

**EVALUATING THE EFFECTIVENESS OF  
ACTIVE LABOR MARKET PROGRAMS IN ROMANIA**

**(PRELIMINARY AND INCOMPLETE  
FOR COMMENTS ONLY)**

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**Abstract**

This paper uses propensity score matching to evaluate the impact of four active labor market programs (ALMPs) in Romania: (1) Training and Retraining (TR); (2) Small Business Consultancy and Assistance (SB); (3) Public Works Community Job Creation (PW); and (4) Employment and Relocation (ER). We collected survey data from a representative sample of both program participants and non-participants from 15 *judets* throughout Romania (2,050 participants and 1,949 non-participants). Using the propensity score matching technique, for each of the four ALMPs, we identified individuals from the non-participants sample who were similar to individuals in the participant's sample. Data from these matched samples were then used to derive program impact estimates. Our analysis of program impacts revealed that three of the four programs (TR, SB and ER) had success in improving participants' economic outcomes. We also find that PW had no impact on employment or earnings and that it reduced the length of the current unemployment spell at survey date. Thus, the impact estimates from this evaluation indicate that ALMPs in Romania had mostly positive impacts on employment and earnings. These results, however, were not uniform for all programs and for all subgroups. As a result, the effectiveness of ALMPs in Romania can be greatly enhanced by using these results to target services in the future.

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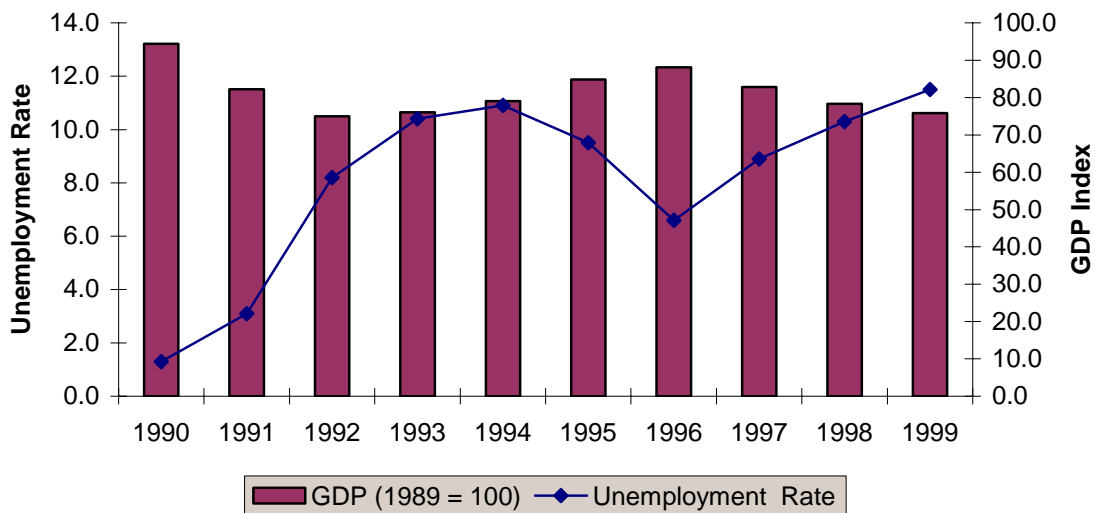
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## I. Introduction

Since 1989, Romania has been in transition to a market economy. This transition has been slow partly as a result of Romania's stop-and-go approach to the restructuring and the reform process. As seen in Figure 1, after a rapid decline in the early 1990s, the economy improved slowly after 1993; then, in 1996, the growth rate started to fall again. After reaching a peak of 10.9% in 1994, the unemployment rate fell to 6.6% in 1996; since then, it has increased to 11.5% (in 1999).

Figure 1

Romania Economic Indicators, 1990-1999



Like other former centrally planned economies of Central and Eastern Europe, Romania faced many handicaps in the transition process resulting partly from Romania's obsolete public enterprises that were poorly prepared to operate in a market economy. These public enterprises were overstaffed, employed obsolete technologies and were managed with little regard for market conditions. Another handicap is Romania's outdated social protection system that was not designed for a market economy. Fortunately, the government recognized the urgency of developing effective social safety programs, including active labor market programs to help the unemployed during this transition period. In the late 1990s, Romania began a major transformation of its active labor market programs (ALMPs) and its social safety net programs.

In this paper, we evaluate the effectiveness of four ALMPs offered in Romania during 1999: (1) training and retraining (TR), (2) small business consultancy and assistance (SB), (3) public works community job creation (PW), and (4) employment and relocation (ER).

The objective is to determine the effects of the programs compared to the outcome if the individual had continued to search for a job as openly unemployed.<sup>2</sup> The effects are measured in terms of employment experiences during the two-year period following participation and employment situation at the time of the survey, which was conducted during January and February 2002. The focus is on the direct effects of the programs; no attempt is made to assess the general equilibrium implications.<sup>3</sup>

Identification of the average treatment effects is based on the conditional independence assumption (CIA), according to which participation in the various programs is independent of the post-program outcome, conditional on observable factors influencing both the decision to participate and the outcome. Given the CIA, matching on the propensity score using an approach introduced by Rosenbaum and Rubin (1983) can be applied to obtain unbiased estimates of the average treatment effects on the treated. Here, a part of the paper is devoted to discussing the plausibility of the CIA in this context. The matching method is also compared to some alternative, well-known methods for estimating average treatment effects based on different identifying assumptions.

Our analysis of program impacts reveals that three of the four programs (TR, SB and ER) had success in improving participants' economic outcomes. Specifically, we find that these three programs increased the likelihood of participants' employment over the past two years as well as current employment (employment at the time of the survey). The three programs also reduced the likelihood of receiving Unemployment Benefits at the time of the survey. Two of the programs (SB and ER) also succeeded in raising participants' monthly earnings.

We also find that the PW program had no impact on employment or earnings and reduced the length of the current unemployment spell. This result sharply contrasts with previous estimates for public works programs in other transition economies.<sup>4</sup> This positive result may reflect on the Romanian PW program or it may reflect on the improved statistical procedures (propensity score matching technique) that we used in identifying a comparison group. In particular, much may be explained by the fact that, in contrast with other studies, we used information on the duration of unemployment prior to the beginning of the LRP as well as information on whether individuals received training prior to the beginning of the LRP to match PW participants to non-participants.<sup>5</sup> Individuals participating in PW tend to be the most disadvantaged unemployed workers—i.e., less educated and younger workers with less work experience and with a long-history of unemployment. Furthermore, they live in areas with high unemployment—the average 1998 unemployment rate is: 15.8%. Thus, by matching

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<sup>2</sup> “Openly unemployed” refers to the unemployed not participating in any ALMP.

<sup>3</sup> For a theoretical macroeconomic framework for studying both the direct and indirect effects, see Layard, Nickell, and Jackman (1991), among others.

<sup>4</sup> See, for example, Benus (1998, 2001), O’Leary (1998), or Kluge et al. (1999). The negative effects of Public Works found in other studies of ALMP in transition economies are usually explained by one or a combination of the following two explanations: First, participating in PW may be ineffective insofar as it does not rebuild human capital, boost search efforts or improve the image of the long-term unemployed individual. Second, participation in PW is a negative signal to the employer (Lehmann, 1995).

<sup>5</sup> In addition to duration of unemployment and training experience before the beginning of the LRP, we also used demographic and regional characteristics to match participants to non-participants.

individuals participating in PW with individuals with similar baseline employment and unemployment experiences, we are estimating impacts using a comparison group that at baseline closely resembles PW participants and we reduce the size of bias towards the "population" impact estimate.

While the literature on evaluations of ALMPs in developed market economies is vast, the evidence on transition countries is scarcer.<sup>6</sup> Recently, several studies have studied the effectiveness of ALMPs in transition economies, e.g., Slovakia (Lubyova and Van Ours, 1998), Hungary (O'Leary, 1998), Poland (Kluve, Schmidt and Lehmann (1999), and Bulgaria (Kotzeva, 2000), among others.

This study contributes to the Romanian and the international literature in three ways. First, it provides an evaluation of the effects of ALMPs in Romania. Second, it applies recently developed methodology to program evaluation. And third, it offers results that suggest that targeting these different services may greatly enhance their effectiveness in the future.

This paper is organized as follows. The next section presents the ALMPs in Romania and the data. Section three discusses the economic evaluation strategy. Section four presents the empirical implementation. Section five describes the results. Section six discusses heterogeneity of the results and sensitivity analysis. Section six concludes.

## **II. The Programs and the Data**

### **a. Labor Market Programs in Romania**

Even though open unemployment was practically non-existent in Romania prior to 1989, with the introduction of political, economic and social reforms, the emergence of labor surplus soared, reaching 11 percent in 1994. The Romanian government soon recognized the urgency of developing effective social safety programs, including labor market programs to help the unemployed during this transition period. Thus, as early as 1991, the Ministry of Labor and Social Protection adopted passive labor programs in Romania.<sup>7</sup> And in 1995, in order to improve the employment services offered through a network of local labor offices distributed throughout the country, the Romanian Government signed a Loan Agreement for the Employment and Social Protection Project. This project provided financial and technical support to: (1) strengthen the capacity of labor offices to

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<sup>6</sup> See Katz (1994), Fay (1996), Martin (1998) or Dar and Tzannatos (1999) for good reviews of the literature.

