



Universidad de San Andrés

Departamento de Economía

Maestría en Economía

Sympathy for the Diligent and the Demand for Workfare

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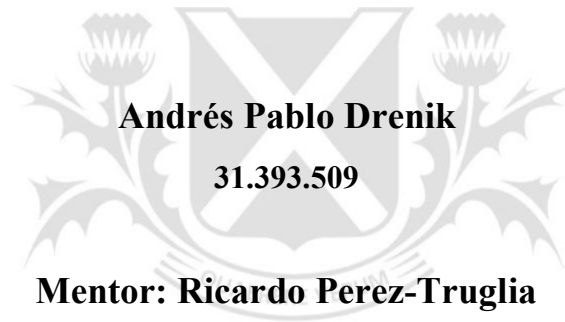
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Tesis de Maestría en Economía de
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Keywords: redistribution, workfare, fairness, social preferences.

Códigos JEL: D31, D64, D82, H23.

Sympathy for the Diligent and the Demand for Workfare*

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June 25, 2019

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Mentor: Ricardo Perez-Truglia (UCLA)

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1 Introduction

We study the role of fairness concerns in the demand for social assistance programs with work requirements (hereafter, referred to as workfare) relative to unconditional assistance programs (welfare). We argue that public support for work requirements responds to a type of social preference that we refer to as *sympathy for the diligent*, according to which individuals are more sympathetic towards poor people whom they perceive to exert high effort than they are towards poor people whom they perceive to exert low effort. This social preference translates into a higher demand for redistribution towards one group relative to the other. Consequently, this social preference generates a demand for work requirements in social programs, because these programs can act as screening devices that target social assistance towards the poor who exert high effort.

A large body of work argues that fairness concerns are important for understanding income redistribution (Alesina and Angeletos (2005)). For example, survey data indicate that the percentage of the population that believes that poor people are lazy has a strong negative correlation with social spending across the set of OECD countries (Alesina and Glaeser (2004)). Within a given country, individuals who believe that the poor are poor because of lack of effort, rather than because of bad luck, tend to have a low demand for redistribution (Fong (2001); Corneo and Grüner (2002); Alesina and La Ferrara (2005)). Fairness concerns are also important drivers in a variety of laboratory experiments, such as the dictator, ultimatum, and gift exchange games (Fehr and Schmidt (1999)), and experiments that study the demand for redistribution of income (Durante et al. (2014)). More precisely, the laboratory evidence supports the idea that individuals believe it is fair to give more resources to those who exert a higher effort. For example, Cappelen et al. (2013) studies fairness views in a game that consists of a risk-taking phase followed by a redistribution phase. The results show that, when deciding how to redistribute, most individuals distinguish between ex post inequality that reflects differences in luck and ex post inequality that reflects differences in choices. A similar distinction between differences in luck and differences in choices has been documented in a variety of other games, such as double auction (Ball et al. (2001)), public good (Clark (1998)), and ultimatum games (Hoffman and Spitzer (1985)). In this paper, we argue that fairness concerns have important implications not only for the overall level of income redistribution, but also for the composition of the spending in different social programs, such as welfare vs. workfare.

In the first part of the paper, we present new evidence about the existence of sympathy for the diligent and its relationship with the demand for workfare. We conducted survey experiments with 1,800 U.S. subjects recruited on Amazon Mechanical Turk. Subjects were asked to provide policy recommendations for the government in a hypothetical scenario. This scenario contained

a description about a poor household to whom the government was considering providing social assistance. We randomly varied the characteristics of the household head who would benefit from the social program. Later, subjects were asked to recommend the amount for a cash transfer to be given to that specific household.

Consistent with our definition of sympathy for the diligent, subjects' recommendations were more generous when the description of the beneficiary included an indication that the individual was hard-working, less generous when this indication was omitted, and even less generous when the description included an indication that the individual was lazy. The magnitudes of these differences are large. For example, when the recipient was described as hard-working, subjects recommended a cash transfer that was almost twice as large as when the recipient was described as lazy. These differences are significant even within the sub-populations of Democrats, Independents, and Republicans, although they are larger in magnitude among Republicans. To obtain a benchmark for the quantitative importance of this social preference, we randomized other characteristics of the hypothetical beneficiary. The estimates suggest that subjects are more generous with African-American than White beneficiaries, more generous with U.S.-born than Mexican-born beneficiaries, and more generous with disabled than non-disabled beneficiaries. However, the gap in generosity between hard-working and lazy beneficiaries is between 4.3 and 8.4 times the magnitude of the gaps in generosity between African-Americans and Whites, U.S.-born and Mexican-born, and disabled and not disabled.

Additionally, we provide evidence that more sympathy for the diligent creates more demand for workfare. To do so, we conducted an additional survey that included a direct question about the respondent's degree of sympathy for the diligent, as well as multiple questions about the respondent's preferences regarding welfare and workfare policies. As expected, compared to those with low sympathy for the diligent, subjects with high sympathy for the diligent have a significantly stronger preference for workfare: they are more likely to demand work requirements in social assistance programs, they prefer a higher share of social spending to be allocated to the Earned Income Tax Credit (EITC), and they are more likely to agree with the statement that work requirements are effective at preventing the lazy poor from benefiting from social assistance programs. These differences are not only statistically significant but also large in magnitude.

In the second part of the paper, we incorporate the empirical findings into a model of income redistribution. We characterize the conditions under which it is optimal for a benevolent government to make income transfers that are contingent on effort requirements (i.e., workfare), as opposed to unconditional transfers (i.e., welfare). We use a framework adapted from [Netzer and Scheuer \(2010\)](#). Ex ante, a risk-averse agent can affect the probability distribution over output by choosing different levels of unobservable effort. For example, this effort choice can

be interpreted as human capital investment, as in [Boadway et al. \(1996\)](#) and [Konrad \(2001\)](#). Once outcomes have been realized, a benevolent government chooses the income-redistribution policy. Following [Netzer and Scheuer \(2010\)](#) and others ([Boadway et al. \(1996\)](#), [Konrad \(2001\)](#)), we assume that the government cannot commit to a certain redistributive scheme before effort choices are made.¹

We introduce a benevolent government with merit-based fairness concerns. The government cares more about the utility of individuals who exert the most effort, because they are believed to deserve higher utility. The government cannot directly verify who exerts effort and who does not, but it can take advantage of the fact that, on average, individuals with lower disutility from effort are more likely to have exerted great effort in the past. Because the work requirement is less costly for individuals with low disutility from effort, the government can use workfare to (imperfectly) screen for diligent individuals and direct more resources toward them. We first analyze the partial-equilibrium problem, in which effort and output are determined and the government must then choose a redistribution policy. The government has the option of offering to the poor a choice between a workfare and a welfare program. For the sake of simplicity, we focus on the case where the workfare effort produces no output. We show that, if the government is not sympathetic towards the diligent, then the government does not use workfare and redistributes only via welfare. However, under fairness concerns, then the government's optimal redistribution policy involves a combination of workfare and welfare, provided there is a minimum share of the poor who exerted high effort.

