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## Health-related Effects of Welfare-to-Work Policies

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## **Abstract**

Non-health related policies may have consequences for health that are more important than the outcomes they were originally designed to produce. In this paper we evaluate the effects of welfare-to-work programs (WTW) on physical and mental health status and a variety of health behaviors. The paper is based on data from the minimum income program of Madrid's Government (IMI). We match the program's administrative records (39,200 households) –covering the whole history of the program from the second half of 1990 to 2001– with a specific survey of former recipients who took part in different work-related activities conducted in 2001 (2,300 households). We perform propensity score matching to find 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. These results offer support for the contention that welfare-to-work policies may have positive unintended health effects.

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

## INTRODUCTION

Non-health related policies may have consequences for health that are equally or more important than the outcomes they were originally designed to produce. 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 may interfere with work goals in these programs [Bjorklund (1985), Kovess *et al.* (1999), Danziger *et al.* (2000), Meara and Frank (2006), Coiro (2008)].

The evidence on the other side of the issue is much more limited. 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 [Borjas (2003), Bitler *et al.* (2005), DeLeire (2006), Kaestner and Kaushal (2003)]. 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– may have positive benefits. 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 positive results in terms of health outcomes and lifestyles. 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). We perform propensity score matching to find that both health status –including physical and mental health problems– and behaviors outcomes are modestly 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 third section introduces the program and the data used in the empirical part. The fourth section presents the estimation strategy. Empirical results are discussed in the fifth section. The paper ends with a brief list of conclusions.

## **HEALTH EFFECTS OF WELFARE-TO-WORK POLICIES: A REVIEW**

### **Background**

There are likely many pathways through which welfare-to-work programs can affect health. However, theory is ambiguous on the potential effects of participation on health status and behaviors. Some of the most common approaches on the determinants of health provide very general guidelines for the setting of hypotheses and their testing. Nevertheless, it is not easy to draw from these approaches any very detailed hypothesis to be tested. In keeping with standard theories, possible income and employment effects anticipate that taking part in these programs might yield positive effects in terms of health outcomes. We might also expect behavioral changes in participants in these programs that reduce the risk of physical and mental health problems. These positive effects will largely depend however on the kind of activities they engage in. Employment improvements will also be limited by the type of jobs these individuals have access to.

Why welfare-to-work policies might have positive health effects is still a relatively open research question. Very general approaches, like the health production function may help to identify some of the general avenues through which these programs may affect health. Kenkel (1995) used the health production function framework to analyze the importance

of lifestyles on health. The stock of health is produced as a function of the production technology given by the various lifestyles, the stock of human capital and different socioeconomic variables that can have an influence on the productivity of gross investment, the stock of pre-existing health or the determining factors of the rate of depreciation. The inclusion of these factors responds to the fact that health is considered an essential resource including aspects of both consumption and capital. Bitler *et al.* (2008) used this differentiation to anticipate the effects of welfare reform on health. 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 of reform on health insurance could take place, while it may take months or years for welfare reform to impact on health status. A key issue, therefore, is the extent to which welfare-to-work participation can produce substantial changes in lifestyles.

Besides lifestyles, 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). 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 that of employment is more controversial. 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. Focusing only on mental health, Bjorklund (1985) and Mayer and Roy (1991) reached a similar conclusion.

A key question may be the role of occupations in this relationship. Llana-Nozal *et al.* (2004) found 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. 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. 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).

There is no guarantee, however, that moving from welfare to work might always yield positive benefits. 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). Empirical work with panel data for some countries has shown that the event of unemployment might not matter as such for health status (Böckerman and Ilmakunnas, 2009). Recipients who move to jobs characterized by low wages, low substantive complexity or routinization may have poorer psychological health (Elliot,

1996). There is also evidence suggesting that access to paid jobs is not enough to overcome structural problems related to welfare participation. Recipients may continue to experience high levels of psychological distress even after securing employment (Kulis, 1988). Evidence also suggests that adverse health effects accumulate over children's lives (Case *et al.*, 2002). Moreover, 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. (Meyer and Sullivan, 2008).

In short, while general approaches like the health production function or the SES gradient anticipate positive health effects of welfare-to-work programs there are some factors that can limit these relationships. This is the case of the characteristics of the potential jobs, the different types of activities participants engage in, or how the programs reduce the levels of material hardship. Therefore, the net effects on health of these programs remain an empirical question.