<sup>7</sup> In Romania, unemployed individuals are eligible for financial support through *unemployment benefits*, *allowance for vocational integration* and *support allowance*. To be eligible, an individual must be: registered at the local Labor Office, aged 18 and over, income less than 50% of indexed minimum wage, unemployed due to liquidation or a lay-off, employed at least 6 months during the last 12 months, or recent graduate from school or university unable to find suitable employment. Unemployment benefits are paid for a maximum duration of 9 months. The level of these benefits ranges from 50% to 60% of the average monthly salary during the last three months of employment. After exhausting unemployment benefits, those who remain unemployed receive a support allowance (60% of the indexed minimum wage) for a maximum period of 18 months.

administer increasing number of claims for unemployment benefits and active labor adjustments services; (2) develop a flexible adult training system which responded to evolving labor market demand resulting from economic restructuring; and (3) implement reforms in social insurance and assistance programs, targeting those population groups that are most vulnerable.

#### **b. Description of the ALMPs**

Beginning 1997, the Employment and Social Protection Project also funded the Labor Redeployment Program (LRP), a program aiming to address mass labor displacements resulting from privatization and economic reform. To reduce the negative impact of Romania's economic reform and privatization, the LRP offered services to support the reintegration of displaced workers into the workforce in the shortest time possible. The program also sought to support the creation of new jobs and to preserve existing jobs, thus contributing to economic growth. In particular, six types of services were offered under the LRP:

- 1. Employment and Relocation Services** – Clients eligible for this service were offered a variety of employment and relocation services, including job and social counseling, labor market information, job search assistance, job placement services, and relocation assistance. Those clients receiving relocation assistance could be reimbursed for expenses associated with moving to another community (up to \$500 U.S. dollars equivalent in lei). In addition, the program offered up to two months of salary at the minimum wage.
- 2. Training and Retraining Services** – Eligible clients for this service could receive up to nine months of training as well as a small subsistence stipend.<sup>8</sup> The cost of training was limited to \$560 U.S. dollars per unit. Another requirement of this service was that local service providers must agree to achieve a minimum negotiated job placement rate and to show evidence of demand for trained workers.
- 3. Public Service Employment** – Local governments and other eligible organizations could propose public works projects with a maximum cost of \$50,000 U.S. dollars (or higher with a no-objection from the World Bank). These public works projects covered the cost of supervisory personnel and up to 6 months of program participants' stipends (stipend is set at a maximum of the average wage level of the type of activity provided).
- 4. Small Business Consulting and Assistance Programs** – Displaced workers who start or operate a small business are eligible to receive legal, marketing, sales, financial services and consulting services. There are also provisions for short-term working capital loans of up to \$25,000 U.S. dollars to program participants.

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<sup>8</sup>The subsistence stipend was at the minimum wage level and for a period equal to the difference between the months of unemployment benefits and months of training.

5. **Small Business Incubator Assistance Programs** – This program was designed to provide facilities, technical assistance, shared services and short-term working capital for new small businesses. Due to the lack of legal framework, however, the implementation of this program was delayed and hence the program has not been fully implemented.
6. **Local Economic Development Planning Services** – This program was designed to support the cost of local economic assessments, workshops, studies and promotional materials. Due to a variety of factors, however, this program was not fully implemented.

Because the later two programs were not fully implemented, we will focus our analysis only on the first four programs described above.

### c. Description of the Data

The data used in this study, a sample of approximately 4,000 persons who registered at the Employment Bureau during 1999, was collected by an outside Romanian firm, the Institute of Marketing and Polls, during January and February 2002. The data was collected using a survey available from the authors upon request (information on response rates is shown in the appendix).

About half of this sample, 2,047 persons, were ALMP participants whose ALMP contract began in 1999.<sup>9</sup> To obtain a representative sample of ALMP participants, we randomly selected 10% of clients served by each of the four ALMPs in the fifteen counties (*judets*) with the largest number of clients served in 1999.<sup>10</sup> These fifteen judets represented 86% of all clients served in 1999. Furthermore, an analysis of the economies of these fifteen judets indicates that they represent a broad spectrum of the Romanian economy with many sectors represented, including heavy industry, mining, agriculture and other sectors. Moreover, these fifteen judets included some of the poorest judets in Romania (Botosani and Vaslui -- north-east region) as well as some judets with substantial natural resources and highly developed industries (Cluj and Maramures -- north-west region).

The other half of the sample—the potential comparison group—were 1,949 persons who had registered at the Employment Bureau around the same time and in the same judet than participants but who had *not* participated in an ALMP.<sup>11</sup>

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<sup>9</sup>We focus our analysis of ALMPs on contracts that began in 1999, even though some of these contracts may have been completed in early 2000. Based on discussions with program implementation staff, we determined that contracts that begun in 1999 most accurately reflect the operations of the LRP. Prior to 1999, the ALMPs were new and some of the procedures were not fully implemented. Similarly, contracts that began in 2000 and 2001 may not be suitable for the evaluation since some may still be in operation and impacts from these contracts may not yet be fully reflected in participant outcomes.

<sup>10</sup> Because of the low number of participants in the Training and Retraining Services program, we used a higher sampling rate (25% of clients served) for this ALMP. More detailed information is provided in the appendix.

<sup>11</sup> To select non-participants, we used the same register list that was used in the participant selection process. Specifically, for each of the four ALMPs, we first determined the number of participants that were

In Table 1, we present the demographic characteristics, and the employment, unemployment, and training experiences during 1998 (prior to the beginning of the LRP) of ALMP participants in each of the four ALMPs (columns 1 through 4) and non-participants (column 5).

Participants in the Public Works Community Job Creation (PW) program are quite different from participants in the other ALMPs. In particular, they tend to be the most disadvantaged group among the unemployed. For example, one fifth of PW participants have only a primary school education. They also are younger workers, and predominantly male (89 percent). More dramatic are the differences in employment and unemployment experiences in 1998 between PW participants and other ALMPs' participants. About four fifths of PW participants are from the pool of the long-term unemployed in 1998 with an average unemployment length of 8.7 months in 1998. In addition, less than half of PW participants worked in 1998. Finally, PW participants are the least likely to have received training in 1998.

In contrast, participants of Small Business Consultancy and Assistance (SB) tended to be older and highly educated workers with a stable employment history during 1998. Two fifths of SB participants are high-school graduates and one fifth have a university degree. Furthermore, four fifths reported working during 1998. On average, they experienced 3.0 months of unemployment in 1998.

Like SB participants, participants in Employment and Relocation (ER) experienced stable employment history during 1998. For example, four fifths of ER participants worked during 1998, and their average unemployment spell in 1998 was only slightly higher than that of SB participants (3.8 months). In contrast, ER participants are more likely to be female, older workers, and less educated workers than SB participants.

Although participants in Training and Retraining (TR) program were more employable than PW participants (57 percent of TR participants worked in 1998), more than half were long-term unemployed with an average unemployment spell of 5.5 months. This group also differed from PW participants in that they were more likely to be female (59 percent) and nearly all (94 percent) have more than a primary school education level. However, in contrast with SB participants and ER participants, only one fourth of TR participants have a high school degree and nearly none have a university degree. The TR group appears to have the highest predisposition for training with one fifth of this group participating in training in 1998. Furthermore, this group is the youngest among the four ALMPs with an average age of 39 years old and only 17 percent older than 45 years old.

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selected for the participant sample in each of the judets. Next, in each judet, we selected an equal number of non-participants who registered at the Employment Bureaus during 1999. The specific procedure for selecting non-participants was as follows: (1) we randomly selected 70% of the required number of non-participants, (2) we selected the remaining 30% of the non-participants to match the demographic characteristics of the participants sample.

**Table 1**  
**BASELINE CHARACTERISTICS OF ALMP PARTICIPANTS AND NON-PARTICIPANTS, 1998**  
**(Percentages except where noted)**

	TRAINING AND RETRAINING	SMALL BUSINESS CONSULTANCY AND ASSISTANCE	PUBLIC WORKS COMMUNITY JOB CREATION	EMPLOYMENT AND RELOCATION	NON-PARTICIPANTS
	(1)	(2)	(3)	(4)	(5)
<i>Characteristics</i>					
Less than 37 years old	45	33	40	27	31
Between 38 and 45 years old	38	37	32	35	30
More than 45 years old	17	30	28	38	39
Male	41	52	89	45	65
Primary school	6	10	22	13	15
Secondary school	69	32	58	46	45
High school	23	38	17	29	28
University	2	21	3	12	12
Work Experience (years)	21	23	22	24	24
Employed in 1998	57	79	40	79	82
Unemployed at least 6 months during 1998	53	27	79	32	25
Average unemployment lengths during 1998 (months)	5.5	3.0	8.7	3.8	2.8
Received training during 1998	19	8	4	7	3
Sample size	97	447	555	951	1,949

The main difference between non-participants and participants is that the former experienced more stable employment history during 1998. Their employment history resembles the most to that of SB participants, whereas the age and education distribution of non-participants resembles that of ER participants. Two thirds of non-participants are male.