Additionally, we analyze the equilibrium implications of the availability of work requirements as an additional redistributive tool. When the government has commitment power, the availability of an additional policy instrument, such as workfare, cannot be harmful (i.e., in the worst case scenario, the government commits to not using the instrument and therefore achieves the same social welfare as if the instrument is not available.) However, when the government lacks commitment power, the availability of an additional policy instrument can be harmful if it leads to a time-inconsistency problem. We compare the set of equilibria in which workfare is available with the set of equilibria in which workfare is not available. The availability of workfare can affect equilibrium effort through two channels, with opposite signs. On the one hand, the availability of workfare allows the government to transfer resources away from agents with high disutility of effort, so that agents with low disutility of effort anticipate that they will not have to share their earnings as much with the agents with high disutility of effort. Consequently, the agents with low disutility of effort face higher incentives to exert effort. On the

¹This assumption differs from other studies of income redistribution such as [Meltzer and Richard \(1981\)](#) and [Alesina and Angeletos \(2005\)](#). Note that it makes no difference whether the redistribution scheme is decided before the uncertainty is resolved. What is truly important is whether the redistribution scheme can be modified after the outcomes are realized.

other hand, agents with low disutility of effort anticipate access to generous workfare programs in the future, which gives them less incentives to work. We show that, under fairly general conditions, the latter effect dominates, so that the availability of workfare reduces the aggregate level of equilibrium effort. Furthermore, the equilibrium allocation obtained when workfare is available can be Pareto-dominated by the allocation attained when workfare is not available. That is, even when the government is benevolent and rational, the availability of workfare can lead to a Pareto-dominated allocation.

Our study relates to various strands of research. In their seminal contribution, [Besley and Coate \(1992\)](#) introduced a model in which a government can use work requirements for screening purposes. Poor individuals have a choice between receiving a transfer from the government or working in the private market. From the perspective of efficiency, the government is interested in directing its help toward low-ability individuals who would not be able to sustain themselves without the government's help. The government can screen low-ability individuals through work requirements, because they have lower opportunity costs from working in the private sector.² Contrary to [Besley and Coate \(1992\)](#), our suggests that work requirements are used target social assistance towards individuals with low disutility of effort rather than towards individuals with low-ability.³

Similar to our paper, [Cuff \(2000\)](#) and [Moffitt \(2006\)](#) also stress the importance of a non-utilitarian social welfare function to understand the demand for workfare. [Moffitt \(2006\)](#) assumes that the government values the leisure time of families whose ability is low, but does not value the leisure time of families whose ability is high. That is, the government directly desires that high-ability individuals work and that low-ability individuals do not work. This assumption makes work requirements optimal, even if they do not screen individuals. On the other hand, [Cuff \(2000\)](#) assumes that the government cares more about individuals with certain ability. For instance, the government may care more about low-ability individuals if their low ability is the product of a disability. Even though [Cuff \(2000\)](#) and [Moffitt \(2006\)](#) show that work requirements can be optimal when the government cares differently about individuals of different types, they do not explain why such government preferences may arise in the first place. We show that fairness concerns, which is a central concept of behavioral economics and political economy, endogenously create a demand for workfare.⁴ In our model, fairness concerns

²Several studies have elaborated on this screening principle ([Besley and Coate \(1995\)](#); [Cuff \(2000\)](#); [Kreiner and Tranæs \(2005\)](#); [Moffitt \(2006\)](#)). In particular, [Kreiner and Tranæs \(2005\)](#) shows that this principle applies not only to poverty alleviation programs but also to unemployment insurance. In that case, unproductive work requirements can be used to target uninsured towards the involuntarily unemployed (which happen to be low-income, low-disutility individuals).

³Besides differences in fairness concerns, our setting also differs in that we assume that agents decide whether to join a workfare or welfare program after their fates in the private market have been determined.

⁴Consistent with our interpretation, [Falk et al. \(2006\)](#) present evidence from laboratory experiments about

create a demand for screening individuals based on their past efforts. Since workfare provides screening based on the agent's type (e.g., high or low disutility from effort), the government finds workfare useful only to the extent that agents' types are correlated to their effort choices. Furthermore, we show that this endogeneity of government preferences has important equilibrium implications, because the agents' effort choices depend on their expectations about future government policies.

We find that, when the government lacks commitment power, the availability of workfare can lead to a Pareto-dominated equilibrium. In reality, commitment power is a degree issue mediated by a myriad of factors, such as reputation and institutions (e.g., [Fudenberg and Tirole \(1990\)](#), [Acemoglu et al. \(2008\)](#)). Nonetheless, our model serves as a cautionary tale. Indeed, a number of studies provide related examples of policies whose positive or normative implications are sensitive to the government's commitment power. For example, [Konrad \(2001\)](#) shows that, because the government lacks commitment power, better information about the agents' types can lead to a Pareto-dominated equilibrium in a model of income redistribution. [Netzer and Scheuer \(2010\)](#) shows that, because of the lack of commitment power, competitive insurance markets can implement allocations that Pareto-dominate those achieved by a benevolent government. And [Farhi et al. \(2012\)](#) shows that, even though a zero capital tax would be optimal under perfect commitment, a government without commitment chooses a positive capital tax.

Given the dramatic differences with respect to the predictions of [Besley and Coate \(1992\)](#), our model illustrates how social preferences can lead to redistributive policies that differ from those resulting from the prescriptions of a purely utilitarian government. In this sense, our paper belongs to a recent but growing literature that emphasizes the need for incorporating social preferences into public finance models and for studying optimal tax theory from a positive perspective. For instance, [Auerbach and Hassett \(2002\)](#) modifies the social welfare function to accommodate social preferences about horizontal equity. [Roemer and et al. \(2003\)](#) apply an equal opportunity criterion to the social welfare function to study optimal income redistribution in a setting in which income differences might arise because of individual merit or family background. Other examples include fairness concerns related to the principles of responsibility and compensation ([Fleurbaey and Maniquet \(2006\)](#)) and to the principle of equal sacrifice ([Weinzierl \(2014\)](#)).⁵ Our model suggests that fairness concerns can be useful not only to explain the overall extent of redistribution ([Alesina and Angeletos \(2005\)](#)), but also to explain the composition of redistributive programs (e.g., welfare vs. workfare).⁶

the role of fairness concerns in creating demand for workfare.

