501	285.21	289.927	244.748	294.88	287.811	234.54
Chi-Sq for Convariates, with 13 DF (p=0.0001)	47.942	52.902	37.22	41.728	44.295	43.464	32.957	44.962
Mean of dependent var	0.44656	0.37405	0.30534	0.32824	0.24046	0.34733	0.30153	0.22519