Description of the ALMPs as well as the differences in characteristics observed across ALMPs and between ALMPs participants and non-participants seems to suggest that either the operators may be consciously targeting those individuals with a comparative advantage for the different ALMP programs, or individuals self-select into the different programs. For example, those highly educated workers with more stable employment seem to participate in Small Business Consultancy and Assistance, whereas those with the highest training predisposition participate in Training and Retraining. These findings suggest there may be selection bias. Below, we present further analysis on whether there is sample selection bias and the direction of the bias

### **III. Econometric Evaluation Strategy**

#### **a. The Evaluation Problem**

The empirical questions we attempt to answer are “Does participation in a specific ALMP improve the employment prospects?” and “Does participation in a specific ALMP lead to higher earnings?”

Since experimental data on these programs are not available, we face the typical problems of selection bias due to a correlation of individual program participation with the outcomes under investigation. Selection bias may arise from a variety of sources. As suggested above, it may arise from the choices of individuals who apply for a particular program (e.g., the highly motivated). It may also arise through screening operations of program operators (e.g., “creaming” of the most qualified candidates).

Since our aim is to determine the causal effect of these four ALMPs compared to no-program, we can follow the framework suggested by Rubin (1973) inspired by the set-up of experiments in science.<sup>12</sup>

Let  $Y^t$  denote the outcome when a person gets the *treatment* (in this case, the person participates in one of the four ALMPs described in the previous section), and  $Y^c$  denote the outcome when a person does not get the treatment, that is, does not participate

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<sup>12</sup> For now, we will argue that the different ALMPs offered were considerably different and targeted to individuals with different skills and labor market experiences. Thus, in this version of the paper, we focus our analysis on comparing the outcomes of two alternative strategies available to displaced workers: to participate in a particular ALMP, or to continue searching for a job as openly unemployed. Further research will explore estimation with multi-valued treatments as was introduced by Imbens (2000) and Lechner (2001), among others. Even though, several studies (Larsson, 2002, among others) find that matching based on the predicted probabilities from a binomial logit framework as opposed to a multinomial logit framework produces similar estimates of the ATET.

in any of the ALMPs described above ( $c$  denotes *comparison* group). Additionally, let  $X$  denote variables that are unaffected by treatments—called *attributes* by Holland (1986). Attributes are exogenous in the sense that their potential values for the different treatment states coincide ( $X^t = X^c$ ). Also, we define a binary assignment indicator,  $D$ , that determines whether the individual gets the treatment ( $D=1$ ) or not ( $D=0$ ).

The average treatment effect on the treated (ATET) is defined as follows:

$$ATET = E(Y^t - Y^c | D = 1) = E(Y^t | D = 1) - E(Y^c | D = 1) \quad (1)$$

The shorthand notation  $E(\cdot | D = 1)$  denotes the mean in the population of all individuals who participate in an ALMP, denoted by  $D = 1$ .

ATET shows the effect of the program for those persons who actually participated. However, we cannot observe the counterfactual,  $E(Y^c | D = 1)$ , that is, the average outcome of those persons who participated in the program had they not participated. Thus, the true causal effect of treatment can never be identified. However, the average causal effect defined in equation (1) can be identified under the conditional independence assumption (see Section III.c).

### **b. Matching as an Evaluation Estimator**

If individuals are randomly assigned to the treatment and the comparison groups, as is the case in well-designed experiments, then the potential outcomes are independent from the assignment mechanism and  $E(Y^c | D = 1) = E(Y^c | D = 0)$ . Thus, the members of the comparison group could be used as the control group. However, the assumption of individuals randomly assigned to the treatment and the comparison groups is not satisfied in this study because there are several variables influencing both assignment into ALMPs and outcomes.

Alternatively, we can evaluate a non-experimental study in which we construct a comparison group as close as possible to the experimental group. A straightforward way to select a comparison group is to identify, from a sample of potential comparison group members (in this case, unemployed individuals who were registered in the Employment Bureau in 1999 but did not participate in an ALMP), an individual that is identical to each treatment group member along each characteristics that affects the outcomes of interest, but who was not offered the treatment. The problem with this approach is that the sample of potential comparison group members may not contain enough individuals to produce an exact match for every treatment group member. However, that sample may contain all the individuals needed to select a comparison group that is similar to the treatment group, *on average*. The problem is how to select such a group.

Rosenbaum and Rubin (1983) showed that, when many characteristics are used in the matching process, a function  $P(x)$ , called the propensity score, can be used to select a comparison group that is similar, on average, to a treatment group along those characteristics. The propensity score is a single number that indicates the extent to which one person is similar to another along a collection of observed characteristic. In the

binary case, it is defined as  $P(x) = P(D = 1 | X = x)$  and it denotes the participation probability conditional on a vector of characteristics  $x$ .

### **c. Conditional Independence Assumption**

The crucial assumption behind matching is that all differences affecting the selection and the outcome between the groups of participants and non-participants are captured by observable characteristics,  $X$ . Conditional independence assumption (CIA) states that given the relevant observed characteristics ( $X$ ) of the participants and non-participants, the outcome of participants if they had not participated is equal to the actual outcome of non-participants:

$$E(Y^c | D = 1, X = x) = E(Y^c | D = 0, X = x)$$

Section IV.b. discusses whether this assumption is reasonable in the context under investigation. The task will be to identify and observe all variables that could be correlated with assignment and potential non-treatment outcomes.

In addition to showing the usefulness of propensity scores for selecting comparison groups, Rosenbaum and Rubin (1983) also show that, for the binary case, if the CIA is valid for  $X = x$ , it is also valid for  $P(x)$ , and thus a comparison group selected using propensity scores can be used to produce unbiased estimates.

## **IV. Empirical Implementation**

### **a. How Comparison Groups Were Selected**

We selected four comparison groups (one for each of the four groups of ALMPs participants) from the sample of potential comparison group members, which in this case is the sample of 1,949 individuals who had registered at the Employment Bureau in 1999 but did not participate in an ALMP.

We used propensity scores to select comparison groups for *each* treatment group, according to the following three steps. First, we estimated a logit model *separately* for each ALMP, where a binary variable that equals 1 for ALMP participants and for non-participants was regressed on variables that represent individual characteristics. See the next section for the list of covariates included in the logit models.

Second, a propensity score was assigned to each treatment group member and each potential comparison group member. The propensity score for each individual equals the weighted sum of the individual's values for the characteristics included in the logit model, where the weights are the parameter estimates of the logit model.

Third, for each treatment group member, we selected potential comparison group members based on their propensity scores. The selection process was done with replacement, so that a potential comparison group member could have been matched to

more than one treatment group member.<sup>13</sup> In addition, the selection method used was caliper matching, which uses all of the comparison units within a predefined propensity score radius (or “caliper”).<sup>14</sup>

To avoid dropping participants from the analysis, we selected the smallest possible caliper under which all participants were matched to at least one comparison member group.<sup>15</sup> When there were multiple matches, each non-participant received a weight that reflects the number of successful matches within the caliper range.

### **b. Is it Plausible to Assume Conditional Independence?**

Our approach for meeting the CIA was to include in the matching process: (1) characteristics influencing the decision to participate in ALMP, (2) baseline values of the outcomes for which we compute outcomes (if available), and (3) variables influencing future potential outcomes. Considered outcomes are employment status and earnings at the time of the survey (about one to two years after the program start—hypothetical for non-participants).

The characteristics of the ALMPs participants indicates that the level of education, previous work experience, and preprogram unemployment history are important factors in determining whether an individual will participate in any program, as well as in which of the programs. These factors are also likely to influence the future labor market outcome, and thus, in order for conditional independence to be plausible, they should be included in the estimation of the propensities.

We included the following variables in the logit models: male; age indicators; education indicators; 1998 experience (and its square); unemployed at least six months in 1998; length of unemployment during 1998 (and its square); only employed during 1998; received training during 1998; 1998 judet unemployment rate; and regional indicators.

What important groups of variables are missing? The following four groups of variables are not included in the matching process. First, we do not use workers’ pre-displacement job characteristics such as earnings, occupation, job position and employer characteristics (e.g., industry or firm size).<sup>16</sup> Second, we do not have information on

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<sup>13</sup> Matching with replacement minimizes the propensity-score distance between the matched comparison units and the treatment unit: each treatment unit can be matched to the nearest comparison unit, even if a comparison unit is matched more than once. This is beneficial in terms of bias reduction, but may reduce the precision of the estimates. An additional advantage of matching with replacement instead of without replacement is that the results are not sensitive to the order in which the treatment units are matched (Rosenbaum, 1995).

<sup>14</sup> By using more comparison units, one increases the precision of the estimates, but at the cost of increased bias.

<sup>15</sup> Sensitivity analysis was done using alternative caliper ranges that corresponded to the smallest range that successfully matched a fixed proportion of participants (e.g., 70%, 80%, 90%) to at least one non-participant. However, because the results presented in section IV.c. were robust to these alternative caliper ranges, we preferred using a caliper range that did not result in a loss of some participants from the analysis.