⁵For further discussion and a survey of the literature, see [Saez and Stantcheva \(2013\)](#) and Chapter 7 of [Piketty and Saez \(2013\)](#).

⁶Moreover, our model suggests that the government's degree of commitment power can also affect the composition of redistributive programs.

In this paper, work requirements should be understood in a broader sense rather than the specific social assistance programs that are often referred to as workfare. For example, some studies argue that governments use some forms of public employment as a tool for income redistribution, including evidence from the United States (Alesina et al. (2000)) and other developed and developing countries (Mattos and França (2011); Alesina et al. (2001); Clark and Milcent (2011); among many others).⁷ Thus, our model can provide an explanation for the demand for public employment as a redistributive tool. Additionally, as illustrated by our survey results, sympathy for the diligent may be relevant for understanding the public support for earning subsidy programs, such as the EITC in the United States. Indeed, even though the utilitarian welfare framework provides good reasons for using a program like the EITC (Saez (2002)), it is uncertain whether its growth can be attributed to those reasons (see Moffitt (2006) and the references therein).⁸

The paper is organized as follows. Section 2 presents the empirical evidence. Section 3 presents the model. The last section concludes.

2 Empirical Evidence

2.1 Survey Design and Subject Pool

In this section, we present new survey results that show the existence of sympathy for the diligent and its relationship with the demand for workfare. We conducted two surveys. The main goal of the first survey, which consisted of a survey experiment, was to quantify the degree of sympathy for the diligent in the population. The main goal of the second survey was to examine whether more sympathy for the diligent creates more demand for workfare.

We conducted both surveys with U.S. subjects recruited on Amazon Mechanical Turk. We followed the recommended practices for using Amazon Mechanical Turk for surveys and experiments to ensure high-quality responses (e.g., see Crump et al. (2013)). Potential recruits were asked to participate in a 5-minutes “public opinion survey.”⁹ We collected data during the month of September 2014.¹⁰ We restricted the sample of participants to U.S. residents only, and we included attention checks to ensure that participants read the instructions and the questions thoroughly.

⁷For example, Clark and Milcent (2011) shows that public hospitals in France employ significantly more workers than similar non-public hospitals, that this gap correlates with the unemployment rate, and that the correlation is stronger in left-wing areas.

⁸In line with Fleurbaey and Maniquet (2006), we emphasize the role of fairness concerns.

⁹We used this vague description on purpose, to avoid conditioning the participants

¹⁰Participants were paid \$0.50 for their participation, which was above-average for surveys of this length.

After excluding a small minority (about 1%) of participants who did not satisfy our attention checks, the final sample comprised 1,778 respondents in the survey experiment and 502 in the non-experimental survey. The full questionnaire is available in the online appendix.¹¹ The subjects seemed confident that they understood the questions: when asked about how difficult it was to understand the survey questions, about 90% of respondents chose “Easy to understand”, only 1% chose “Difficult to understand,” and the remaining 9% chose “Neither easy nor difficult.” The first set of questions was identical for respondents in the experimental and non-experimental surveys. These questions collected background information about the respondent, such as gender, age and political views. As in other experiments with Amazon Mechanical Turk, the participants in our sample are not representative of the U.S. population. Most notably, our sample is younger, more educated, and more Democrat than the U.S. average. In any case, in line with other studies (Kuziemko et al. (2013)), we find similar results if we re-weight observations to match the U.S. average demographics (results available upon request).

2.2 Evidence about the Existence and Magnitude of Sympathy for the Diligent

The existing evidence shows that individuals who believe that the poor are lazy also prefer lower redistribution (Fong (2001); Corneo and Grüner (2002); Alesina and La Ferrara (2005)). However, this evidence is subject to the usual concerns with omitted variable biases. For instance, it is possible that individuals who believe that the poor are lazy may differ in other beliefs and values that are relevant for redistribution, such as their political beliefs or inequity aversion. These differences can create a spurious correlation between beliefs about laziness of the poor and preferences for redistribution. In this subsection, we present a survey experiment that is specifically designed to measure the degree of sympathy for the diligent while addressing these identification challenges.¹²

We asked the respondents to imagine that they were appointed by the U.S. government to recommend policies that would aid poor families. We provided the respondent with a description of the household that would benefit from the social program. The beginning of the description read: “Consider the case of a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household.” We randomized the information displayed immediately after that baseline description, with the goal of measuring the effect of that extra piece of information on the respondent’s generosity towards the beneficiary. The *No-Info* treatment arm received no additional informa-

¹¹Both online surveys can be completed at [this link](#).

¹²For other examples of survey experiments in the context of preferences for redistribution, see Fong and Luttmer (2011), Cruces et al. (2013), and Kuziemko et al. (2013).

tion (i.e., they were shown the baseline description only). The *Hard-Working* treatment arm included the text: “He has worked very hard his entire life. However, he cannot find a full-time job because his line of work has been dramatically affected by the recent economic crisis.” The *Lazy* treatment arm included the text: “He has been lazy for his entire life and as a result cannot find a full-time job.”¹³

To provide a benchmark for the effect of the information about whether the individual was hard-working or lazy, we included three additional pairs of treatment groups, by including an extra sentence indicating the race of the beneficiary (White or African-American), the country of birth of the beneficiary (American-born or Mexican-born), or the disability status of the beneficiary (Disabled or Not-Disabled).¹⁴ Immediately after the description, the respondent was asked to recommend a cash transfer amount for the government to make to this beneficiary.¹⁵ The available options were cash amounts from \$0 per week (\$0 per year) to \$200 per week (\$10,400 per year), in increments of \$20 per week (\$1,040 per year). Given the net income of the beneficiary of \$20,000 per year, the options ranged from 0% to 50% of his disposable income.¹⁶

The so-called sympathy for the diligent predicts that respondents should be the most generous in the Hard-Working treatment group, less generous in the No-Info group, and even less generous in the Lazy group. To test this hypothesis, Figure 1 provides a comparison of the average cash transfer recommended in all the different treatment arms. As expected, on average, respondents recommended a \$122 cash transfer in the Hard-Working treatment, \$111 in the No-Info treatment, and \$66 in the Lazy treatment. Preferences towards the diligent poor seem to be quantitatively significant, insofar as respondents were almost twice as generous to individuals who were described as hard-working, compared to individuals who were described as lazy. Additionally, the fact that the recommended amounts from the No-Info and Hard-Working treatments were closer in value than those from the No-Info and Lazy treatments suggests that subjects in the No-Info group believed that the beneficiary was substantially more likely to be hard-working than lazy.

