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HEALTH-RELATED EFFECTS OF WELFARE TO-WORK POLICIES

Authors: *Luis Ayala*¹
Universidad Rey Juan Carlos
*Magdalena Rodríguez*²
Instituto de Estudios Fiscales

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- (1) Corresponding author. Facultad de Ciencias Jurídicas y Sociales,
Universidad Rey Juan Carlos, Paseo Artilleros s/n, 28032 Madrid,
SPAIN, luis.ayala@urjc.es (phone: +34914959248 fax: +34915532796)
- (2) Instituto de Estudios Fiscales, Cardenal Herrera Oria, 378, 28035
Madrid, SPAIN, magdalena.rodriguez@ief.meh.es



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ABSTRACT

In this paper we evaluate the effects of welfare-to-work programs on physical and mental health status and a variety of lifestyles. We test whether participation in work-related activities yields better results in terms of health outcomes than more general measures aimed at promoting life-skills. The paper is based on data from the minimum income program of Madrid's Government (IMI). We match the program's administrative records –covering the whole history of the program– with a specific survey of former recipients who took part in different activities. Our results show that both health status –including physical and mental health problems– and behaviors outcomes were modestly better for those individuals who had taken part in work-related activities.

Keywords: welfare-to-work, health outcomes, health behaviors, propensity score matching.

INTRODUCTION¹

Non-health related policies may have consequences for health that are equally or more important than the outcomes they were originally designed to produce. The World Health Organization launched the Health Impact Assessment approach aiming at considering the potential health effects of a policy, program or project on a population, particularly on vulnerable or disadvantaged groups. In the European Union, the public health movement Health in All Policies has given rise to a new paradigm requiring new methodologies to measure ‘health impact assessment’. This impact may be especially important in the case of income support policies. Health outcomes and health behaviors have become important themes in the broader public discourse about welfare reform. In most OECD countries, antipoverty programs have been redesigned with the aim of achieving better results in terms of work, personal responsibility, and economic self-sufficiency. As a result, raising the employability of recipients has become a key issue.

This strategy faces major challenges, as poor physical or mental health diminishes the labor market prospects of a significant proportion of welfare recipients. Health problems may not only affect the likelihood of employment but may also constrain recipients to successfully participate in work-related activities embedded in these programs. A growing literature documents the prevalence of physical, mental and behavioral health problems among welfare recipients [Bjorklund (1985), Kovess *et al.* (1999), Danziger *et al.* (2000), Coiro (2001), Cawley and Danziger (2005), Meara and Frank (2006)]. Researchers have consistently documented that physical health problems and psychological distress disorders may interfere with work goals in these programs. There is also evidence that shows that these mental- and physical-health related characteristics co-occur with human capital problems (Danziger, Kalil and Anderson, 2000). The difference is that whereas low education and job skills are obvious drawbacks in a competitive labor market, less tangible individual factors raise more subtle problems for employment and training interventions (Jayakody *et al.*, 2000). Physical and behavioral health problems may restrict recipients’ ability to effectively participate in these programs and may also affect non-economic aspects of recipients’ social performance.

The evidence on the other side of the issue is much more limited. It can be argued that strategies moving people from dependence on welfare to self-sufficiency may also generate relevant health-related effects. In addition to direct effects on health insurance, welfare-to-work programs may impact households’ economic resources, time constraints, and levels of stress. By fostering transitions from welfare to work these policies may affect both lifestyles and health status although it is not clear in which direction. This impact is an open question that has fueled some recent research but results are still inconclusive. There are primarily two domains of literature in this area. The first concerns the impact of welfare programs on health insurance. This issue is especially crucial in countries where health insurance coverage is not universal. A large literature looked at the impact of welfare reform on health insurance in the U.S [Borjas (2003), Bitler *et al.* (2005), DeLeire (2006), Kaestner and Kaushal (2003)]. In general terms, the measured impacts were relatively small. The second area explores the relationship between welfare-to-work programs and a variety of health outcomes with a dominant role of assessment related to psychological distress. Evidence on this issue is beginning to emerge, and the results of different studies suggest that welfare-to-work programs can have significant effects on health outcomes (See Bitler and Hoynes, 2008, and Blank, 2009, for a review).

Our paper focuses on the second strand of this literature. There are still some key issues that remain open questions which the paper attempts to address. First, very few studies provide information on the effects of welfare-to-work programs both on health status and health behaviors. In this paper we evaluate the effects of a specific program on physical and mental health status and a variety of lifestyles. Second, few papers have specifically focused on work-related program participation. The mere fact of participation in work-related activities –even if recipients do not successfully find a job–

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may have positive benefits. Second, we compare the health effects of participation in activities promoting labor-skills with those of general life-skills programs. Third, although previous work has provided evidence on European countries (Huber *et al.*, 2009), to date the bulk of the research literature on health effects of welfare-to-work participation has almost exclusively focused on North America. This paper is based on data from the minimum income program of Madrid's Government (IMI). The Spanish model is an interesting case of welfare reform and universal health systems in the comparative context. A pioneering model of welfare-to-work was put into action some years before employment-targeted reforms were implemented in most OECD countries and transitions from employment to unemployment are rather larger than in other countries.

The main goal is testing whether participation in work-related activities yields better results in terms of health outcomes than more general measures aimed at promoting life-skills. While it seems clear that the likelihood of moving recipients to employment is higher in the former programs, the evidence is less clear about health effects. We match the program's administrative records –covering the whole history of the program– with a specific survey of former recipients who took part in different activities (2,300 households). This survey covers a variety of dimensions of the households' economic well-being –including health status and behaviors– some years after their participation in the program. We perform propensity score matching. Our results show that both health status –including physical and mental health problems– and behaviors outcomes were better for those individuals who had taken part in work-related activities.

The structure of the paper is as follows. The following section reviews some of the pathways through which welfare-to-work programs may affect health status and behaviors. The second section introduces the program and the data used in the empirical part. The third section presents the estimation strategy. Empirical results are discussed in the fourth section. The paper ends with a brief list of conclusions.

1. HEALTH EFFECTS OF WELFARE-TO-WORK POLICIES: A REVIEW

1.1. Background

There are likely many pathways through which welfare-to-work programs can affect health, and theory is ambiguous on the potential effects of participation on health status and behaviors. Since health is a durable capital stock that will change slowly with investment and health services are investment goods consumed each period, it can be expected that a somewhat immediate impact on health insurance could take place, while it may take months or years for welfare reform to impact on health status (Bitler *et al.*, 2008). A key issue, therefore, is the extent to which welfare-to-work participation can produce substantial changes in lifestyles. As stressed by Cawley and Ruhm (2011), in industrialized countries where morbidity and mortality are primarily related to chronic rather than infectious diseases, health behaviors are particularly important as determinants of health.

Health investment decisions can be largely affected by changes in income. Insofar as welfare-to-work programs aim at alleviating recipients' financial problems, these policies should improve health. An enormous literature has grown about the positive gradient between socioeconomic status (SES) and health (See Cutler *et al.*, 2008, and Currie, 2009, for recent reviews). Among the different theories underlying the relationship between SES and health, one outstanding hypothesis for examining this interaction is that of poverty or relative deprivation. The poverty hypothesis refers to the disadvantages experienced by people living in poverty and may especially mirror some of the difficulties faced by welfare recipients. Over their life cycle, some low-income households face enormous threats to health and well-being as a result of the combined disadvantages related to poverty and negative health behaviors. A natural caveat is, however, the problem of reverse causation. Poorer health is likely to reduce earning opportunities and another large literature has established that poor health reduces income and wealth. In terms of welfare policies, it seems clear that since welfare is a last resort for recipients, those who turn to it for support are likely to be in poorer health than those who do not.