<sup>16</sup> Some of this information is available and will be included in future specifications of the matching process.

another group of variables that capture workers' motivation, ability, and social contacts. Third, we do not observe individuals' discount rates. And fourth, we lack information on the willingness of the Employment Bureau staff of the different local offices to assign people into different programs.

The available data include much, but not all, information on factors, which affect the selection and the outcomes. The crucial question—that is left to the reader to decide—is whether there is sufficient information to justify the conditional independence assumption. Later on, in Section V.b., we test the plausibility of the CIA by applying various methods to the same problem and comparing the results.

### **c. Similarity of the Treatment and Comparison Groups**

Our goal was to select, for each of the four groups, a well-matched comparison group. A comparison group is well matched to a treatment if the estimated propensity score and the collection of available characteristics are not significantly different across the two groups.

The results in Table 2 show that the statistical significance of various explanatory variables differs across the four programs. However, the variables for sex, age, preprogram unemployment history, as well as those for describing the judet's unemployment rate seem to be highly significant in general.

As explained above, our propensity scoring method matches each ALMP participant with all non-participants whose predicted probability of being assigned to the ALMP (i.e., propensity score) is sufficiently close as specified by a caliper range.

In Table 3, we present demographic characteristics, and employment, unemployment, and training experience in 1998 of each of the four ALMP participants as well as the demographic characteristics, and employment, unemployment, and training experiences in 1998 of their respective matched non-participants.<sup>17</sup> As indicated in this table, the distributions of all four ALMP comparison groups are similar to the distributions of the corresponding ALMP participant samples.

For the TR program, for example, 97 participants were matched with 944 non-participants located in the same judets. The results indicate that the propensity matching technique generated a comparison sample that, in general, closely matches the participant sample. Looking at gender, for example, we see that 41 percent of the participant sample is male; among the non-participants, 65 percent are male (last column of Table 5). After

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<sup>17</sup> For reference, last column of Table 5 has the means for the whole sample of non-participants.

**Table 2**  
**RESULTS FROM THE BINOMIAL LOGIT ESTIMATIONS**

Characteristics	TRAINING AND RETRAINING		SMALL BUSINESS CONSULTANCY AND ASSISTANCE		PUBLIC WORKS COMMUNITY JOB CREATION		EMPLOYMENT AND RELOCATION	
	Coefficients	Standard Error	Coefficients	Standard Error	Coefficients	Standard Error	Coefficients	Standard Error
Less than 37 years old	0.015	0.016	0.058	0.043	0.008	0.036	-0.078*	0.046
Between 38 and 45 years old	0.008***	0.009	0.046*	0.028	-0.003***	0.024	-0.005	0.031
Male	-0.014***	0.006	-0.039**	0.017	0.098***	0.014	-0.139***	0.019
Primary school	0.033	0.030	-0.091***	0.021	0.117***	0.047	-0.042	0.035
Secondary school	0.046***	0.018	-0.118***	0.022	0.068**	0.032	0.043	0.030
High school	0.023	0.018	-0.057**	0.021	0.037	0.036	0.012	0.032
Work Experience (years)	0.001	0.001	0.014**	0.005	0.011***	0.004	0.004	0.006
Experience <sup>2</sup> (years)	-0.000	0.000	-0.000**	0.000	-0.000***	0.000	-0.000	0.000
Only employed in 1998	-0.070***	0.026	-0.258***	0.049	-0.177***	0.039	-0.435***	0.044
Only unemployed in 1998	0.041**	0.025	0.114*	0.071	0.090**	0.042	0.008	0.059
Unemployed at least 6 months during 1998	0.082***	0.052	0.260***	0.093	0.045	0.042	0.030	0.065
Average unemployment lengths during 1998 (months)	-0.011**	0.005	-0.091***	0.020	0.018	0.014	-0.061***	0.020
Unemployment <sup>2</sup> (months)	0.000	0.000	0.005***	0.001	-0.001	0.000	0.004**	0.001
Received training during 1998	0.055***	0.028	0.130***	0.49	0.011	0.036	0.118***	0.49
1998 judet's unemployment rate	-0.006***	0.001	-0.035***	0.003	0.014***	0.003	-0.019***	0.005
Region 1	-0.005	0.006	-0.010	0.022	0.031	0.029	-0.165***	0.026
Region 2	0.031*	0.025	n.a.	n.a.	0.376***	0.071	-0.111*	0.043
Region 3	0.024***	0.010	0.031	0.024	-0.014	0.029	-0.281***	0.019
Region 4	n.a.	n.a.	-0.129***	0.014	0.048	0.038	-0.098***	0.025
Log likelihood	244.26		270.45		849.36		495.73	

Estimate significantly different from zero at the 90% confidence level (\*), the 95% confidence level (\*\*), and the 99% confidence level (\*\*\*).

**Table 3**  
**BASELINE CHARACTERISTICS OF ALMP PARTICIPANTS AND MATCHED NON-PARTICIPANTS, 1998**  
(Percentages except where noted)

Characteristics	TRAINING AND RETRAINING		SMALL BUSINESS CONSULTANCY AND ASSISTANCE		PUBLIC WORKS COMMUNITY JOB CREATION		EMPLOYMENT AND RELOCATION	
	Participants	Non-Participants	Participants	Non-Participants	Participants	Non-Participants	Participants	Non-Participants
Less than 37 years old	45	48	33	31	40	39	27	27
Between 38 and 45 years old	38	30	37	38	32	30	35	32
More than 45 years old	17	22	30	31	28	30	38	41
Male	41	45	52	50	89	89	45	45
Primary school	6	6	10	10	22	21	13	13
Secondary school	69	63	32	31	58	55	46	44
High school	23	26	38	38	17	19	29	29
University	2	5**	21	21	3	4	12	14
Work Experience (years)	21	21	23	23	22	22	24	24
Employed in 1998	57	53	79	75	40	40	79	78
Unemployed at least 6 months during 1998	53	53	27	28	79	73	32	30
Average unemployment lengths during 1998 (months)	5.5	5.8	3.0	3.2	8.7	8.2	3.8	3.7
Received training during 1998	19	16	8	9	4	4	8	8
1998 judet's unemployment rate	11	11	11	11	16	16	12	12
Region 1	10	9	20	17	42	43	18	16
Region 2	5	5	0	0	6	3***	3	2
Region 3	35	40	23	21	39	37	10	8
Region 4	0	0	8	8	7	8	15	22**
Region 5	50	46	50	53	6	8**	54	52
Sample size	97	944	447	1,250	555	1,817	951	1,330

Participant's estimate significantly different from nonparticipant's estimate at the 90% confidence level (\*), the 95% confidence level (\*\*), and the 99% confidence level (\*\*\*)

applying the matching process, we generate a comparison sample that is much closer to the participant sample -- 45 percent male. Similar results are obtained when examining the age and education distributions.

The results of this comparison are even more dramatic when we analyze the differences in employment and unemployment experience in 1998 and training experience in 1998. For example, 19 percent of the TR participants took part in a training program in 1998 (prior to the beginning of the LRP); during the same period, only 2 percent of the non-participants took part in training (Table 5). The comparison group, on the other hand, has 16 percent participating in a training program. Thus, the propensity scoring method generated a comparison sample that closely resembles the participant group on demographic and other characteristics.

#### **d. What are the Outcomes of Interest?**

##### **1. Outcomes During 2000-2001**

In the survey, we asked about participants' employment experiences during the two-year period following participation in an ALMP (2000-2001). As indicated in Table 4, participants in the TR program were the most likely group to have had at least one job during this 24-month period (77 percent). The PW group was the least likely to have been employed during this period, with only 55 percent responding that they had at least one job during 2000-2001. In terms of length of unemployment, the PW group also reported being unemployed for the longest time with an average of 15.5 months of unemployment during this period. Perhaps as a result of their long unemployment duration, the PW group was also the most likely to have registered with the Public Employment Service during this period (19 percent).

##### **2. Current Outcomes**

In the survey, we also asked respondents about their employment situation at the time of the survey, which took place in January-February of 2002. In Table 4, we summarize the current employment status of ALMP participants. The group most likely to be employed at the time of the survey was the TR group of participants (62 percent employed). The group least likely to be employed was the PW group (29 percent). The PW group was also the most likely to be receiving unemployment benefits at the time of the survey. As expected, the SB group was the most likely to be self-employed. However, only 7 percent of this group was self-employed at the time of the survey.

Table 4

**OUTCOMES FOR ALMP PARTICIPANTS, 2002**  
(Percentages except where noted)

	Training and Retraining	Small Business Consultancy and Assistance	Public Works Community Job Creation	Employment and Relocation
<b>OUTCOMES</b>				
<b>In the last two years</b>				
Employed	77	69	55	66
Number of jobs held	1	0.8	0.7	0.8
Length of unemployment (months)	7.7	9.9	15.5	9.3
Registered with the Public Employment Services	5	14	19	11
<b>Current experience</b>				
Working in an enterprise or self-employed				
Working in an enterprise	62	44	29	49
Self-employed	0	7	3	3
Monthly earnings (includes self-employed income) (in lei)	1,126	977	149	189
Unemployed				
Length of unemployment (months)	6.5	6.9	12.0	6.2
Receiving UI benefits	10	10	36	8
Has received UI benefits in the current unemployment spell	17	24	51	20
Sample size	97	447	555	951

## **IV. Program Impacts**

Impacts were estimated as the difference in average outcomes between the treatment and the comparison group, and are shown in Table 5.<sup>18</sup> Regression-adjusted program impact estimates using the non-experimentally matched comparison group were also estimated.<sup>19</sup> The latter estimates (presented in Table 6) are our preferred estimates.