Figure 1 also compares the degree of sympathy for the diligent with respect to the corresponding sympathies based on race, nationality, and disability of the beneficiary. Subjects were

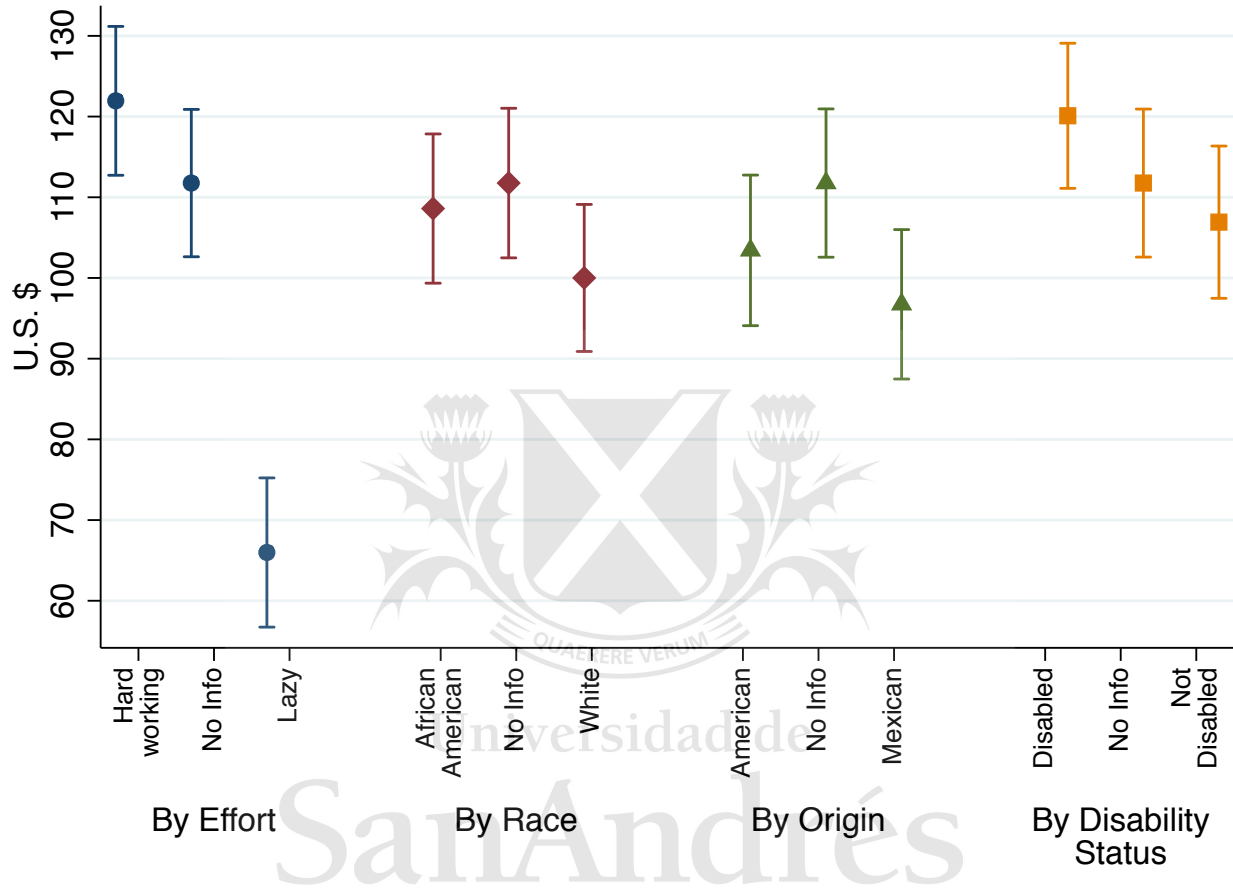
¹³The mean (median) time spent on the description was about 46 (40) seconds, which suggests that the average respondent paid a non-trivial amount of attention to the task.

¹⁴Specifically, at the end of the generic description of the potential beneficiary we added the following descriptions for each treatment arm: “He is African American.”, “He is White.”, “He was born in Mexico.”, “He was born in the United States.”, “He has a disability.” and “He does not have a disability.”.

¹⁵We specified that the respondent’s decision applied to that particular beneficiary only by stating “Please remember that your choice applies to this individual only, because the government is making decisions on a case-by-case basis”.