Despite this caveat, there is little doubt that the receipt of income may alleviate the extent of structural health problems. There is evidence in many countries, for instance, that cardiovascular diseases are

especially sensitive to income effects (Middelkoop *et al.*, 2000). Living in low-income households leads to psycho-social stress, which compromises bodily functions, including the immune system. Participation, therefore, in welfare-to-work programs –by raising recipients’ income– may cause better access to care, a greater ability to afford a healthy lifestyle, less risk from the environment and better nutrition.

A possible direct link between changes in SES and health induced by work-related activities is the impact of transitions from welfare to paid job. While the effect from more income is clear –generally improves health– that of employment is more controversial. From the early eighties the question of what are the effects of unemployment on family life has attracted great attention (Fagin and Little, 1984). Clark and Oswald (1994) found that jobless people had approximately twice the mean mental distress of those with jobs. Theodossiou (1998) also found that unemployed individuals have significantly higher odds of experiencing a marked rise in anxiety, depression and loss of confidence and a reduction in self-esteem and the level of general happiness even compared with individuals in low-paid employment. Focusing only on mental health, Bjorklund (1985) and Mayer and Roy (1991) reached a similar conclusion. A very relevant result for the analysis of welfare-to-work programs is that the duration of unemployment –not only the occurrence– negatively affects mental health (Bjorklund, 1985). A key question may be the role of occupations in this relationship. Llana-Nozal *et al.* (2004) look at whether the effect of work choices on mental health differs across occupations finding that the higher the skill level of the occupation, the better the mental health. Morefield *et al.* (2011) suggest that blue-collar employees have a greater likelihood of transitioning from very good to bad health but with no difference in the relative probability that they move from bad to very good health.

Other pathways suggested also relate to the transition into paid employment. Reform-induced increases in employment may lead to changes in a parent’s time endowment which in turn can affect choices about health care utilization, diet, and health (Haider *et al.*, 2003). Paid employment also increases an individual’s ability to contribute to the household’s financial well-being, enhancing sense of accomplishment and self-esteem (O’Campo and Rojas-Smith, 1998). Depression, high stress levels, low self-esteem and lack of motivation have been found to be associated with less participation in job activities (Montoya *et al.*, 2002). Insofar as work-related activities can remove some of these barriers, positive psychological effects from these activities could be expected. Gottschalk (2005) also finds that work leads welfare recipients to be more optimistic about their abilities.

There is no guarantee, however, that moving from welfare to work always yields these positive benefits. On the one hand, empirical work with panel data for some countries has shown that the event of unemployment might not matter as such for the level of health status (Böckerman and Ilmakunnas, 2009). Second, recipients who move to jobs characterized by low wages, low substantive complexity or routinization –the type of jobs that welfare recipients usually have access to– may have poorer psychological health (Elliot, 1996). The stressors associated with this type of jobs may outweigh the aforementioned benefits. Transitions from welfare to the working poor may involve additional threats. Employment in jobs with inconvenient schedules or providing limited personal satisfaction may lead to greater psychological distress.

There is also evidence suggesting that access to paid jobs is not enough to overcome structural problems related to welfare participation. Kulis (1988), for instance, found that recipients may continue to experience high levels of psychological distress even after securing employment. People who were also on welfare in their childhood may have worse chronic conditions than those from higher income households. Evidence suggests that these adverse health effects accumulate over children’s lives (Case *et al.*, 2002). In these cases, participation in work-related activities may have only a very limited impact on health outcomes. Previous work has provided evidence that regular health-promoting behaviors may work better in low-income households than low-wage jobs (Cheng, 2007, and Yoo *et al.*, 2010). Moreover, given the link between economic hardship and psychological and physical health problems, welfare-to-work programs will only produce positive health effects under substantial reductions of material hardship. While some authors have found that ex-recipients experience higher levels of hardship than welfare recipients (Edin and Lein, 1997, Danziger *et al.*, 2002), others conclude that material circumstances of single mother families improved modestly after welfare reform in the U.S. (Winship and Jencks, 2004, Meyer and Sullivan, 2008).

1.2. Empirical evidence

Despite the policy implications of potential health outcomes of welfare-to-work programs, not too many papers have paid particular attention to this issue. The bulk of the literature has focused almost exclusively on the U.S. experience (See Grogger and Karoly, 2005, Bitler and Hoynes, 2008, and Blank, 2009, for a review). Given that the core of welfare recipients in the U.S. is women with children, most studies look at women's health care utilization and children's health, especially prenatal care and birth outcomes. An advantage of focusing on children is also that they are less susceptible to reverse causation concerns. As stated by Knab *et al.* (2008), before welfare reform was enacted there were serious fears that increased work requirements and stronger child support enforcement might increase maternal stress, leading to increases in mental health problems.

There is a body of results that suggest that the introduction of welfare-to-work programs has had small, mixed and often insignificant impacts on health. Most studies find only small reductions in health care utilization (Currie and Grogger, 2002, Kaestner and Lee, 2005, Bitler *et al.*, 2005). The evidence on the effects of welfare reform on the utilization of health services by children is somewhat mixed, with an equal number of unfavorable and favorable impacts of reform on health (Grogger and Karoly, 2005, Bitler *et al.*, 2008). Looking at changes in welfare caseloads, Kaestner and Tarlov (2007) found little evidence on the effects on health, obesity and mental health. Their results also show few statistically significant results on health behaviors. Only the likelihood of less binge drinking seemed somewhat positively affected by reductions in welfare caseloads resulting from more restrictive policies. Regarding drug abuse, Corman *et al.* (2010) found that welfare reform led to declines in illicit drug use and increases in drug treatment among women at risk for relying on welfare.

There are, however, other studies that find more negative effects. Time limits imposed to push welfare recipients into the labor market as soon as possible may have contributed to a deterioration of infant health. Kaplan *et al.* (2005) found that welfare recipients' health outcomes—including hypertension, obesity, and cholesterol—were worse after welfare reform. Leonard and Mas (2008) find some evidence that the population of mothers affected by time limits were less likely to seek prenatal care, suggesting a possible role for reduced medical care in explaining the deterioration in infant health. Knab *et al.* (2008) results show that stricter requirements in welfare policies lead to increases in stress-related behaviors, depression, and ultimately to poorer overall health. Haider *et al.* (2003) found that breastfeeding would have been 5.5 percent higher in the absence of welfare reform.

A substantial part of this literature has focused on mental health problems. Boothroyd and Olufokunbi (2001) compared the status of current welfare recipients with those who have transitioned away from welfare considering both general and mental health. Their results show that current recipients who have not found a job report significantly poorer health and mental health status than individuals who left the program. Danziger *et al.* (2001) also found that having worked reduces the probability of being at risk of depression of former welfare recipients despite the poor quality of jobs. Jayakody *et al.* (2000) try to disentangle the simultaneous causal pathways by which mental and behavioral health problems both influence and reflect adverse family circumstances and poor economic outcomes. Substance use and prior mental health problems may trigger prolonged welfare receipt whereas welfare dependence can stimulate depressive symptoms and substance use. Their results show that prolonged welfare dependence and poverty aggravate existing substance use and mental health problems. At the same time, individuals who enter welfare with existing substance use and mental health problems are likely to have prolonged spells.