### **Empirical evidence**

The bulk of the literature on the potential health outcomes of welfare-to-work programs has focused almost exclusively on the U.S. (See Grogger and Karoly, 2005, Bitler and Hoynes, 2008, and Blank, 2009, for a review). 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 that they are less susceptible to reverse causation concerns.

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 (Currie and Grogger, 2002, Kaestner and Lee, 2005, Bitler and Hoynes, 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 and Hoynes, 2008). Looking at changes in welfare caseloads, Kaestner and Tarlov (2007) found little evidence on the effects on health, obesity, mental health and health behaviors. Only the likelihood of less binge drinking seemed somewhat positively affected by reductions in welfare caseloads. 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 negative effects. Time limits in welfare programs may have contributed to a deterioration of infant health. Kaplan *et al.* (2005) found that recipients' health outcomes –including hypertension, obesity, and cholesterol– were worse after welfare reform. Leonard and Mas (2008) found that the population of mothers affected by time limits were less likely to seek prenatal care. Knab *et al.* (2008) showed 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 showed 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) tried 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 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.

This brief review shows that participation in welfare-to-work programs has not always have positive effects on health. The fact that most of this literature has focused on the US does not allow to extrapolate the results to other countries. Nevertheless, the studies for other countries also seem to indicate that these effects are not always well defined.

## DATA AND METHODS

### 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 framework. "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. 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.

A 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.

All households receiving benefits must take part in some activity and all recipients can participate in work-related activities. Some recipients only receive life-skills support while others also participate in labor-skills activities. This framework is very different from that of most papers in the literature, which measure the effect of participation in a work-skills program compared to not participating at all. Data from our survey somewhat show that caseworkers might play a relevant role in assigning IMI recipients to the different activities. Nevertheless, most respondents state that, while the final decision was taken by the caseworker, it was the result of a negotiation process. Households were asked on the assignment process. Almost one third of the assignments were the result of an agreement under caseworkers' predominance and approximately 30 percent were made on the basis of a fifty-fifty agreement between caseworkers and recipients.

## **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. Administrative records provide very detailed information on the recipients' characteristics at the moment of welfare participation. These records comprise over 50,000 spells in the program corresponding to 39,200 households. Recipients' characteristics include some of the variables highlighted as ideal for analyzing welfare populations, such as the existence of structural problems or the development of behavior associated with marginal situations (prostitution or begging). We use the socioeconomic information from administrative

records of these households to estimate the probability of taking part in a given activity. These administrative records also provide information on participation in the different ‘insertion’ activities included in the IMI program. We will use this data to identify the ‘treatments’.

The survey of IMI recipients was conducted by Madrid’s Government in 2001 on a sample of recipients (2,300 households) using as initial universe those households that had been in the program at a given moment in the previous decade. It may include both households who are still in the programs and leavers. The survey contains detailed 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 will use the survey data to identify the outcomes in our evaluation.

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. 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. Because our analyses use de-identified data, it was not necessary to obtain institutional ethical approval for this research.

[TABLE 1]

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. Small households stand out in general. People living alone make up a third of total households and have gained in relative weight over time. Single-parent households have the highest frequency of all household types.

Three types of social problems stand out among IMI recipients. The first is related to social pathologies arising from insolvency in situations of debt, including non-payment for dwellings. A second problem involves belonging to an ethnic minority. In general terms, this is not in itself a social problem. It is regarded as such by case workers in so far as belonging to an ethnic minority limits a person's possibilities of social integration. Most individuals classified into this group are gipsies. A third problem is the development of behaviour associated with social alienation, such as begging or prostitution, although this group is rather small.

Survey data include detailed information on health outcomes and behaviors. These measures will be used in our evaluation as outcomes. The two general outcomes we consider are physical health problems and mental health problems. The definitions we use are constrained by the limited information provided by the survey. Households were asked if anyone in the household had severe physical or mental health problems. We do not have information on health status through self-reported definitions. It is not possible either to differentiate the number and severity of health problems.

The survey also gives information on the relative importance of some health behaviors that are relevant in these populations. There is no information on physical activity or nutrition habits but there are detailed data on some behaviors which can be more prevalent in welfare populations. These are 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 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 it 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. 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]

As shown in Table 2, the prevalence of health problems and “bad” behaviors is high in these households. 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 (last row in Table 2). 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 former recipients have some kind of health problems. Physical health problems stand out. More than one out of every four recipients has a physical health problem. The proportion is around a ten per cent in the case of mental health problems. Drug and alcohol dependence occurs in about 3% of the recipients whereas the prevalence of gambling addictions is rather low.