Our analysis of program impacts reveals that three of the four programs (TR, SB and ER) had success in improving participants' economic outcomes. Specifically, we find that these three programs increased the likelihood of participants' employment over the past two years as well as current employment (employment at the time of the survey). The three programs also reduced the likelihood of receiving Unemployment Benefits at the time of the survey. Two of the programs (SB and ER) also succeeded in raising participants' monthly earnings.

We also find that the PW program had no impact on employment and reduced the length of the current unemployment spell. In contrast, PW increases the likelihood of currently being unemployed.<sup>20</sup>

## **V. Heterogeneity and Sensitivity Analysis**

### **a. Heterogeneity among Individuals**

As noted above, three of the ALMPs (TR, SB and ER) had positive impacts on employment at the time of the survey. In contrast, the PW program had no impact on this outcome. In this section, we examine whether these overall results are consistent for all population subgroups or whether they vary by the participants' characteristics. Specifically, we examine whether program impacts vary by gender, age and education.

We find that there is heterogeneity. To illustrate this, we present the subgroup impact estimates for the likelihood of current employment in Table 7. The overall conclusion is that impacts varied substantially by subgroups. For example, the TR program had no impact on males and a strong positive impact for females. Thus, our earlier finding that the TR program had a positive impact on current employment is entirely attributable to the large impact for females. The same result is found for the SB program. That is, the positive impact for this program is attributable to females. In contrast, the positive impact of the ER program is attributable to males. That is, the program had a strong positive impact for males and a zero impact for females. The PW

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<sup>18</sup> Estimates were calculated within each stratum (where each judet is a strata) and weighted so that they would be representative of the 1999 population.

<sup>19</sup> Impact regressions include the following covariates: male; age indicators; education indicators; 1998 experience (and its square); unemployed at least six months in 1998; length of unemployment during 1998 (and its square); only employed during 1998; received training during 1998; 1998 judet unemployment rate; and regional and judet indicators.

<sup>20</sup> Future research will explore differences in differences-in-differences impact estimates. We suspect that the later result could be sensitive to controlling for baseline earnings.

**Table 5**  
**IMPACTS ON ALMPs**  
**(Percentage points except where noted)**

Outcomes	TRAINING AND RETRAINING		SMALL BUSINESS CONSULTANCY AND ASSISTANCE		PUBLIC WORKS COMMUNITY JOB CREATION		EMPLOYMENT AND RELOCATION	
	Difference of Means	Standard errors	Difference of Means	Standard errors	Difference of Means	Standard errors	Difference of Means	Standard errors
<b>IN THE LAST TWO YEARS</b>								
Employed	14**	06	7**	3	0	3	8***	3
Number of jobs held	0.2*	0.1	0.1*	0.05	0	0.05	0	0.09
Length of unemployment (months)	-3.5**	1.5	-0.9	0.6	2.1***	0.56	-1.5***	0.6
Registered with the Public Employment Services	-4	3	-4	2	3	2	-3**	2
<b>CURRENT EXPERIENCE</b>								
Working in an enterprise or self-employed	11	7	4	3	-4	3	8***	3
Working in an enterprise	14*	0.07	3	3	-3	3	9***	3
Self-employed	-4***	1	0	2	0	1	0	1
Monthly earnings (includes self-employed income)	149	164	126**	88	-109*	59	184**	90
Unemployed	-7	6	-3	0.03	11***	3	-5***	0.03
Length of unemployment (months)	-2.7	2.2	-0.3	1.0	-1.8*	1.0	-1.3	0.83
Receiving UI benefits	1	3	-4**	2	19***	3	-4**	2
Has received UI benefits in the current unemployment spell	-12**	6	-3	3	11***	3	-7***	2

\* Estimate significantly different from zero at the 90% confidence level, two-tailed test

\*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test

\*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

**Table 6**  
**IMPACTS ON ALMPs**  
**(Percentage points except where noted)**

Outcomes	TRAINING AND RETRAINING		SMALL BUSINESS CONSULTANCY AND ASSISTANCE		PUBLIC WORKS COMMUNITY JOB CREATION		EMPLOYMENT AND RELOCATION	
	Difference of Means	Regression Adjusted	Difference of Means	Regression Adjusted	Difference of Means	Regression Adjusted	Difference of Means	Regression Adjusted
<b>IN THE LAST TWO YEARS</b>								
Employed	14**	12**	7**	9***	0	0	8***	7***
Number of jobs held	0.2*	0.2**	0.1*	0.1*	0	0	0	0
Length of unemployment (months)	-3.5**	-3.2*	-0.9	-1.4	2.1***	1.7***	-1.5***	-1.7***
Registered with the Public Employment Services	-4	-4	-4	-3	3	3	-3**	-5***
<b>CURRENT EXPERIENCE</b>								
Working in an enterprise or self-employed	11	10*	4	6*	-4	-2	8***	7***
Working in an enterprise	14*	13**	3	5*	-3	-2	9***	8***
Self-employed	-4***	-4***	0	0	0	0	0	0
Monthly earnings (includes self-employed income)	149	189	126**	165**	-109*	-74	184**	191**
Unemployed	-7	-7	-3	-5	11***	8**	-5***	-7***
Length of unemployment (months)	-2.7	-2.5	-0.3	-1	-1.8*	-3***	-1.3	-1.4*
Receiving UI benefits	1	3	-4**	-5**	19***	19***	-4**	-5***
Has received UI benefits in the current unemployment spell	-12**	-12**	-3	-5**	11***	9***	-7***	-8***

\* Estimate significantly different from zero at the 90% confidence level, two-tailed test

\*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test

\*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

**Table 7**  
**SUBGROUP PROGRAM IMPACTS**  
**(BY PROGRAM)**  
**LIKELIHOOD OF CURRENT EMPLOYMENT**

SUBGROUP	TRAINING AND RETRAINING	SMALL BUSINESS CONSULTANCY AND ASSISTANCE	PUBLIC WORKS COMMUNITY JOB CREATION	EMPLOYMENT AND RELOCATION
Gender -				
Male	0%	1%	-3%	11% ***
Female	17% **	8% *	-3%	3%
Age -				
Less than 38 years old	21% ***	0%	-7% *	10% **
38-45 years old	-0%	12% **	-4%	10% **
More than 45 years old	NA <sup>21</sup>	3%	8% *	3%
Education -				
Primary school	NA	-14% **	7%	0%
Secondary/vocational	NA	9% *	-5%	8% *
High school	NA	7%	-4%	12% ***
University	NA	7%	-15%	0%

\*\*\*Indicates coefficient is significantly different from zero at the .01 level

\*\*Indicates coefficient is significantly different from zero at the .05 level.

\*Indicates coefficient is significantly different from zero at the .10 level.

program, on the other hand had a similar insignificant impact for both males and females.

A review of the remaining subgroups indicates some interesting results. For example, the PW program had no overall impact, but a negative impact for those less than 38 years old and a positive impact for those older than 45 years old. These results, therefore, suggest that, while the PW program had no overall impact on employment, it may be more suitable for older participants.

On the other hand, the ER program may be more suitable for young males. That is, the subgroup analysis indicates that the ER program had a strong positive impact for males and a strong positive impact for participants who are 45 and younger. There was no impact for those who are older than 45 years old.<sup>22</sup>

<sup>21</sup> Sample size was insufficient to estimate these subgroup impacts.

<sup>22</sup> Further research will examine heterogeneity with respect to the propensity of a treatment. A positive correlation between the propensity of a treatment and the treatment effect would indicate that the criteria for assignment are correct.

## b. Sensitivity Analysis

The fundamental problem of an evaluator is to choose the right estimator. The decision should be based on available data and the design of the programs. In this study, we have based the analysis on the conditional independence assumption, according to which the data provide information on all factors affecting selection as well as the outcome. This is a strong assumption and cannot be tested directly.

One way to test the plausibility of identifying assumption, or at least the robustness of the results, is to apply various estimators to the same problem to see whether the results differ. We compared the results obtained by matching to some alternative estimators. Tables 8 through 11 present impact estimates for the effect of the ALMPs on various employment outcomes and earnings in Romania using six alternative estimators. The first set of results is gross impact estimates, which were not adjusted for observable differences between the participant and non-participants. The second set of results is net impact estimates, which were adjusted for demographic observable differences using multivariate ordinary least squares regression. The third set of results are net impact estimates which were adjusted for demographic and regional differences using multivariate ordinary least squares regression. The fourth set of results are net impact estimates which were adjusted for demographic and regional differences, and employment, unemployment and training experiences in 1998 using multivariate ordinary least squares regression.<sup>23</sup> The fifth and sixth set of results are the estimators presented in section IV (Tables 5 and 6)—that is, the net impact estimates that were computed as simple differences between the mean outcome of interest for the participant group and the mean outcome for a non-experimentally matched comparison group selected by the propensity score method described in section III. And IV., and the regression-adjusted program impact estimates using the non-experimentally matched comparison group.<sup>24</sup>

The most obvious overall result in Table 8 through 11 is that the unadjusted impact estimates (column 1) are generally different from the regression-adjusted results (columns 2 through 4). For TR, SB and ER, the unadjusted impact estimates were better than the regression-adjusted ones, suggesting that operators may “cream off” the most qualified candidates among the unemployed for training and retraining courses. This finding is consistent with other analysis of ALMP in transition economies (O’Leary, 1997 and Benus).