The empirical research on the impact of European welfare-to-work programs on health status and behaviors is very limited. Although a number of studies analyze how health problems diminish the labor market prospects of a significant proportion of welfare recipients (Ayala and Rodriguez, 2006, Capellari and Jenkins, 2009, Hansen, 2009) there has been little research on the reverse effect. Huber *et al.* (2009) offer the most comprehensive analysis for Germany. They examine whether finding work or participating in welfare-to-work programs can come with additional benefits in terms of improved health. Their results show that whereas employment increases mental health the effects of participation in welfare-to-work programs are ambiguous and statistically insignificant.

There is, therefore, a need for research that provides a more complete picture of how participation in welfare-to-work programs affects a more varied set of health outcomes. An examination of the relative

effectiveness of work-related activities as compared to more general life-skills measures can yield important insights into the underlying effects on health of the new generation of welfare programs.

2. DATA

2.1. The IMI program

The program analyzed is the Madrid Regional Government's Welfare Program (IMI), which was set up in 1990. This welfare scheme is designed for individuals who have exhausted their rights to unemployment benefits. Social Assistance in Spain is completely decentralized and general risk of poverty is covered by regional schemes. The Madrid program can be considered an 'average' program within the complex set of regional schemes existing in Spain and Southern Europe. As in other European systems, all households are entitled to IMI access if they have used up entitlement to other income maintenance programs.

Among the different institutional features of the program, the 'insertion activities' represent the most prominent trait in a comparative framework². Once benefits are approved by the program's managers, recipients must sign an 'insertion contract' with the welfare agencies. Participation in these contracts is mandatory while recipients receive benefits. Initially, they are intended to improve the recipients' self-sufficiency through an individualized design of activities adjusted both to individual and households' characteristics. The idea of co-responsibility is at the heart of the program. Individual assessment is conducted when recipients enter the program and social services support is provided to help these households to address specific challenges. The contents of the contracts are negotiated by both sides resulting in a final plan of specific public intervention for each household.

Every recipient has to join a specific program. A broad classification of the activities can be made by breaking down the existing activities into two categories. The first set of activities includes overall actions developed to guarantee the basic preconditions of social participation (life-skills). They consist of a variety of services comprising such different topics as general life-skills, family mediation, children's schooling and activities aimed at making it easier for some families to continue their daily routines or helping recipients recognize their strengths. These actions also include specific medical assistance that may be relevant for understanding possible health effects.

A second set of activities specifically aim at improving recipients' employment opportunities (labor-skills). There are, first, various general services designed to improve the recipients' labor market opportunities including training and job assistance. Second, there are specific actions trying to push recipients into the labor market as soon as possible, including social enterprises and subsidized employment. The common purpose of these actions is the achievement of basic labor skills and the establishment of a friendly work environment as necessary first steps in the transition to competitive employment. Social enterprises are relatively similar to some of the experiences embedded in the U.S. paid work experience programs. Usually, they are conducted by government agencies and non-profit organizations. These entities work with a variety of targeted populations, including long-term unemployed.

2.2. Data

In this study, we match the program's administrative records –covering the whole history of the program from the second half of 1990– with a specific survey conducted in 2001. This survey covers very different dimensions –including health outcomes– of the households' economic well-being some years after their participation in the program. Administrative records provide very detailed information on the recipients' characteristics at the moment of welfare participation. The IMI survey allows us to assess the possible effects of having taken part in the different activities on a variety of measures of economic well-being.

Administrative records comprise over 50,000 spells in the program corresponding to 39,200 households, 8,500 of which had left the program at some stage and then re-entered it at least once.

² "Insertion programs" is the general term used in these countries to summarize the different types of activities aimed at improving life and labor skills of welfare participants. In general terms, "insertion" means higher levels of social participation.



Recipients' characteristics include some of the variables highlighted as ideal for analyzing welfare populations, such as the existence of structural problems (social isolation, alcohol abuse and drug addiction) or the development of behavior associated with marginal situations (prostitution or begging). The survey of IMI recipients was conducted by Madrid's Government in 2001 on a sample of recipients including very detailed information on both participation in subprograms during their time in IMI and different dimensions of the current economic situation. The sample size is about 2,300 households, obtained by stratified random sampling from the program's administrative records. The population of ex-welfare recipients was divided into four strata and a simple random sample was selected from each stratum³.

The survey contains detailed information on participation in the different 'insertion' activities included in the IMI program. There is also information on different dimensions of economic well-being, such as employment, subjective economic well-being, material hardship, social difficulties and health outcomes and behaviors. We use the latter dimensions to evaluate the outcomes of the program⁴. Some data on socioeconomic characteristics such as age, gender, household type, marital status, educational attainment and labor status are also collected in the dataset.

A descriptive analysis of the IMI using administrative records data allows us to have a preliminary assessment of the characteristics and the incidence of personal problems among recipients including health problems. Table 1 differentiates between the households that completed a spell in the program at some time between 1990 and 2001 and the households that were receiving benefits when data gathering was underway. Almost fifty thousand spells are available, which are divided into the approximately 42,000 observations that correspond to already closed claimant files and 7,500 ongoing participants.

Table 1
SOCIO-ECONOMIC CHARACTERISTICS OF IMI RECIPIENTS (frequency distribution)

	Completed spells	Ongoing spells
AGE		
<26	6,7	11,4
26-35	30,9	29,5
36-45	28,7	26,5
46-55	18,0	19,6
56-65	15,7	12,9
GENDER		
Males	40,3	34,2
Females	59,7	65,6
HOUSEHOLD SIZE		
1 person	25,8	33,4
2 people	20,6	21,1
3 people	20,2	18,6
4 people	15,5	12,1
5 people	8,9	7,6
6 people	4,7	3,9
7 people	2,2	1,9
8 or more people	2,0	1,3
HOUSEHOLD TYPE		
Single person	25,8	33,4
Single-parent household	31,6	37,6
Other households with children	20,1	12,0
Other households without children	22,5	17,0

(It continues)

³ The survey was conducted using as initial universe those households that had been in the program at a given moment in the previous decade. Therefore, the sample may include both households who are still in the programs and leavers.

⁴ We use the survey data to identify treatments and outcomes. Socioeconomic information from administrative records of these households is used to estimate the probability of taking part in a given treatment..