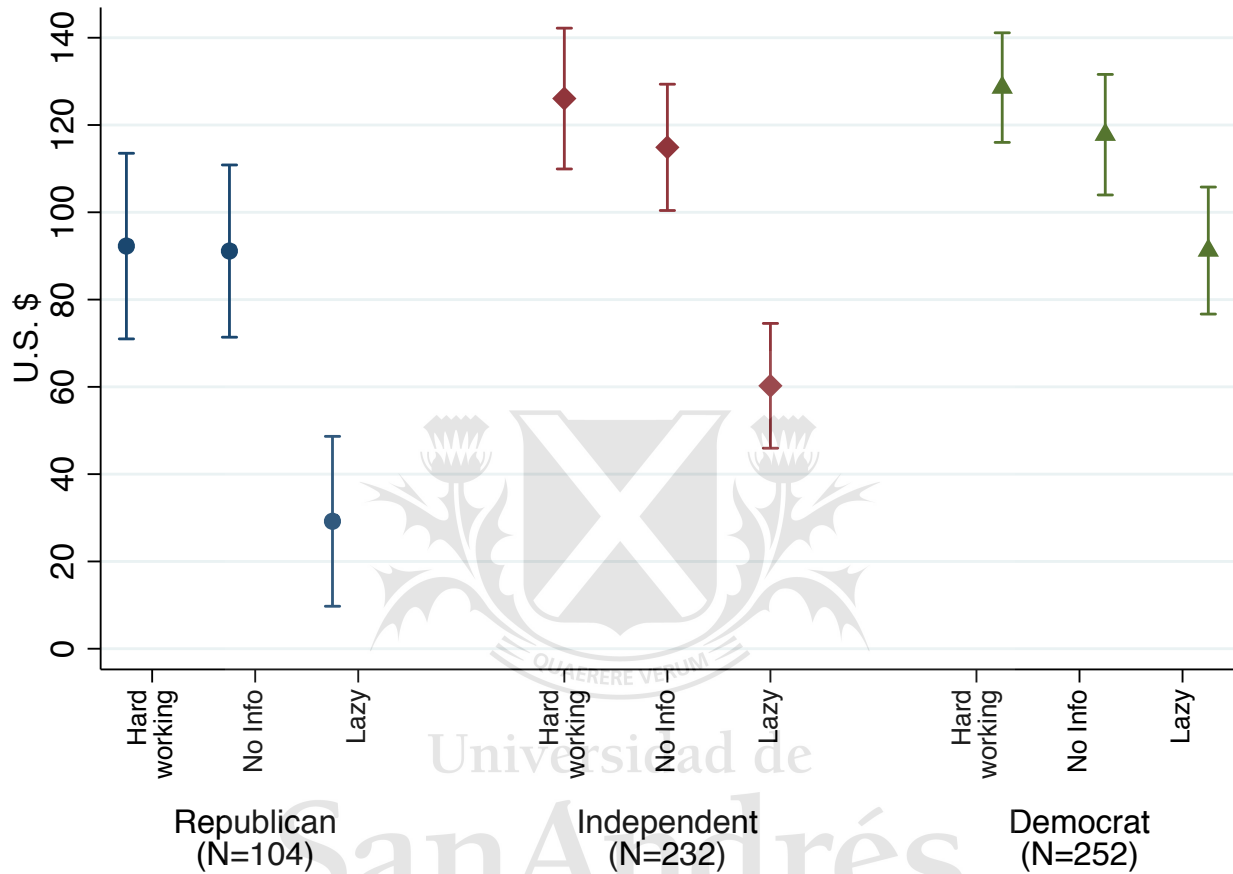
¹⁶The scale was not restrictive for most respondents, since only 22% of the respondents chose the highest option.

Figure 1: Average Generosity in Cash Transfers across Treatment Arms



Notes: $N = 1,778$. Data from the survey experiment. Respondents were put in the hypothetical position in which the United States government appoints them to choose policies that would aid poor families. We provided the respondent with a description of the household that would benefit from the social assistance, and we randomized some information in this description. The x -axis shows the additional information that was included in the description of the hypothetical scenario. No-Info corresponds to the baseline information (i.e., no further information added). After the description, respondents were asked to recommend to the government a cash transfer for this beneficiary. The y -axis corresponds to the amount of unconditional cash transfer that the subjects recommended in the hypothetical scenario. The dots correspond to the point estimate for the mean amount (in U.S. \$) and the brackets denote the corresponding 95% confidence interval. For more details see the Questionnaire in the online appendix.

Figure 2: Average Generosity in Cash Transfers across Treatment Arms, by Political Identification of the Respondent



Notes: Data from the survey experiment. Respondents were put in the hypothetical position in which the United States government appoints them to choose policies that would aid poor families. We provided the respondent with a description of the household that would benefit from the social assistance, and we randomized some information in this description. The x – *axis* shows the additional information that was included in the description of the hypothetical scenario. No-Info corresponds to the baseline information (i.e., no further information added). After the description, respondents were asked to recommend to the government a cash transfer for this beneficiary. The y – *axis* corresponds to the amount of unconditional cash transfer that the subjects recommended in the hypothetical scenario. The dots correspond to the point estimate for the mean amount (in U.S. \$) and the brackets denote the corresponding 95% confidence interval. The sample is grouped according to respondent’s political identification, based on self-reported identification as Democrat, Independent or Republican. For more details see the Questionnaire in the online appendix.

significantly more generous to African-Americans than they were to Whites,¹⁷ more generous to American-born than to Mexican-born, and more generous to disabled than to not-disabled individuals. However, the gap between Hard-Working and Lazy is much larger in magnitude: about 6.5 times the African-American/White gap, 8.4 times the American/Mexican gap, and 4.3 times the Disabled/Not-Disabled gap.

To check the robustness of sympathy towards the diligent across ideological groups, Figure 2 lists the recommended transfers in the Hard-Working, No-Info, and Lazy treatment arms by political identification, based on self-reported identification as Democrat, Independent, or Republican.¹⁸ We must be careful in interpreting the results because, as a result of the lower sample sizes, the averages are less precisely estimated (especially for Republicans, which have only 104 observations). We focus first on the transfers recommended in the No-Info treatment group. As expected, Republicans are the least generous (\$91 on average), followed by Independents (\$115), and then Democrats (\$118). The first finding is that the gap between Hard-Working and Lazy is twice the size of the gap between Republican and Democrat. A second finding is that, although it is larger among Republicans, the gap between Hard-Working and Lazy is significant across the sub-samples of Democrats, Independents, and Republicans. Thus, sympathy for the diligent does not seem to be a phenomenon exclusive to Democrats or Republicans.

2.3 Examining the Link between Sympathy for the Diligent and the Demand for Workfare

The previous subsection provides evidence showing that individuals are more sympathetic towards the diligent poor relative to the lazy poor. In this subsection, we examine whether this sympathy for the diligent creates more demand for workfare. For that, we test the hypothesis that individuals with a stronger sympathy for the diligent have a stronger preference for workfare. Unfortunately, the experimental data do not provide an individual-level measure of sympathy for the diligent. Therefore, we conducted a separate survey that included a question specifically designed to measure the respondent's degree of sympathy for the diligent. This question followed the structure proposed by [Saez and Stantcheva \(2013\)](#) to measure social preferences. We provided the respondent with a description of two individuals, corresponding to the Hard-Working and Lazy treatment arms in the survey experiment:

¹⁷Assuming that a majority of subjects are White, this finding contrasts with the finding in [Fong and Luttmer \(2011\)](#) of no racial preferences in charitable giving. However, our sample comprised relatively young, educated, and liberal respondents.

¹⁸The results are similar if, instead, we categorize the individuals based on their self-reported location in the liberal-conservative spectrum.

- Individual A: a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household. He has worked very hard his entire life. However, he cannot find a full-time job because his line of work has been dramatically affected by the recent economic crisis.
- Individual B: a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household. He has been lazy for his entire life and as a result cannot find a full-time job.

Then, we asked the respondent to report which of these two individuals was more deserving of a cash transfer of \$5,000 per year. The possible answers ranged from “Individual A is much more deserving” (1) to “They are both equally deserving” (3) to “Individual B is much more deserving” (5). There are some disadvantages of this survey measure relative to the survey experiment.¹⁹ However, conditional on the experimental evidence, fewer concerns remain.