In contrast, adjusting for observable characteristics reduces the detrimental employment and unemployment impact estimates on Public Works Community Job Creation (Table 10). The largest change between the unadjusted estimates (column 1)

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<sup>23</sup> The demographic characteristics are: male, age, education, and 1998 experience (and its square). The regional characteristics are indicators for the judet and region of residence in 1998, and the judet unemployment rate in 1998. The 1998 employment, unemployment, and training experiences are: and indicator of whether individual was unemployed at least six months; length of unemployment during 1998 (and its square); employment status; received training.

<sup>24</sup> Future research will calculate estimates using Heckman two-stage model.

and the regression-adjusted estimates (columns 2 through 4) occurs when we control for regional differences between participants and non-participants, suggesting that programs like public works may be used as a regional policy by “bringing work to the workers”, i.e., creating job in high unemployment regions.

Overall, the results reported in tables 8 through 11 show that, in this specific case, OLS and probit on the one hand, and matching on the other produce fairly similar estimates of the average treatment effects on the treated. This is not very surprising since identification is based on the same assumption and set of covariates.

## VII. Conclusion

In this study, we analyzed the net impacts of four Romanian ALMPs:

- Training and Retraining (TR)
- Small Business Consultancy and Assistance (SB)
- Public Works Community Job Creation (PW)
- Employment and Relocation (ER)

To measure the net impacts of these programs, we used a rigorous quasi-experimental evaluation technique. Specifically, we selected a representative sample of program participants and non-participants from 15 judets throughout Romania. We interviewed members of these two groups, completing a total of 3,999 interviews (2,050 participants and 1,949 non-participants). Using the propensity score matching technique, for each of the four ALMPs, we identified matched participant and comparison samples. Data from these matched samples were then used to derive program impact estimates.

Our analysis of program impacts revealed that three of the four programs (TR, SB and ER) had success in improving participants' economic outcomes. Specifically, we found that these three programs increased the likelihood of participants' employment over the past two years as well as current employment (employment at the time of the survey). The three programs also reduced the likelihood of receiving Unemployment Benefits at the time of the survey. Two of the programs (SB and ER) also succeeded in raising participants' monthly earnings.

The results for the PW program were somewhat surprising -- the program had no impact on employment or earnings and the program reduced the length of the current unemployment spell. It should be noted, that these results for the PW program are more positive than previous impact estimates for public works programs.<sup>25</sup> This positive result may reflect on

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<sup>25</sup> See, for example, Benus (1998, 2001) or O'Leary (1998). The negative effects of Public Works found in other studies of ALMP in transition economies are usually explained by one or a combination of the following two explanations: First, participating in PW may be ineffective insofar as it does not rebuild human capital, boost search efforts or improve the image of the long-term unemployed individual. Second, participation in PW is a negative signal to the employer (Lehmann, 1995).

the Romanian PW program or it may reflect on the improved statistical procedures (propensity score matching technique) that we used in identifying a comparison group. In particular, much may be explained by the fact that, in contrast with other studies, we used information on the duration of unemployment prior to the beginning of the LRP as well as information on whether individuals received training prior to the beginning of the LRP to match PW participants to non-participants.<sup>26</sup> Individuals participating in Public Works tend to be the most disadvantaged unemployed workers—i.e., less educated and younger workers with less work experience and with a long-history of unemployment. Furthermore, they live in areas with high unemployment—the average 1998 unemployment rate is: 15.8%. Thus, by matching individuals participating in PW with individuals with similar baseline employment and unemployment experiences, we are estimating impacts using a comparison group that at baseline closely resembles PW participants and we reduce the size of bias towards the "population" impact estimate.

Our findings also suggest that there was considerable sample selection in three of the four programs. In the case of Training and Retraining and Small Business Consultancy and Assistance, we found evidence that the most qualified unemployed participated in those programs. This may be explained by operators consciously targeting those individuals with a comparative advantage for the different ALMP programs, or individuals self-selecting into the different programs. In contrast, we found evidence that the long-term unemployed tend to participate in Public Works Community Job Creation. The presence of sample selection highlights the importance of using econometric methods to correct for sample selection. However, key to reducing the sample selection bias is to have observable characteristics directly related with those unobservable characteristics that explain participation in the different ALMP programs—e.g., duration of unemployment prior to the beginning of the LRP.

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<sup>26</sup> In addition to duration of unemployment and training experience before the beginning of the LRP, we also used demographic and regional characteristics to match participants to non-participants.

**Table 8**  
**IMPACTS ON TRAINING AND RETRAINING**  
**(Percentage points except where noted)**

Outcomes	PARTICIPANTS VS. NON-PARTICIPANTS				PARTICIPANTS VS. MATCHED NON-PARTICIPANTS	
	Difference of Means	Regression Adjusted		Difference of Means	Regression Adjusted	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>IN THE LAST TWO YEARS</b>						
Employed	19***	18***	15***	12**	14**	12**
Number of jobs held	0.3***	0.3***	0.2***	0.2**	0.2*	0.2**
Length of unemployment (months)	-3.5***	-4.5***	-4.7***	-4.2***	-3.5**	-3.2*
Registered with the Public Employment Services	-12***	-12***	-12***	-11***	-4	-4
<b>CURRENT EXPERIENCE</b>						
Working in an enterprise or self-employed	20***	18***	15***	13**	11	10*
Working in an enterprise	24***	22***	18***	16***	14*	13**
Self-employed	-5***	-4***	-4***	-4***	-4***	-4***
Monthly earnings (includes self-employed income)	285***	273**	134	152	149	189
Unemployed	-9*	-12**	-9*	-8	-7	-7
Length of unemployment (months)	-1.5	-2.8*	-1.9	-2.0	-2.7	-2.5
Receiving UI benefits	-5	-5	-4	-1	1	3
Has received UI benefits in the current unemployment spell	-13***	-17***	-14**	-12**	-12**	-12**

NOTE: Columns 1 and 5 are the unadjusted results. Column 2 adjusts for demographic differences. Column 3 adjusts for demographic and regional differences. Columns 4 and 6 adjust for demographic, regional differences, and employment, unemployment and training experiences in 1998.

\* Estimate significantly different from zero at the 90% confidence level, two-tailed test

\*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test

\*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

**Table 9**  
**IMPACTS ON SMALL BUSINESS CONSULTANCY AND ASSISTANCE**  
**(Percentage points except where noted)**

	PARTICIPANTS VS. NON-PARTICIPANTS			PARTICIPANTS VS. MATCHED NON-PARTICIPANTS		
	Difference of Means	Regression Adjusted		Difference of Means	Regression Adjusted	
Outcomes	(1)	(2)	(3)	(4)	(5)	(6)
<b>IN THE LAST TWO YEARS</b>						
Employed	13***	10***	9***	9***	7**	9***
Number of jobs held	0.2***	0.1***	0.1***	0.1***	0.1*	0.1*
Length of unemployment (months)	-1.8***	-1.6***	-1.6***	-1.4**	-0.9	-1.4
Registered with the Public Employment Services	-3	-3	-7***	-6**	-4	-3
<b>CURRENT EXPERIENCE</b>						
Working in an enterprise or self-employed	11***	7***	6**	5*	4	6*
Working in an enterprise	8***	5*	5	4	3	5*
Self-employed	3**	2*	1	1	0	0
Monthly earnings (includes self-employed income)	259***	160**	181**	208**	126**	165**
Unemployed	-8***	-7***	-4	-3	-3	-5
Length of unemployment (months)	-1.5**	-1.6*	-1.2	-1.6	-0.3	-1
Receiving UI benefits	-6***	-6***	7***	-6***	-4**	-5**
Has received UI benefits in the current unemployment spell	-6***	-6**	-5*	-4	-3	-5**

NOTE: Columns 1 and 5 are the unadjusted results. Column 2 adjusts for demographic differences. Column 3 adjusts for demographic and regional differences. Columns 4 and 6 adjust for demographic, regional differences, and employment, unemployment and training experiences in 1998.