(Continuation)

	Completed spells	Ongoing spells
EDUCATION		
Does not read or write	10,3	13,6
No academic qualifications (only reads and writes)	20,6	21,6
Primary Education	36,7	35,5
Middle School Education	18,1	15,8
Secondary Education	6,6	6,6
Level 1 Vocational Training	2,9	2,3
Level 2 Vocational Training	1,7	1,4
University Degree	1,3	1,3
Post-Graduate Degree	1,5	1,8
LABOR FORCE STATUS		
Employed	18.0	13.5
Unemployed	59.1	69.0
Inactive	22.9	17.5
EMPLOYABILITY		
Totally unfit for normal work	9,6	8,0
Needs process of social / health recuperation	23,8	37,3
Unemployed needing training / education	21,1	25,4
Could access employment now	32,4	21,3
Does work on hidden economy or equivalent activity	8,3	7,0
Does normal work or equivalent activity	4,8	1,1
SOCIAL PROBLEMS¹		
Drug abuse	5,0	6,0
Alcohol abuse	4,8	4,7
Other mental health problems	8,8	10,9
Other physical health problems	14,9	18,1
Non-payment of dwelling, eviction	6,3	7,0
Debt accumulation, non-payment	9,7	9,4
Beggary	0,8	1,2
Prostitution	0,4	0,7
Social isolation	10,8	15,9
Ethnic minority	11,7	23,2

1 The categories appearing in social problems are non-excluding dummy variables. A household can therefore suffer from more than one problem. The figures show percentages of recipients affected by each problem.

The data on age show a larger presence of middle-aged individuals among households' heads (Table 1). Concerning the differences between completed and ongoing spells the lower proportion of young people and the greater presence of individuals over 55 in the former stand out. This is due to the transfer of recipients to the national non-contributory pension scheme at the age of 65. Frequencies of recipients' gender suggest that the program has been increasingly used by women, who represent almost two-thirds of current spells and around 60 percent of completed spells. Regarding household size and type, small households stand out in general. People living alone make up a third of total households and have gained in relative weight over time. The presence of single-parent households is also striking, accounting for almost 40 percent of all cases. While the percentage of single-parent households is common to other European countries, the high figures of people living alone are a differentiating feature of the program being analyzed.

A final set of variables provides information on different social problems. Five types of social problems stand out among IMI recipients. The first is related to health problems, be they general health problems or those derived from the consumption of drugs and alcohol, as well as from mental illnesses. Results show the prevalence of physical and mental health problems among welfare recipients especially in ongoing spells. Another group constitutes social pathologies arising from

insolvency in situations of debt, including non-payment for dwellings. A third problem involves belonging to an ethnic minority⁵. There is also a large percentage of recipients suffering from severe mental health problems that limit their chances of becoming economically self-sufficient. A final problem is the development of behaviour associated with social alienation, such as begging or prostitution, although this group is rather small.

Survey data include more detailed information on health outcomes and behaviours. These variables are used as outcomes in our evaluation strategy. First, there is specific information on general physical and health outcomes. Households were asked if anyone in the household had severe physical or mental health problems. Second, the IMI survey also gives information on the relative importance of some key health behaviours. Among the different options, we have chosen some of the most important behaviors that may affect health: drug addiction, alcoholism and gambling addiction. While health behaviors such as drinking or smoking may respond to short-term changes in employment and income circumstances and have been already studied (Kaestner and Tarlov, 2007), research on the other two issues is sparse.

Although a number of studies have investigated the relationship between welfare and drug use, most, however, have explored the extent to which illicit drug use affects welfare participation rather than how welfare affects drug use. Corman *et al.* (2010) use economic theory to explore the effects of welfare reform in drug use: welfare reform would decrease the demand for drugs if the opportunity cost of the recipients' time increases as a result of employment, if income decreases and drugs are normal, through increased sanctions, and/or if drugs become more distasteful when recipients join the labor market. Their results show that welfare reform led to declines in illicit drug use.

The evidence on the effects of welfare reform on gambling is still less well explored although gambling can be a precipitating factor in numerous health problems. The increased stress and anxiety faced by those experiencing gambling related difficulties, or failing to take care of one's needs while gambling –such as eating properly, taking needed medication, or taking breaks from play to do other activities– may all be contributors. Problem gamblers often experience liver, lung, and heart disease, poor nutrition, physical pain, depression and anxiety, and sleep disorders [Korn and Shaffer (1999), Burge *et al.* (2004), Desai *et al.* (2004)].

Table 2
PREVALENCE OF HEALTH PROBLEMS AND BEHAVIORS

	Participants in work-related activities			Participants in life-skills activities		
	N	Mean	Std	N	Mean	Std
Physical health problems	1023	0,2600	0,4389	793	0,3190	0,4664
Mental health problems	1031	0,1018	0,3026	794	0,1083	0,3110
Alcoholism	1032	0,0262	0,1597	797	0,0402	0,1964
Drug addiction	1031	0,0242	0,1539	796	0,0327	0,1779
Gambling addiction	1021	0,0039	0,0625	781	0,0102	0,1008
Health problems & behaviors	1034	0,3617	0,4807	799	0,4130	0,4927

Table 2 gives general support to the notion that the prevalence of health problems and “bad” behaviors is high among welfare recipients. The incidence of these problems can be succinctly summarized by a variable that takes the value of 1 if participants have at least either a health problem or a “bad” health behavior. Having physical and mental health problems, or being dependant on alcohol, drugs or gambling, may hamper the ability to be employed for a high proportion of participants. More than one third of the participants have some kind of health problems.

Physical health problems stand out. The upper panel of Table 2 shows that one out of every four participants in work-related activities has a physical health problem. The proportion is somewhat higher for participants in life-skills activities (32%). Despite the fact that our measure is not strictly

⁵ Belonging to an ethnic minority is not a social problem in itself. It is regarded as such insofar as belonging to an ethnic minority limits a person's possibilities of social integration. Most individuals classified into this group are Gypsies.

comparable, the rate of mental health problems is lower than that found for welfare populations in the U.S. (Danziger *et al.*, 2000). Drug and alcohol dependence occurs in about 2.5% of the recipients whereas the prevalence of gambling addictions is rather low.

3. ESTIMATION STRATEGY

The key question in our evaluation approach is the extent to which participation in activities aimed at improving labor skills produces better health results than taking part in more general activities whose main goal is improving life skills. The IMI survey provides very detailed information on fourteen different treatments, including both actions aimed at upgrading life skills and work-related initiatives. We have aggregated these treatments into two different and mutually exclusive groups: non-participation in work-related activities (participation in life skills only) and participation in work-related activities. The latter include both general labor-oriented activities –access to specific employment offers, general job search assistance, and training– and labor-intensive sub-programs like subsidized employment and social enterprises.

The question concerning which the major health effects of each one of the two possible treatments are makes it necessary to choose a particular method of evaluation. We perform propensity score matching using administrative data to identify the probability of taking part in each treatment and the IMI survey to identify treatments and outcomes. The fundamental basis of matching evaluation is to re-establish experimental conditions when no such data are available. It is possible to build up a sample counterpart by pairing each participant with non-participant recipients. A necessary assumption is conditional independence between non-treated outcomes and program participation (Rubin, 1977).

We consider the results of participation in work-related activities as the treatment effect. The primary treatment effect we analyze is the expected treatment effect for the treated population:

$$\tau = E(Y_1 - Y_0 | D=1) = E(Y_1 | D=1) - E(Y_0 | D=1) \quad (1)$$

where Y_1 denotes the health outcome for individuals engaged in work-related activities, Y_0 denotes the outcome if these individuals were not exposed to the treatment, and $D_i \in \{0,1\}$ is an indicator of this participation.