In addition to the above question about sympathy for the diligent, we included a few questions to measure preferences for redistribution. We elicited a measure of raw willingness to redistribute, based on a question about whether the U.S. government should decrease, maintain, or increase its spending on aid to poor families. We also included three specific questions about preferences for workfare relative to welfare. The first question measured the respondent’s agreement with the statement, “Beneficiaries of social programs should be required to do some work in exchange for government aid. For example, they could perform a few hours of work per week for their local governments.” The second question measured the degree of agreement with the statement, “If beneficiaries of social programs were required to do some work in exchange for government aid (for example, perform a few hours of work per week for their local governments), that would prevent lazy people from participating in social programs.” This statement most closely represents the mechanism that we model in the next section. The last question asks the respondent to allocate a fixed social assistance budget between the EITC and an unconditional cash transfer program (i.e., to assign amounts to both that add up to 100%). Given that some subjects may be unfamiliar with the EITC, we provided a brief explanation about how the EITC works in comparison to an unconditional cash transfer. The explanation included a numerical example in which the EITC provides a higher transfer to a low-income household head who works (and earns) more, relative to a low-income household head who works (and earns) less.

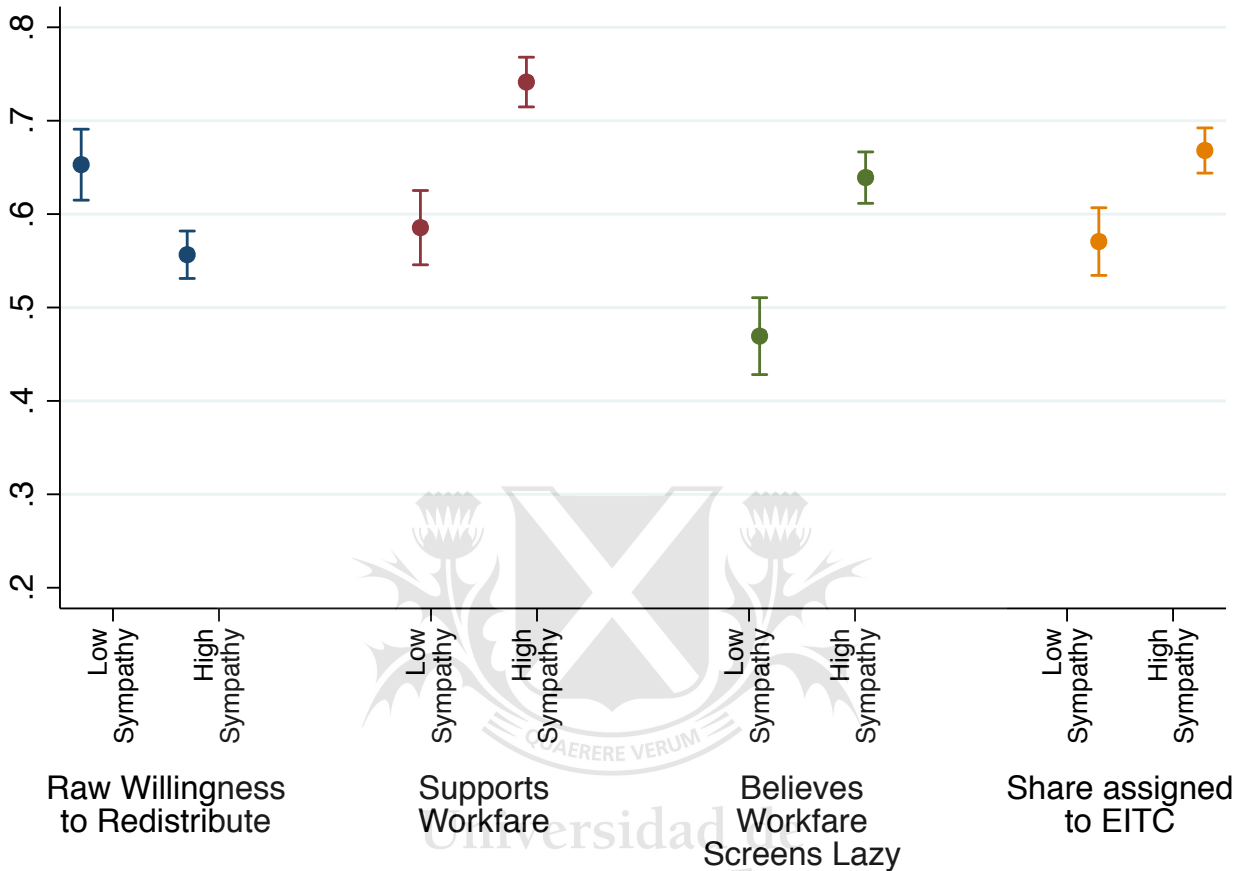
¹⁹For example, subjects may have incentives to lie when asked directly about some issues, because they do not want to reveal their true preferences and because they may feel pressure to agree with the interviewer (Goffman (1963)). If, for instance, a subject is asked whether a Mexican-born deserves help more than an American-born, he may want to lie to “hide” his preference towards the American-born. In the survey experiment, the respondent is asked about redistributing only to the Mexican-born or the American-born (but not both). Thus, the respondent does not perfectly reveal his preferences and has fewer incentives to lie.

Table 1: Summary Statistics for Non-Experimental Survey

	Rep.	Indep.	Dem.	Total
Which of these two individuals is more deserving of a cash transfer of \$5,000 per year?				
Individual A is much more deserving	78.9	62.7	69.5	69.1
Individual A is slightly more deserving	15.8	22.7	19.7	19.9
They are both equally deserving	4.4	13.0	10.8	10.2
Individual B is slightly more deserving	0.9	0.0	0.0	0.2
Individual B is much more deserving	0.0	1.6	0.0	0.6
Should beneficiaries of social programs be required to do some work?				
Strongly agree	45.6	21.1	20.7	26.5
Agree	42.1	47.0	36.9	41.8
Neither agree nor disagree	4.4	18.9	20.2	16.1
Disagree	5.3	11.4	20.2	13.5
Strongly disagree	2.6	1.6	2.0	2.0
Would work requirements prevent lazy people from participating in social programs?				
Strongly agree	22.8	8.1	10.3	12.4
Agree	45.6	42.7	36.5	40.8
Neither agree nor disagree	12.3	25.4	20.7	20.5
Disagree	16.7	18.9	27.1	21.7
Strongly disagree	2.6	4.9	5.4	4.6
What percentage would you assign to each program?				
% Unconditional cash transfer	30.9	34.0	41.2	36.2
% EITC	69.1	66.0	58.8	63.8