\* Estimate significantly different from zero at the 90% confidence level, two-tailed test

\*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test

\*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

Table 10

**IMPACTS ON PUBLIC WORKS COMMUNITY JOB CREATION  
(Percentage points except where noted)**

	PARTICIPANTS VS. NON-PARTICIPANTS				PARTICIPANTS VS. MATCHED NON-PARTICIPANTS	
	Difference of Means	Regression Adjusted			Difference of Means	Regression Adjusted
Outcomes	(1)	(2)	(3)	(4)	(5)	(6)
<b>IN THE LAST TWO YEARS</b>						
Employed	-2	-5**	0	1	0	0
Number of jobs held	0	0.1	0	0	0	0
Length of unemployment (months)	4.0***	3.2***	2.6***	2.4***	2.1***	1.7***
Registered with the Public Employment Services	2	1	2	4*	3	3
<b>CURRENT EXPERIENCE</b>						
Working in an enterprise or self-employed	-10***	-11***	-5*	-5*	-4	-2
Working in an enterprise	-8***	-8***	-3	-2	-3	-2
Self-employed	-2*	-3***	-2*	2**	0	0
Monthly earnings (includes self-employed income)	-300***	-328***	-186***	-161***	-109*	-74
Unemployed	27**	20***	12***	12***	11***	8**
Length of unemployment (months)	3.8***	2.5***	-1.0	-1.9**	-1.8*	-3***
Receiving UI benefits	21***	19***	18***	20***	19***	19***
Has received UI benefits in the current unemployment spell	22***	18***	12***	12***	11***	9***

NOTE: Columns 1 and 5 are the unadjusted results. Column 2 adjusts for demographic differences. Column 3 adjusts for demographic and regional differences. Columns 4 and 6 adjust for demographic, regional differences, and employment, unemployment and training experiences in 1998.

\* Estimate significantly different from zero at the 90% confidence level, two-tailed test

\*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test

\*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

**Table 11**

**IMPACTS ON EMPLOYMENT AND RELOCATION  
(Percentage points except where noted)**

	PARTICIPANTS VS. NON-PARTICIPANTS				PARTICIPANTS VS. MATCHED NON-PARTICIPANTS	
	Difference of Means	Regression Adjusted			Difference of Means	Regression Adjusted
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Outcomes</b>						
<b>IN THE LAST TWO YEARS</b>						
Employed	9***	12***	8***	8***	8***	7***
Number of jobs held	0.12***	0.15***	0.08***	0.09**	0	0
Length of unemployment (months)	-2.6***	-2.9***	-2.6***	-2.3***	-1.5***	-1.7***
Registered with the Public Employment Services	-7***	-7***	-8***	-7***	-3**	-5***
<b>CURRENT EXPERIENCE</b>						
Working in an enterprise or self-employed	11***	13***	9***	8***	8***	7***
Working in an enterprise	13***	14***	10***	10***	9***	8***
Self-employed	-2***	-2**	-1*	-2*	0	0
Monthly earnings (includes self-employed income)	246***	309***	206***	224***	184**	191**
Unemployed	-11***	-11***	-7***	-6***	-5***	-7***
Length of unemployment (months)	-2.5***	-2.7***	-0.9*	-1.6***	-1.3	-1.4*
Receiving UI benefits	-8***	-8***	-6***	-4***	-4**	-5***
Has received UI benefits in the current unemployment spell	-11***	-12***	-8***	-8***	-7***	-8***

NOTE: Columns 1 and 5 are the unadjusted results. Column 2 adjusts for demographic differences. Column 3 adjusts for demographic and regional differences. Columns 4 and 6 adjust for demographic, regional differences, and employment, unemployment and training experiences in 1998.

- \* Estimate significantly different from zero at the 90% confidence level, two-tailed test
- \*\* Estimate significantly different from zero at the 95% confidence level, two-tailed test
- \*\*\* Estimate significantly different from zero at the 99% confidence level, two-tailed test

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## APPENDIX

### I. Utilization of ALMPs

As indicated in Table A.1, among these four ALMPs, there were 767 contracts completed as of September 1, 2001; these 767 contracts served over sixty-four thousand clients. The overall placement rate among these contracts was 20% (12,623 placed / 64,360 clients).<sup>27</sup> The program with the largest number of clients (Employment and Relocation Services) provided assistance to 31,679 individuals at an average cost of only US\$12 per client. In contrast, the Public Service Employment program served a much smaller number of clients (9,496); the cost per client for this program was US\$294.

**Table A.1**  
**SUMMARY STATISTICS**  
**Completed Active Labor Measure Contracts**  
**As of September 1, 2001**

ALMP	# Contracts	Clients Served	Clients Placed	Total Cost (US\$)	Cost per Client (US\$)	Cost per Placement (US\$)
Employment/Relocation Services	88	31,679	6,610	\$ 394,641	\$ 12.46	\$ 59.70
Training/Retraining Services	54	2,892	1,197	\$ 157,529	\$ 55.68	\$ 131.60
Public Service Employment	533	9,496	1,248	\$ 2,787,427	\$ 293.54	\$ 2,233.52
Small Business Assistance	92	20,293	3,568	\$ 366,000	\$ 18.04	\$ 102.58
<b>TOTALS</b>	<b>767</b>	<b>64,360</b>	<b>12,623</b>	<b>\$ 3,705,597</b>	<b>\$ 57.58</b>	<b>\$ 293.56</b>

Source: US DOL Technical Assistance Support Team

### II. Site Selection

Based on administrative data from the National Agency for Employment and Vocational Training (ANOFM), there 425 contracts began in 1999. The distribution of these 425 contracts across all judets is presented in Table A.2

As seen in Table A.2, Employment and Relocation Services was the largest program in

<sup>27</sup> In total, through September 1, 2001, the LRP has implemented over one thousand contracts, served over seventy-two thousand clients, placed over thirteen thousand clients and spent over seven million US\$.

**Table A.2**  
**ACTIVE LABOR MEASURE CONTRACTS**  
**1999**

	<b>Training and Retraining</b>		<b>Small Business Consultancy and Assistance</b>		<b>Public Works Community Job Creation</b>		<b>Employment and Relocation</b>		<b>TOTAL</b>	
	<i>contracts</i>	<i>clients</i>	<i>contracts</i>	<i>clients</i>	<i>contracts</i>	<i>clients</i>	<i>contracts</i>	<i>clients</i>	<i>contracts</i>	<i>clients</i>
<b>Sibiu</b>	4	184	4	2035	3	95	8	4089	19	6403
<b>Hunedoara</b>			2	260	120	1874	1	383	123	2517
<b>Neamt</b>					3	42	2	1276	5	1318
<b>Cluj</b>					1	25	1	1284	2	1309
<b>Bacau</b>	1	35	2	825	5	113			8	973
<b>Suceava</b>					25	587	1	200	26	787
<b>Alba</b>					6	211	2	550	8	761
<b>Vaslui</b>					43	731			43	731
<b>Gorj</b>	2	63	3	600					5	663
<b>Botosani</b>					37	660			37	660
<b>Maramures</b>			1	300	16	348			17	648
<b>Dolj</b>	2	60	1	60	3	91	1	400	7	611
<b>Buzau</b>					15	266	1	250	16	516
<b>Caras-Severin</b>					23	510			23	510
<b>Giurgiu</b>	1	19			2	57	1	400	4	476
<b>Timis</b>					3	30	1	345	4	375
<b>Dimbovita</b>			1	119	2	50	1	156	4	325
<b>Vilcea</b>			1	123	10	166			11	289
<b>Vrancea</b>					1	16	1	268	2	284
<b>Covasna</b>			2	62	9	102	1	100	12	264
<b>Iasi</b>			1	170	2	60	1	25	4	255
<b>Harghita</b>			3	71	4	70	2	60	9	201
<b>Calarasi</b>			1	162					1	162
<b>Bihor</b>	1	40			5	118			6	158
<b>Arges</b>			2	140					2	140
<b>Bistrita</b>					5	108			5	108
<b>Salaj</b>			1	106					1	106
<b>Teleorman</b>			1	60	2	40			3	100
<b>Brasov</b>	1	18			2	35	1	20	4	73
<b>Constanta</b>					3	56			3	56
<b>Prahova</b>					3	56			3	56
<b>Braila</b>			1	48					1	48
<b>Satu-Mare</b>					3	33			3	33
<b>Ialomita</b>							2	32	2	32
<b>Mehedinti</b>					1	26			1	26
<b>Tulcea</b>					1	23			1	23
<b>TOTAL</b>	<b>12</b>	<b>419</b>	<b>27</b>	<b>5,141</b>	<b>358</b>	<b>6,599</b>	<b>28</b>	<b>9,838</b>	<b>425</b>	<b>21,997</b>

1999 with 9,838 clients served. Public Works and Small Business programs were slightly smaller with 6,599 and 5,141 clients, respectively. Training and Retraining Services was, by far, the smallest of the four programs with only 419 clients served during this period.

An analysis of the distribution of the clients served in 1999 by judet, indicates that 86% of all clients were in the largest 15 judets (i.e., the judets with the largest number of clients). Furthermore, an analysis of the economies of these 15 judets indicates that they represent a broad spectrum of the Romanian economy with many sectors represented, including heavy industry, mining, agriculture and other sectors. These 15 judets included some of the poorest judets in Romania (Botosani and Vaslui -- north-east region) as well as some judets with substantial natural resources and highly developed industries (Cluj and Maramures -- north-west region).

An indication of the diversity in economic conditions in our sample is indicated in Table A.3, where we present the unemployment rates for the 15 judets in 1999. The unemployment rate ranges from a low of 8.7 percent in Dolj to a high of 18.7 percent in Hunedora. Dolj is benefiting from the recent arrival of manufacturing firms like Daewoo Automobile (South Korea). In contrast, Hunedora is experiencing severe economic difficulties due to huge losses and restructuring in the mining sector.