To the extent that participation in activities aimed at improving labor skills is not completely random, a counterfactual is needed to estimate $E(Y_0 | D=1)$, the health outcome participants would have experienced on average had they participated only in life-skills activities. We can select from the non-participants a control group in which the distribution of observed variables is as similar as possible to the distribution in the participants group. This requires:

$$0 < Pr(D=1 | X=x) < 1 \quad \text{for } x \in \tilde{X} \quad (2)$$

and guarantees that all treated recipients have a counterpart in the non-treated group.⁶ Rosenbaum and Rubin (1983) suggested the use of the probability of receiving treatment conditional on covariates (propensity score) to reduce the dimensionality of the matching problem. If the propensity score is known the average effect of treatment on the treated (ATT) can be estimated as:

$$\tau = E\{E\{Y_1 | D=1, p(X)\} - E\{Y_0 | D=0, p(X) | D=1\}\} \quad (3)$$

where $p(X)$ is the propensity score. To derive (3) from (1) requires an adequate balancing of pre-treatment variables. If this balancing hypothesis is satisfied observations with the same propensity score must have the same distribution of observable characteristics independently of treatment status. This means a random exposure to treatment and control, and treated units should be on average observationally identical.

As Dehejia and Wahba suggest (1999) propensity score methods can be more effective than parametric models in controlling observed differences in the evaluation of employment and training programs. Nevertheless, their drawbacks have also been outlined by different authors.⁷ It may be the

⁶ These assumptions have been widely justified in different studies. See Rubin (1977), Rosenbaum and Rubin (1983), Angrist *et al.* (1996), Smith (2000), Becker and Ichino (2002), and Frolich (2004).

⁷ See Blundell (2000), Imbens (2004), and Smith and Todd (2005).

case that the matching process leads to a considerable loss of observations and that the more detailed the information is, the harder it is to find a similar control.

In order to obtain the corresponding scores we estimated a probit model with the covariates predicting participation in work-related activities using the program's administrative data⁸:

$$Pr \{D=1 | X\} = \Phi \{h(X)\} \quad (4)$$

where $h(X)$ is a starting specification that includes all the covariates as linear terms. Different covariates were considered in the initial specification including household size, gender, age, the number of social problems, educational attainment, employability and single persons. All the covariates are pre-treatment. In order to test the sensitivity of our results to the specification of the propensity score we used alternative probit models (see Annex).

Data were sorted according to estimated propensity score, ranking from lowest to highest, in order to define a valid comparison group for treated individuals. The next step was to create subclasses with similar propensity scores. The subclasses (quintiles) were checked until balance was achieved. Different weighting procedures were selected to associate the set of non-treated observations with treated units. The results we present below have been obtained with nearest neighbor matching estimators without replacement. As stressed by Smith and Todd (2005), replacement reduces bias but in turn increases the variance of the estimator. The problem of matching without replacement is that estimates depend on the order in which observations get matched (Caliendo and Kopeinig, 2008). In our estimates ordering is randomly done. We carried out different sensitivity analyses with other estimators –including Abadie and Imbens (2011) bias-corrected matching estimator– finding that results remain reasonably robust (see Annex).

4. RESULTS

The key question in our evaluation approach is whether participation in work-related activities produces better results in terms of health outcomes than taking part in measures aimed at upgrading basic life-skills. Table 3 presents estimates of the effects of participation in work-related activities on health as compared to having taken part only in life-skills activities. We begin the discussion with the estimated effects on general health problems. The main outcomes considered are physical health problems –defined as having any kind of severe problems– and mental health problems. Regarding the former, participation in work-related activities seems to produce positive effects on health as compared to the effects of participation in life-skills sub-programs. We find that, to a high degree of statistical confidence, engaging welfare recipients in work-related activities yields a reduction of 5.5 percent in physical health problems. The evidence is, therefore, consistent with the hypothesis that participation in welfare-to-work programs improves health outcomes even if recipients do not move into more stable forms of employment.

Table 3
EFFECTS ON HEALTH OUTCOMES (ATT, nearest neighbor random draw)

Health behaviors	Participation in work-related activities (treated)	Participation in life-skills activities (controls)
<i>Physical health problems</i>	1038	749
N		-0.055**
ATT		(0.025) ¹
<i>Mental health problems</i>	1038	750
Average effect		-0.014 (0.018)
<i>Health problems & behaviors</i>	1038	754
Average effect		-0.059** (0.028)

1 Bootstrapped standard errors in brackets. *** Significant at 99%, **Significant at 95%, *Significant at 90%.

⁸ Survey data were used in some cases to reduce the number of missing values.

The next outcome we discuss is the extent to which participation in these work-related activities produces noticeable changes in mental health problems. The most common finding in this strand of the literature –mainly focused on the U.S.– is that welfare reform reduced mental health problems among those recipients who left the programs and found a job. Our results show, however, that participation in work-related activities produces only modest positive effects. Although the coefficient is negative –showing a reduction of the incidence of mental health problems– the effect is not well defined. Our estimates, therefore, provide somewhat contrasting evidence with respect to the results from previous studies. This difference may be partly explained by the way the outcome variable is defined. The aggregate nature of our variable –having or not mental health problems in the household– may hinder specific differences in particular mental health indicators like depression, high stress levels, low self-esteem, loss of concentration, irritability, fatigue or anxiety. Anyway, our results are in keeping with some of the studies analyzing the effects of participation in welfare-to-work programs in other European countries (Huber *et al.*, 2009).

These two results show that participation in work-related activities seems to improve health outcomes, the effects being more visible in terms of physical than mental health. In order to provide a general assessment of the impact of these activities on health we have created an outcome variable comprising any kind of health problem including both physical and mental health difficulties and “bad” health behaviors. The average effect is positive and statistically significant. Participation in work oriented measures would result in a 6 percent reduction in overall health problems –including health outcomes and behaviors. A plausible case can be made, therefore, that health effects matter as outcomes of the program under study.

The results for health behaviors show modest positive effects of participation in work-related activities. This general outcome is somewhat different from those found in the U.S. Estimates of the association between changes in the welfare caseload caused by welfare policy and changes in health behaviors have found that U.S. welfare reform resulted in less binge drinking but does not appear to be related to other health behaviors, such as smoking, diet, and exercise (Kaestner and Tarlov, 2006). In our case, the prevalence of alcoholism falls by 1 percent when recipients are involved in any kind of work-related activities as compared to participation only in very general actions aimed at improving social participation (Table 4).

Although this effect is not significant raises some doubts regarding the relatively undefined effects for mental health. The major economic rationale for changes in drinking and other health behaviors revolves around assertions of improvements in mental health. However, we do not find significant changes in mental health outcomes. This can be due to the fact that participation in work-related activities can potentially affect alcoholism habits in several ways not always connected to substantial mental health progress. It must be noted again that the definition of mental health problems is very broad. As a matter of fact, the percentages of mental health problems among participants are somewhat larger than the incidence of “bad” health behaviors.

Table 4
EFFECTS ON HEALTH BEHAVIORS (ATT, nearest neighbor random draw)

Health behaviors	Participation in work-related activities (treated)	Participation in life-skills activities (controls)
Alcoholism	1038	753
Average effect		-0.010 (0.010) ¹
Drug addiction	1038	753
Average effect		-0.010 (0.009)
Gambling addiction	1038	753
Average effect		-0.012** (0.006)

1 Bootstrapped standard errors in brackets. *** Significant at 99%, **Significant at 95%, *Significant at 90%.

Results for drug addiction also show mixed evidence. The effect seems positive but it is small and not significant. This result is somewhat similar to those found in previous studies. Most previous empirical research on this issue has produced widely varying results and evidence is far less clear in this case than in other health behaviors. Only a handful of studies have examined the possible link of welfare-to-work participation and drug use. Recent results from Corman *et al.* (2010) show that welfare reform in the U.S. has led to declines in illicit drug use and increases in drug treatment among women at risk of relying on welfare. However, the limited number of studies on this relationship makes further research necessary, thus remaining an open question. In a certain sense, the lack of concluding evidence may be related to the limited effects found in mental health problems. With all the limits implied by the variety of pathways for health behaviors to affect mental health, a significant change in drug abuse should be associated with likely changes in mental health. As stressed by Montoya *et al.* (2002), early drug use has been associated with increased depression in adulthood, illicit drug use has also been associated with self-medication for mental illness and drug use can exacerbate underlying mental health problems.