### **Estimation strategy**

The key question in our evaluation is the extent to which participation in activities aimed at improving labor skills produces better health results than not taking part in these activities. Our administrative records provide very detailed information on very different activities. We have aggregated these treatments into two different and mutually exclusive groups: non-participation in work-related activities 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.

We perform propensity score matching using administrative data to identify treatments and the probability of taking part in those treatments and the IMI survey to identify 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 different outcomes –health problems and behaviors– come from the survey data. 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 not participated in work-related 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. These assumptions have been widely justified in different studies [Rubin (1977), Rosenbaum and Rubin (1983), Angrist *et al.* (1996), Becker and Ichino (2002), and Frolich (2004)].

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. Deriving (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.

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 data:

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

where  $b(X)$  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 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).

The estimated effect may provide therefore valid estimates of the health impact for participants in welfare-to-work activities as compared to households not taking part in them. Our results, however, will depend to an important extent on the validity of our propensity score matching approach to identify causal impacts. Propensity score matching has become the most popular estimator in the recent evaluation literature. Nevertheless, its

drawbacks have been outlined by different authors (Blundell (2000), Smith and Todd (2005), and Imbens (2004)). It may be the 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. It also heavily relies on the assumption of conditional independence between non-treated outcomes and program participation. This is a strong assumption since we are accepting that there is no selection on unobservables.

This assumption is more reasonable the more variables can be included in the propensity score. Despite it does not completely guarantee that the unconfoundedness assumption is satisfied, the richness of our set of variables might appropriately address the problem of unobservable selection reducing the omitted variable bias. We also use alternative probit models and interactions and extensive robustness checks.

## **RESULTS**

The key question in our evaluation approach is whether participation in work-related activities produces better results in terms of health outcomes than not taking part in these activities. Table 3 presents estimates of the effects of participation in work-related activities on health. 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. 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 seems, 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]

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 the effect is not well defined. This difference may be partly explained by the way the outcome variable is defined. The aggregate nature of our variable 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).

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. 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. The prevalence of alcoholism falls by 1 percent when recipients are involved in any kind of work-related activities (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.

[TABLE 4]

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. 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. 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.

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 non-participation in work-related activities. However, the results should be taken cautiously since the prevalence of this behavior is rather small both in control and treated units.

## **CONCLUSIONS**

In this paper we have tested whether participation in work-related activities yield positive results in terms of health outcomes and behaviors. Propensity score matching estimates suggest that participation in work-related activities seems to have produced positive but modest effects on health. 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 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 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.

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 gambling with small but significant effects.

Our results, in short, offer support for the contention that welfare-to-work policies 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. The sequence by which these policies improve health and health improvements enhance employability should be considered in any overall assessment of welfare-to-work strategies.

However, there is still a need for research to provide a more complete picture of the possible unintended health effects of these policies. Firstly, a deeper analysis of the heterogeneity across recipients in the estimated effects is needed, and secondly, further evidence on the different impact of specific work-related activities is also desirable. As more disaggregated data are available, a more detailed analysis could help to clarify some of the estimated relationships.

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**Table 1**  
**Socio-Economic Characteristics of IMI Recipients**  
*(frequency distribution)*

	<i>Completed spells</i>	<i>Ongoing spells</i>
<b>AGE</b>		
<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
<b>GENDER</b>		
Males	40.3	34.2
Females	59.7	65.6
<b>HOUSEHOLD SIZE</b>		
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
<b>HOUSEHOLD TYPE</b>		
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
<b>EDUCATION</b>		
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
<b>LABOR FORCE STATUS</b>		
Employed	18.0	13.5
Unemployed	59.1	69.0
Inactive	22.9	17.5
<b>EMPLOYABILITY</b>		
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

**Table 1 (cont.)**

SOCIAL PROBLEMS <sup>a</sup>		
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
<hr/>		
Number of observations	(41,996)	(7,568)

<sup>a</sup>The categories appearing in social problems are non-excluding dummy variables. The figures show percentages of recipients affected by each problem.

**Table 2**  
**Prevalence of health problems and behaviors in former welfare recipients**  
*(frequency distribution)*

	N	Frequency
Physical health problems	2074	0.2854
Mental health problems	2083	0.1037
Alcoholism	2083	0.0336
Drug addiction	2084	0.0302
Gambling addiction	2058	0.0068
Health problems & behaviors	2093	0.3846

**Table 3**  
**Effects on health outcomes**  
**(ATT, nearest neighbor random draw)**

<b>Health behaviors</b>	Participation in work-related activities (treated)	Non-participation in work-related activities (controls)
<i>Physical health problems</i>	1038	749
N		-0.055**
ATT		(0.025) <sup>a</sup>
<i>Mental health problems</i>	1038	750
Average effect		-0.014 (0.018)
<i>Health problems &amp; behaviors</i>	1038	754
Average effect		-0.059** (0.028)

<sup>a</sup> Bootstrapped standard errors in brackets.