### **III. Participant Sample Selection**

To obtain a representative sample of ALMP participants, we randomly selected 10% of clients served by each of the four ALMPs in these judets. Because of the low number of participants in the Training and Retraining Services program, we used a higher sampling rate (25% of clients served) for this ALMP. The higher selection rate for this program will improve the accuracy of our impact estimates. Using these sampling rates, the resulting evaluation sample includes 2,050 participants. This participant sample size is similar to sample sizes used in ALMP impact evaluations in other countries in the region.

In summary, our proposed sampling procedure involves the following steps:

- (1) Select all contracts begun in 1999;
- (2) Select 15 judets with the largest number of program participants;
- (3) Randomly select the required proportionate sample of participants from these judets.

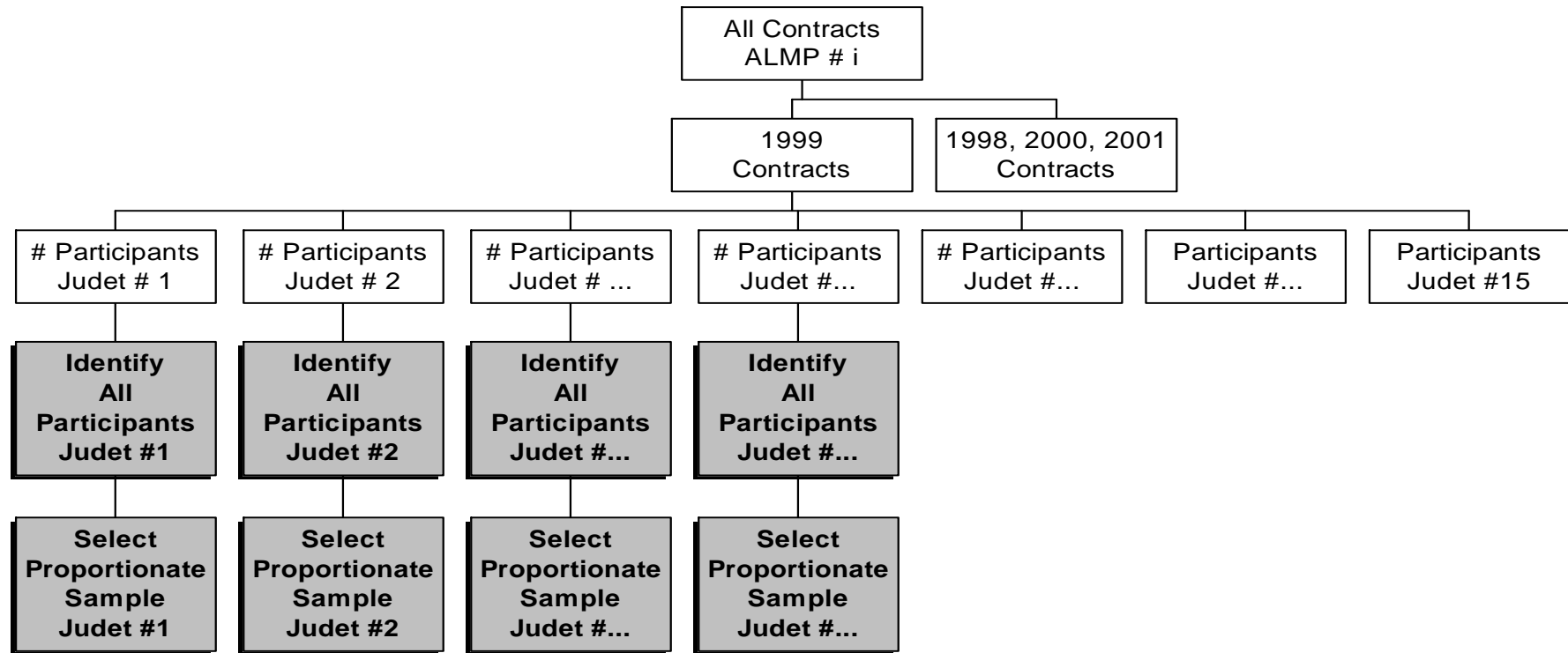
This procedure is depicted graphically in Exhibit 1. The resulting sample is then presented in Table A.4. As indicated in Table A.4, the total number of participants in our sample is 2,050. The largest group comes from the Employment and Relocation program with 951 participants. By far, the smallest group comes from the Training and Retraining program with only 97 participants. There is also a wide range between the largest and smallest judet with 759 participants in Sibiu and only 12 participants in Giurgiu. Only two judets (Sibiu and Dolj) implemented all four of the ALMPs; the other judets implemented a subset of these four ALMPs.

**Table A.3**  
**UNEMPLOYMENT RATES**  
**(PERCENT)**  
**1999**

<b>REGION</b>	<b>JUDET</b>	<b>%</b>
<b>NORTH-EAST</b>	Bacau	<b>10.7</b>
	Botosani	<b>16.7</b>
	Neamt	<b>16.3</b>
	Suceava	<b>13.7</b>
	Vaslui	<b>18.0</b>
<b>NORTH-WEST</b>	Cluj	<b>10.4</b>
	Maramures	<b>8.8</b>
<b>CENTER</b>	Alba	<b>12.7</b>
	Sibiu	<b>10.8</b>
<b>SOUTH-EAST</b>	Giurgiu	<b>7.4</b>
	Buzau	<b>12.6</b>
<b>SOUTH-WEST</b>	Dolj	<b>8.7</b>
	Gorj	<b>13.0</b>
	Hunedora	<b>18.7</b>
<b>ROMANIA</b>		<b>11.5</b>

Exhibit 1

**PARTICIPANT SAMPLE  
Selection Procedure  
(for each ALMP)**



**TABLE A.4**  
**PARTICIPANT SAMPLE<sup>28</sup>**

	<b>TRAINING AND RETRAINING</b>	<b>SMALL BUSINESS CONSULTANCY AND ASSISTANCE</b>	<b>PUBLIC WORKS COMMUNITY JOB CREATION</b>	<b>EMPLOYMENT AND RELOCATION</b>	<b>TOTAL</b>
Sibiu	38	236*	11	474	<b>759</b>
Hunedoara		28	204	42	<b>274</b>
Neamt			3	140	<b>143</b>
Cluj			3	140	<b>143</b>
Bacau	12	79	13		<b>104</b>
Suceava			65	22	<b>87</b>
Alba			23	60	<b>83</b>
Vaslui			78		<b>78</b>
Gorj	21	64		44	<b>129</b>
Botosani			72		<b>72</b>
Maramures		33	38		<b>71</b>
Dolj	20	7	10	44	<b>81</b>
Buzau			29	27	<b>56</b>
Giurgiu	6		6		<b>12</b>
<b>TOTAL</b>	<b>97</b>	<b>447</b>	<b>555</b>	<b>951</b>	<b>2,050</b>

\* In Sibiu, initially 2,035 persons applied for small business and consultancy assistance services. However, only 485 persons actually received this assistance. Because we did not learn about this until later, we interviewed 45% of all assisted persons, instead of the 10 % sampling rate in the other strata.

<sup>28</sup> In selecting the sample, we eliminated one judet (Caras-Severin) since it was relatively small and provided clients only in the Public Works program.

#### **IV. Non-Participant Sample Selection**

Following the selection of the participant sample as described above, we selected approximately an equal number of non-participants in each judet. Thus, the total sample exceeds 4,100 (2,050 participants and 2,062 non-participants). This total sample size is similar to the evaluation samples used in the net impact evaluation of ALMPs in Hungary (O'Leary, 1998), Bosnia and Herzegovina, Turkey and the Czech Republic (Benus, et. al, 1998, 2001). Our overall approach for selecting a comparison group was to use the same register list that was used in the participant selection process. Specifically, for each of the four ALMPs, we first determined the number of participants that were selected for the participant sample in each of the judets. Next, in each judet, we selected an equal number of non-participants who registered at the Employment Bureaus during 1999.<sup>29</sup>

#### **V. Survey Response Rates**

IMAS interviewers conducted the field surveys during January-February 2002. As a result of extraordinary efforts by these interviewers, the study goal of over 4,100 respondents was achieved in a relatively short time. The result of the survey effort is presented in Table A.5. As seen in the table, the evaluation sample is divided nearly equally between participant (2,095) and non-participants (1,949). The overall survey response rate was 70 percent, a good outcome for a survey under difficult implementation conditions.

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<sup>29</sup> The specific procedure for selecting non-participants was as follows: (1) we randomly selected 70% of the required number of non-participants, (2) we selected the remaining 30% of the non-participants to match the demographic characteristics of the participants sample.

**Table A.5**

**RESPONSE RATE ANALYSIS**

	<b>Participants</b>	<b>Non-Participants</b>
Completed	72.3 %	67.1 %
Wrong Address	2.6 %	3.9 %
Moved Away	9.8 %	1.4 %
Respondent Abroad	2.3 %	3.4 %
Not at Home	9.6 %	9.2 %
Refused/Busy	1.9 %	2.1 %
Other	1.5 %	3.0 %
<b>COMPLETED INTERVIEWS</b>	<b>2,050</b>	<b>1,949</b>