The last health behavior to discuss is gambling. As stated before, there is no prior evidence on the possible relationship between participation in welfare-to-work programs and gambling addiction. While it seems reasonable to expect a negative effect of gambling on employment due to a higher incidence of many psychological disorders and psychosocial concerns (Breyer *et al.*, 2009), there are no clear hypotheses supporting the opposite relationship. Insofar as reducing gambling addiction lowers stress and anxiety as well as encourages better health habits, positive health effects could be expected from moving recipients to friendly labor environments. But no clear hypotheses emerge regarding the direct effect of participation in these work-related activities. Nevertheless, our results show a positive and significant effect. Gambling addiction falls 1.2 points when compared to participation in very general life-skills activities. Therefore, participation in these activities aimed at improving labor skills seems to raise renewed capabilities for avoiding prior gambling behavior. However, the results should be taken cautiously since the prevalence of this behavior is rather small both in control and treated units.

A relevant question is whether the estimated effects are homogeneous across different types of households. Research findings for the U.S. suggest that the impacts of the new welfare-to-work programs vary across demographic groups (Bitler and Hoynes, 2008). Unfortunately, the size of our sample does not permit a very detailed analysis of this issue. In some outcomes, like gambling addiction, the rather low incidence of the problem makes it not possible to have reliable information. In other outcomes, however, there is evidence suggesting that the effects may differ among the different types of households.

If disaggregated data are used a more mixed picture emerges (Table 5). There is not a very clear pattern of the effects of participation in work-related activities on health outcomes and behaviors. Couples with children appear in terms of health outcomes less responsive to participation in these programs than other types of households. Participation in work-related activities seems especially positive in terms of the composite measure of health outcomes and behaviors for people living alone. There is also a sizeable effect on physical health problems in the case of single parent families whereas participation in work-related activities seems to be more effective to reduce “bad” health behaviors in single person households. The reduction of drug addiction in the latter households especially stands out. To the extent that marginal behaviors have usually been shown to have a higher prevalence among single persons, it seems that welfare-to-work strategies may have especially positive effects in these households. However, there are also some results showing relatively bad effects for single-parents and couples with no children.

Table 5
EFFECTS ON HEALTH OUTCOMES AND BEHAVIORS FOR TYPES OF HOUSEHOLD (ATT, nearest neighbor random draw)

Health Outcomes and Behaviors	Single parents		Couples with children		Couples, no children		Single person	
	Participation in work-related activities n=292	Participation in life-skills activities n=139	Participation in work-related activities n=169	Participation in life-skills activities n=77	Participation in work-related activities n=180	Participation in life-skills activities n=87	Participation in work-related activities n=209	Participation in life-skills activities n=109
<i>Physical health problems</i>	-0.037** (0.049) ¹		0.044 (0.072)		0.085* (0.068)		-0.181** (0.065)	
Average effect	n=292	n=139	n=169	n=77	n=180	n=87	n=209	n=109
<i>Mental health problems</i>	0.030 (0.030)		0.001 (0.048)		-0.033 (0.068)		0.010 (0.043)	
Average effect	n=292	n=141	n=169	n=77	n=180	n=88	n=209	n=106
<i>Health problems & behaviors</i>	-0.046 (0.049)		0.072 (0.073)		-0.025 (0.067)		-0.110* (0.088)	
Average effect	n=292	n=141	n=169	n=77	n=180	n=88	n=209	n=109
<i>Alcoholism</i>	0.017** (0.008)		0.006 (0.018)		0.023 (0.025)		-0.017 (0.041)	
Average effect	n=292	n=141	n=169	n=77	n=180	n=88	n=209	n=109
<i>Drug addiction</i>	0.007 (0.015)		0.018 (0.037)		0.041* (0.028)		-0.030** (0.025)	
Average effect	n=292	n=141	n=169	n=77	n=180	n=87	n=209	n=109

¹ Bootstrapped standard errors in brackets.

*** Significant at 99%, **Significant at 95%, *Significant at 90%.

5. CONCLUSIONS

The past decade has witnessed an intense debate over the best strategies for moving people from welfare to work. The employment effects of welfare-to-work programs have been extensively studied in recent years. These policies, however, may also have very relevant consequences for health. While there is substantial empirical evidence showing that health problems may interfere with work goals in these programs the evidence on the other side of the issue is much more limited. Although these strategies may generate relevant health-related effects, results are still inconclusive.

In this paper we have focused on the minimum income program of Madrid's Government (IMI) to test whether participation in work-related activities embedded in these new strategies yield better results in terms of health outcomes and behaviors than more general measures aimed at promoting life-skills. Propensity score matching estimates suggest that participation in work-related activities seems to have produced positive but modest effects on health as compared to the effects of participation in activities aimed at upgrading life-skills. Engaging recipients into different work-related activities may improve health outcomes even if recipients do not move into more stable forms of employment.

Results are more mixed when considering mental health outcomes. Our estimates do not show conclusive results in this dimension. The average effect is negative –showing, therefore, a reduction in this problem– but it is not well defined. This result partially differs from most U.S. empirical studies that find a lower incidence of mental health problems among welfare recipients who find a job. There is a substantial difference, however, in the nature of the treatment under study since we only focus on program participation –work-related vs. life-skill activities– regardless of the exits from the program into the labor market. Nevertheless, our results are relatively in keeping with the scarce empirical evidence for other European welfare-to-work programs.

Improvements in physical health outcomes are not the only positive consequences of participation in welfare-to-work programs. Our estimates also yield some significant effects on the prevalence of bad health behaviors. Alcoholism, drug abuse and gambling addiction seem to have a lower incidence after having taken part in the varied schemes aimed at improving labor-skills. Especially relevant are the impacts on binge drinking and gambling with small but significant effects.

With some caution, it must also be noted that the effects are somewhat heterogeneous across different types of households. When disaggregated data are used the pattern of the effects of participation in work-related activities is less clear. Health outcomes for couples with children appear less responsive to participation in these programs than those of other households. There are especially strong effects in the case of single person households. In these households, participation in work-related activities brings especially positive effects in terms of physical health outcomes and a sizeable reduction of “bad” health behaviors.

Our results, in short, offer critical support for the contention that welfare-to-work policies and the different actions focused on helping disadvantaged workers lacking basic job skills may have positive unintended health effects. Health problems may create barriers to work but welfare-to-work programs can yield positive health effects which may contribute to overcome those obstacles. This sequence –these policies improve health and health improvements may enhance employability– should be considered in any overall assessment of welfare-to-work strategies. A better understanding of the effects of these new welfare policies on health may be helpful for an adequate design of the programs.