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

**Table 4**  
**Effects on health behaviors**  
**(ATT, nearest neighbor random draw)**

<b>Health behaviors</b>	Participation in work-related activities (treated)	Non-participation in work-related activities (controls)
<i>Alcoholism</i>	1038	753
Average effect		-0.010 (0.010) <sup>a</sup>
<i>Drug addiction</i>	1038	753
Average effect		-0.010 (0.009)
<i>Gambling addiction</i>	1038	753
Average effect		-0.012** (0.006)

<sup>a</sup> Bootstrapped standard errors in brackets.

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

## ANNEX

### Matching method details

*Propensity Score.* 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). We use propensity score matching to evaluate health outcomes and behaviors derived from participation in ‘welfare-to-work’ programs. First, we fit a probit using covariates predicting participation in these activities to produce the propensity score (Table A.1). All these variables are pre-treatment covariates. The final model was defined taken into account that covariates should be balanced (Heckman *et al.*, 1998). A number of alternative models were also considered (Dehejia and Wahba, 1999, 2002). We examined the sensitivity of the estimated treatment effects introducing higher-order terms and interactions between covariates (Dehejia 2005).

*Matching estimators.* Different weighting procedures were selected for associating the set of non-treated observations with each participant in work-related activities. 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 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. It 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.

Tables A.3 shows the estimated average effects for a set of matching estimators. 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. Introducing interactions may help to improve the fit of the probit model but reduces the significance level of the effects.

*Balancing properties.* Propensity score estimators are only reliable if 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. Other indicators of matching quality were also estimated like the reduction in the standardized bias suggested by Rosenbaum and Rubin (1983).

*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	Hsize	Hsize	Hsize
SINGLE PERSON	SP	SP	SP <sup>2</sup>
GENDER	Gender	Gender	
AGE	Age	Age	Age
EDUCATION	Edu	Edu	Edu x Age Edu x Gender
EMPLOYABILITY	Employ	Employ	Employ Employ x Gender Employ x Age
NUMBER OF SOCIAL PROBLEMS	Problems	Problems	Problems Problems x Age Problems x Edu

**Table A.2**  
**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 [.355, .831]

The region of common support in Model 2 is [.156, .943]

**Table A.3**  
**Propensity Score Model 1**

<b>Health Outcomes</b>	Nearest Neighbor (random draw)	Direct nearest- neighbor (1)	Direct nearest- neighbor (2)	Normal Kernel
<i>Physical health problems</i>				
N Treated	1038	1416	1416	1038
N Controls	749			811
ATT	-0.055**	-0.025	-0.037	-0.063***
Std Err. <sup>a</sup>	0.025	0.030	0.028	0.023
<i>Mental health problems</i>				
N Treated	1038	1425	1425	1038
N Controls	750			811
ATT	-0.014	-0.002	-0.012	-0.011
Std Err.	0.018	0.020	0.019	0.013
<i>Health problems &amp; behaviors</i>				
N Treated	1038	1432	1432	1038
N Controls	754			811
ATT	-0.059**	-0.041	-0.057**	-0.054**
Std Err.	0.028	0.032	0.030	0.025
<b>Health Behaviors</b>				
<i>Alcoholism</i>				
N Treated	1038	1429	1429	1038
N Controls	753			811
ATT	-0.010	-0.018	-0.0020**	-0.013
Std Err.	0.010	0.012	0.011	0.009
<i>Drug addiction</i>				
N Treated	1038	1427	1427	1038
N Controls	753			811
ATT	-0.010	-0.016	-0.014	-0.008
Std Err.	0.009	0.012	0.011	0.009
<i>Gambling addiction</i>				
N Treated	1038	1411	1411	1038
N Controls	734			811
ATT	-0.012**	-0.006	-0.006	-0.005
Std Err.	0.006	0.006	0.006	0.004

<sup>a</sup> Bootstrapped standard errors in brackets.

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

**Table A.4**  
**Propensity Score Model 2**

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

<sup>a</sup> Bootstrapped standard errors in brackets.

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

Figure A.1. Common Support