Notes: $N = 502$. Data from the non-experimental survey. Distribution of responses for the main multiple-choice questions. Each figure corresponds to the share of respondents that chose the corresponding option. In the first question we provided the respondent with a description of two individuals of similar characteristics, corresponding to the Hard-Working (Individual A) and Lazy (Individual B) treatment arms in the survey experiment and we asked them to report which of these two individuals was more deserving of a cash transfer of \$5,000 per year. The second group of results elicit the degree of agreement with the statement “Beneficiaries of social programs should be required to do some work in exchange for government aid. For example, they could perform a few hours of work per week for their local governments.”. The third set of results elicit the degree of agreement with the statement “If beneficiaries of social programs were required to do some work in exchange for government aid (for example, perform a few hours of work per week for their local governments), that would prevent lazy people from participating in social programs.”. Finally, the last set of results shows the percentage of a hypothetical government budget that respondents assigned to the EITC program as opposed to an unconditional cash transfer program. The results are broken down according to respondent’s political identification, based on self-reported identification as Democrat, Independent or Republican. The last column reports the results for the entire population. For more details see the Questionnaire in the online appendix.

Figure 3: Preferences for Redistribution across Individuals with Low and High Sympathy for the Diligent



Notes: $N = 502$. Data from the non-experimental survey. Respondents were divided into high- and low- sympathy individuals according to their answer to a question about whether a hard-working individual deserved an income transfer more than a lazy individual. The set of results labeled *Raw Willingness to redistribute* correspond to the question “Should government spending on aid to poor families increase, decrease, or stay the same?”, where the answers go from “Increase by 50%” (1) to “Decrease by 50%” (0). The second set of results labeled *Supports workfare* elicit the degree of agreement with the statement “Beneficiaries of social programs should be required to do some work in exchange for government aid. For example, they could perform a few hours of work per week for their local governments.” and the answers go from “Strongly Agree” (1) to “Strongly Disagree” (0). The third set of results elicit the degree of agreement with the statement “If beneficiaries of social programs were required to do some work in exchange for government aid (for example, perform a few hours of work per week for their local governments), that would prevent lazy people from participating in social programs.” and the possible answers are the same as in the previous column. Finally, the column labeled *Share assigned to EITC* shows the percentage of a hypothetical government budget that respondents assigned to the EITC program as opposed to an unconditional cash transfer program. The bars denote the mean value, and the brackets denote the corresponding 95% confidence interval. For more details see the Questionnaire in the online appendix.

Table 1 shows a full tabulation of the responses for the main questions in this non-experimental survey. Consistent with the findings from the survey experiment, most individuals displayed a strong sympathy for the diligent poor. When asked which individual is more deserving of the \$5,000, 69.1% of respondents chose "Individual A is much more deserving," while less than 1% chose either "Individual B is much more deserving" or "Individual B is slightly more deserving." Also consistent with our model's mechanism that links sympathy for the diligent and the demand for workfare, 53.2% of respondents agreed that work requirements can prevent lazy people from benefiting from social programs, while only 26.3% disagreed with that statement. A vast majority of respondents (68.3%) preferred the general use of work requirements in social assistance programs. On average, respondents assigned almost twice as much funding to the EITC, compared to an unconditional cash transfer program.

To test the hypothesis that individuals with a stronger sympathy for the diligent demand more workfare, we divided the sample into two levels of sympathy for the diligent: high-sympathy respondents (the 69.1% who responded that "Individual A is much more deserving") and low-sympathy respondents (the remaining 30.9%). Figure 3 shows the respondents' preferences over the range of redistributive policies, sorted by high- and low-sympathy respondents. All outcome variables were standardized to take values between 0 and 1. The first outcome measures the raw willingness to redistribute (without any references to workfare or welfare). Relative to low-sympathy respondents, high-sympathy respondents had a 14.8% lower willingness to redistribute. The last three outcomes in Figure 3 measure the preferences for work requirements. As expected, relative to low-sympathy respondents, high-sympathy respondents had a 26% higher preference for work requirements and a 36% higher belief that work requirements are effective at preventing lazy people from benefiting from social programs. High-sympathy respondents preferred a 17% higher share of the social spending budget to be spent on the EITC. Apart from being large in magnitude, all of these differences are statistically highly significant. For a discussion of additional evidence, see Appendix B.

3 The Model

The previous empirical section showed two important results: individuals want to redistribute more towards the diligent poor relative to the lazy poor and these social preferences are correlated with preferences for workfare over welfare programs. In this section, we incorporate sympathy for the diligent in the preferences of a benevolent government that decides the level of income redistribution once individuals' stochastic incomes are realized. We show under which conditions it is optimal for the government to implement workfare programs and the equilibrium consequences of the availability of workfare as a redistributive tool.

3.1 Timing of the Agent's Decisions and Outcomes

The model analyzed in this paper is an adapted version of the model from [Netzer and Scheuer \(2010\)](#). There is a continuum of risk-averse agents of measure one indexed by the set $[0, 1]$. Agents are expected utility maximizers with a Bernoulli utility function $U(c)$, where c denotes consumption. We assume that $U(c)$ is twice continuously differentiable with $U' > 0$ and $U'' < 0$. Also, consumption is restricted to be non-negative and the range of U is given by \mathbb{R} . The Inada conditions $\lim_{c \rightarrow 0} U'(c) = \infty$ and $\lim_{c \rightarrow \infty} U'(c) = 0$ are assumed to hold. Let $\Phi(U)$ be the inverse function of U , which satisfies $\Phi' > 0$, $\Phi'' > 0$, $\lim_{U \rightarrow -\infty} \Phi(U) = 0$, $\lim_{U \rightarrow \infty} \Phi(U) = \infty$ and $\lim_{U \rightarrow \infty} \Phi'(U) = \infty$.