ANNEX: Matching method details

Propensity Score. As stated in the text, our estimates rely on matching procedures to get a sample of controls and treated units. Following the standard theory of matching estimators, we assume that assignment to treatment is independent of the outcomes, conditional on the covariates, and that the probability of assignment is bounded away from zero and one (Imbens, 2004). This assumes that conditioning on observable covariates (X), the outcomes of the non-treated are independent of the participation status. We can select from the non-participants a control group in which the distribution of observed variables is as similar as possible to the distribution in the participants group.

The limitation for matching is that it relies on a sufficiently rich comparison group. As the number of observable covariates increases, there are growing problems for finding exact matches for each of the treated units. Rosenbaum and Rubin (1983) suggested the use of the probability of receiving treatment conditional on covariates (propensity score) to reduce the dimensionality of the matching problem. A necessary condition is an adequate balancing of pre-treatment variables (Becker and Ichino, 2002). We use propensity score matching to evaluate health outcomes and behaviors related to participation in ‘welfare-to-work’ programs. First, we fit a probit using covariates predicting participation in these activities to produce the propensity score. We used administrative records and the survey to get a large number of background characteristics. Different covariates were used including those usually considered in the standard framework of the health production function. Control variables include household size, living in single-person households, gender, age, education, employability and the number of social problems (Table A.1). All these variables are pre-treatment covariates. We used the same source of data for participants and nonparticipants to identify the units that enrolled in the program and those that did not, estimating the probability that each individual enrolls in the program based on individual baseline characteristics observed in the survey, restricting the sample to units for which common support appears in the propensity score distribution. The final model to obtain participation probabilities was defined taken into account that covariates should be balanced (Heckman *et al.*, 1998). In order to test the sensitivity of our results to this specification a number of alternative models were also considered (Dehejia and Wahba, 1999, 2002).

We examined the sensitivity of the estimated treatment effects introducing some changes in the propensity score specification. More precisely, the abovementioned basic model was extended to take into account higher-order terms and interactions between covariates (Dehejia 2005). Results of the probability models are shown in Table A.2. In general terms the set of variables used –covariates that determine participation– seems to predict reasonably well the probability of taking part in work-related activities.

Matching estimators. Different weighting procedures were selected for associating the set of non-treated observations with each participant in work-related activities. As reference we use a nearest-neighbor matching estimator which selects the comparison units such that:

$$|p_i - p_j| = \min_{k \in \{D=0\}} \{|p_i - p_k|\} \quad (\text{A.1})$$

A random and no replacement approach was considered. As stated by Smith and Todd (2005), replacement reduces bias but in turn increases the variance of the estimator. However, estimates resulting from matching without replacement may depend on the order in which observations get matched (Caliendo and Kopeinig, 2008). In our approach the matching protocol is random draw. In order to test the sensibility of our results to the chosen estimators we also used smoothed weighted matching estimators. More precisely, we used a kernel matching estimator given by:

$$\tau^K = \frac{1}{N^T} \sum_{i \in T} \left\{ Y_i^T - \frac{\sum_{j \in C} Y_j^C G\left(\frac{p_j - p_i}{h_n}\right)}{\sum_{k \in C} G\left(\frac{p_k - p_i}{h_n}\right)} \right\} \quad (\text{A.2})$$

where T denotes the set of treated units, C the set of control units, Y_i^T and Y_j^C are the observed outcomes of the treated and control units, respectively, $G(\cdot)$ is a kernel function, and h_n is a bandwidth parameter.

A problem with these matching estimators is that can be biased in finite samples when the matching is not exact. Abadie and Imbens (2011) propose an approach that leads to estimators with little remaining bias. They show that given a number of covariates the estimator will have a term corresponding to the matching discrepancies –difference in covariates between matched units and their matches. This bias-corrected matching estimator adjusts the differences within the matches for the differences in their covariate values. A substantial difference with the other estimators is that this one is based on direct matching without previous estimates of the propensity score. It also uses replacement weighting the observations by the number of times a unit is used as a match. It must be noted that using bias adjustment decreases the size of the estimated effect but increases the variance.

Tables A.3 shows the estimated average effects for a set of matching estimators. Column 2 presents the same estimates included in the previous tables since the nearest neighbor matching is the one used as reference. Columns 3 and 4 show the results for the direct nearest matching proposed by Abadie and Imbens (2011). We used two different estimators corresponding to the number of matches considered for each unit (1 and 2, respectively). The last column shows the estimated effects corresponding to the kernel approach using a normal density estimator. In general terms, the table gives general support to the notion that participation in work-related activities improves health outcomes and behaviors. The estimated effects are not particular sensitive to the matching estimator used. The sign of the effects is the same for most of the outcome variables and the values of the estimated effects do not drastically change. The most marked differences occur in the direct nearest-neighbor estimator when one match for each unit is chosen. The estimated effects are smaller and significance levels are lower. In general, our results are fairly close to the previous statement that using bias adjustment decreases the size and significance of the estimated levels.

Table A.4 helps to check the sensitivity both to the matching estimator as well as to the propensity score specification. While previous comments for differences between the different estimators still hold in this case, most of the effects are not significant. It seems that introducing interactions may help to improve the fit of the probit model but reduces the significance level of the estimated effects. Results must therefore be considered with caution.

Balancing properties. As aforementioned, estimates of the effects of welfare-to-work programs on health outcomes and behaviors using propensity score estimators are only reliable if the matching produces credible control groups. It is necessary to test that the estimated probabilities are successful in balancing values of matched treatment and comparison cases. Figure A.1 plots the different density distributions of the propensity score for the comparison under study. Overlap in compared propensity scores regions seems to ensure common support across treatment groups. Even though there are differences between the two densities the crucial issue of the overlap condition seems to hold. Other indicators of matching quality were also estimated. The reduction in the standardized bias suggested by Rosenbaum and Rubin (1985) was estimated for the different variables used to define treated and matched control subsamples. Results suggested an acceptable fit.

Standard errors. There are several approaches that have been considered for estimating standard errors. The approach we follow in our estimates is bootstrapping (Efron and Tibshirani, 1993, Horowitz, 2003). As stressed by Imbens and Wooldridge (2009), bootstrapping has been widely used in the treatment effects literature, as it is straightforward to implement. However, when there are a small number of matches the bootstrap may not be an effective method for obtaining standard errors. Nevertheless, bootstrapping estimators are asymptotically linear and will produce valid standard errors and confidence intervals (Imbens, 2004). We also use the Abadie and Imbens (2011) variance estimator that allows for heterokedasticity.

Table A.1
PROPENSITY SCORE PARTICIPATION MODEL

Variable description	Variable name	Participation Model 1	Participation Model 2
HOUSEHOLD SIZE (1 person, 2 - 4 people, 5 - 7 people, 8 or more people)	Hsize	Hsize	Hsize ³
SINGLE PERSON (Household type)	SP	SP	SP ²
GENDER (Males,Females)	Gender	Gender	
AGE (<26, 26-35,36-45,46-55,56-65)	Age	Age	Age
EDUCATION (Does not read or write, No academic qualifications (only reads and writes), Primary Education, Middle School Education, Secondary Education, Level 1 Vocational Training, Level 2 Vocational Training, University Degree, Post-Graduate Degree)	Edu	Edu	Edu x Age Edu x Gender
EMPLOYABILITY (Totally unfit for normal work, Needs process of social / health recuperation, Unemployed needing training / education, Could access employment now, Does work on hidden economy or equivalent activity, Does normal work or equivalent activity)	Employ	Employ	Employ ³ Employ x Gender Employ x Age
NUMBER OF SOCIAL PROBLEMS (Drug abuse, Alcohol abuse, Other mental health problems, Other physical health problems, Non-payment of dwelling, eviction, Debt accumulation, non-payment, Beggary, Prostitution, Social isolation, Ethnic minority)	Problems	Problems	Problems Problems x Age Problems x Edu

Table A.2
PROPENSITY SCORE MATCHING PROBIT MODELS OF PROGRAM PARTICIPATION

Participation Model 1			Participation Model 2		
Variable	Coefficient	Standard error	Variable	Coefficient	Standard error
Constant	.4797*	.3088	Constant	.9099***	.2352
Hsize	-.0403	.0761	Hsize	-.0050*	.0036
SP	.1209	.1279	SP	.1348*	.0981
Gender	.1057*	.0719			
Age	-.1960***	.0316	Age	-.4257***	.0754
Edu	.0170	.0358	Edu x Age	.0535***	.0200
			Edu x Gender	-.0554*	.0353
Employ	.0648**	.0369	Employ	-.0407***	.0067
			Employ x Gender	.1591***	.0490
			Employ x Age	.0734***	.0230
Problems	.0700**	.0398	Problems	.3401	.1681
			Problems x Age	-.0392	.0346
			Problems x Edu	-.0555*	.0371
Observations	1446			1446	

*** Significant at 99%, **Significant at 95%, *Significant at 90%.

Notes: The region of common support in Model 1 is [.35529761, .83070789].

The region of common support in Model 2 is [.15555575, .94310898].

Table A.3
ROBUSTNESS TEST PROPENSITY SCORE MODEL 1

Health Outcomes	Nearest Neighbor (random draw)	Direct nearest- neighbor (1)	Direct nearest- neighbor (2)	Normal Kernel
Physical health problems		1416	1416	
N Treated	1038			1038
N Controls	749			811
ATT	-0.055**	-0.025	-0.037	-0.063***
Std Err. ¹	(0.025)	(0.030)	(0.028)	(0.023)
Mental health problems		1425	1425	
N Treated	1038			1038
N Controls	750			811
ATT	-0.014	-0.002	-0.012	-0.011
Std Err.	(0.018)	(0.020)	(0.019)	(0.013)
Health problems & behaviors		1432	1432	
N Treated	1038			1038
N Controls	754			811
ATT	-0.059**	-0.041	-0.057**	-0.054**
Std Err.	(0.028)	(0.032)	(0.030)	(0.025)
Health Behaviors				
Alcoholism		1429	1429	
N Treated	1038			1038
N Controls	753			811
ATT	-0.010	-0.018	-0.020**	-0.013
Std Err.	(0.010)	(0.012)	(0.011)	(0.009)
Drug addiction		1427	1427	
N Treated	1038			1038
N Controls	753			811
ATT	-0.010	-0.016	-0.014	-0.008
Std Err.	(0.009)	(0.012)	(0.011)	(0.009)
Gambling addiction		1411	1411	
N Treated	1038			1038
N Controls	734			811
ATT	-0.012**	-0.006	-0.006	-0.005
Std Err.	(0.006)	(0.006)	(0.006)	(0.004)

1 Bootstrapped standard errors in brackets.

*** Significant at 99%, **Significant at 95%, *Significant at 90%.

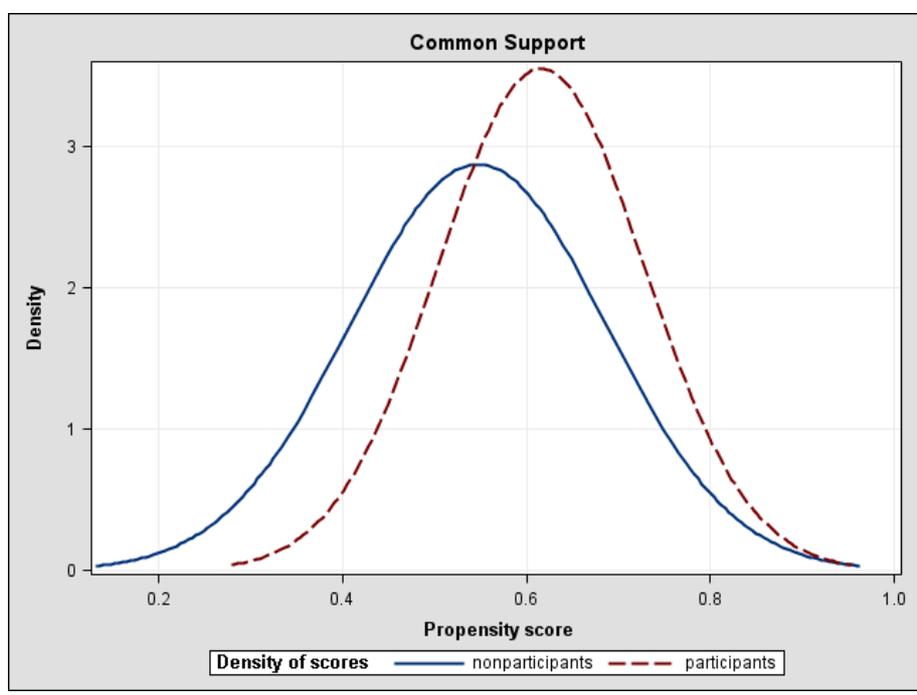
Table A.4
ROBUSTNESS TESTS PROPENSITY SCORE MODEL 2

Health Outcomes	Nearest Neighbor (random draw)	Direct nearest- neighbor (1)	Direct nearest- neighbor (2)	Normal Kernel
Physical health problems		1416	1416	
N Treated	1038			1038
N Controls	636			811
ATT	-0.003	-0.033	-0.036	-0.014
Std Err. ¹	(0.031)	(0.030)	(0.026)	(0.026)
Mental health problems		1425	1425	
N Treated	1038			1038
N Controls	638			811
ATT	0.018	0.009	-0.002	0.000
Std Err.	(0.025)	(0.020)	(0.017)	(0.015)
Health problems & behaviors		1432	1432	
N Treated	1038			1038
N Controls	642			811
ATT	-0.020	-0.038	-0.052**	-0.031
Std Err.	(0.035)	(0.032)	(0.028)	(0.023)
Health Behaviors				
Alcoholism		1429	1429	
N Treated	1038			1038
N Controls	640			811
ATT	-0.013	-0.014	-0.020*	-0.014
Std Err.	(0.013)	(0.012)	(0.011)	(0.009)
Drug addiction		1427	1427	
N Treated	1038			1038
N Controls	641			811
ATT	0.005	-0.009	-0.011	-0.006
Std Err.	(0.011)	(0.011)	(0.011)	(0.010)
Gambling addiction		1411	1411	
N Treated	1038			1038
N Controls	629			811
ATT	-0.005	-0.007	-0.012**	-0.002
Std Err.	(0.006)	(0.006)	(0.006)	(0.005)

1 Bootstrapped standard errors in brackets.

*** Significant at 99%, **Significant at 95%, *Significant at 90%.

Figure A.1
COMMON SUPPORT



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