Each agent faces idiosyncratic risk with respect to the level of output he/she can produce. There are two possible levels of output: high (y_h) or low (y_l), with $y_l < y_h$. In order to generate this output, agents have to decide between two effort levels $e \in \{\underline{e}, \bar{e}\}$. The assumption that there are only two possible levels of effort is not problematic. Despite the fact that each agent can only choose between two levels of effort, aggregate effort (and also aggregate output) can be a continuous variable - because what matters in the aggregate is the proportion of individuals choosing high effort.²⁰ If $e = \bar{e}$ then the agent is an ex post good type (g) and if $e = \underline{e}$ then the agent is an ex post bad type (b). Good types produce the high output y_h with probability p_g and bad types produce the high output y_h with probability p_b , where the restrictions $0 < p_b < p_g < 1$ hold. Agent's preferences are represented by an utility function that is separable between consumption utility and effort cost, $U(c) - H(e)$, where $H(e)$ represents the effort cost. We normalize $H(\underline{e})$ to zero, which does not affect our results. Agents differ in their disutility of effort $H(\bar{e}) = d$, which can take the values $d \in \{d_l, d_h\}$, with $d_h > d_l$.²¹ A proportion q ($1 - q$) of the population has a low (high) effort cost d_l (d_h). We assume that neither effort costs nor effort choices are observable. The fraction q of agents with low disutility from effort and the probabilities of producing a high level of income are assumed to be known by the government.

Differences in agents' effort costs must be interpreted as differences in agents' preferences for leisure (as in [Cuff \(2000\)](#), [Fleurbaey and Maniquet \(2006\)](#) and [Moffitt \(2006\)](#)), as opposed to

²⁰This resembles the necessity of randomization between effort levels in [Fudenberg and Tirole \(1990\)](#). In our model, for a given type, we can think of the proportion of agents exerting high effort as the individual probability of choosing high effort for each individual agent.

²¹The assumption of two ex ante types of agents is a deviation from the original setup from [Netzer and Scheuer \(2010\)](#), who assume a continuum of ex ante types. The primary goal of this assumption is to reduce the complexity of the government's problem. One important implication of this assumption is that, in equilibrium, different agents with low disutility from effort will choose different levels of effort. As a result, there will be no one-to-one mapping between agents' types and effort choices. Therefore, the government will not be able to use work requirements to perfectly screen diligent individuals. This implication would also be attained in a model with a continuum of types if we also assumed, for example, that an agent observes an imperfect signal of his/her own return from effort (i.e., so that the relationship between effort levels and types is not one-to-one).

differences originated from disabilities or opportunities. It must be noted that our model is not intended to approximate what the fairness ideal should be. Instead, we want to approximate the fairness ideals that regular individuals seem to have (in our survey, a sample of Americans). Also, in reality, individuals can differ in other important dimensions, most notably in ability. Indeed, since [Mirrlees \(1971\)](#) heterogeneity in ability has played a central role in optimal taxation analysis, and there is a long tradition in the literature of combining heterogeneity in ability with heterogeneity in disutility from effort ([Sandmo \(1993\)](#); [Fleurbaey and Maniquet \(2006\)](#); [Lockwood and Weinzierl \(2015\)](#)). We focus on differences in just one dimension (disutility from effort) to make the model tractable. One reason why the distinction between disutility from effort and ability may be relevant is because of fairness ideals. It is possible that the average individual believes that exerting low effort because one is lazy is wrong but exerting low effort because one has low ability is not so wrong. Indeed, it is quite possible that these fairness ideals differ markedly across individuals from different countries. For instance, Steve Jobs' genius may have justified his wealth for the average American, but maybe the average individual from France believes that Jobs got his genius from the lottery of birth and therefore his wealth is not justified. Indeed, it would be straightforward to extend our survey experiment to provide direct evidence about these distinctions.

We analyze a two-period model of income redistribution in which effort choices are endogenous. In the first stage, agents who make an effort are individuals who actively try to discover their comparative advantage by working longer hours and investing in human capital. Those who perform a low effort represent people who work the bare minimum and do not invest in human capital. In the second stage, the greater the effort exerted in the first stage the more likely that the agent will end up with a better outcome. However, some of those who put in little effort can end up with a high income, and some of those who worked hard can end up with a low income (e.g., the hard-working athlete who got injured).

3.2 The Government

Once efforts were chosen, the government chooses how to redistribute income. Following [Boadway et al. \(1996\)](#), [Konrad \(2001\)](#) and [Netzer and Scheuer \(2010\)](#), we assume that the government cannot commit to a certain redistributive scheme before effort choices are made.²² This assumption differs from other studies in the literature ([Meltzer and Richard \(1981\)](#); [Alesina and Angeletos \(2005\)](#)). Note that it makes no difference whether the redistribution scheme is decided

²²An important difference with respect to [Netzer and Scheuer \(2010\)](#) is that we assume that the redistributive policy is decided after the agent's income is realized, while they assume that the policy is decided after effort choices are made but before incomes are realized. Therefore, in their model, an agent must choose between different contracts offered by the government. In our model, an agent gets a single contract that depends only on his or her realized income.

before the uncertainty is resolved. What is truly important is whether the redistribution scheme can be modified after the outcomes are realized. The assumption about the government's lack of commitment is based on the fact that the time period represents a long horizon. Making an effort in this model does not mean working longer hours during a given year, but rather the accumulation of human capital over decades (Boadway et al. (1996)).

The objective of the government is to maximize a weighted average of the *ex post* utilities of all agents, where the weights may depend on the agents' *ex post* types. In particular, we examine the case in which the government would like to redistribute more toward agents that made an effort earlier in their lives. This fairness concern from the government's side can be the result of the underlying preferences of the voters. An alternative interpretation for the fairness concerns is that they represent the government's political constraints: that is, the government wants to redistribute as much as possible but redistribution is politically viable only if it is perceived as helping the unlucky rather than coddling the lazy. As in many papers in the positive optimal tax literature (Cuff (2000), Auerbach and Hassett (2002), Roemer and et al. (2003), Fleurbaey and Maniquet (2006), Moffitt (2006) and Weinzierl (2014), among many others), we do not explicitly model the way individuals' preferences shape the government's objective function. Since in reality different groups of individuals have different social preferences and fairness concerns, understanding how these heterogeneous social preferences end up affecting the choices made by politicians is important but beyond the scope of this paper.

Following Netzer and Scheuer (2010), we carry out the analysis in the utility space. A contract offered by the government is a vector of consumption utilities that agents obtain when producing the high and low output, respectively. The optimal tax rate for each agent can be easily recovered from the level of consumption offered by the government and the level of output produced by the agent.

3.3 Redistributive Policies

In this subsection, we characterize the set of equilibria that arise with two different redistributive mechanisms: welfare and workfare. In the following subsection, we compare the outcomes that are attainable in these two sets of equilibria.

3.3.1 Welfare

Welfare represents a redistributive scheme in which the government can screen agents based on income only. This restriction implies that all the rich agents receive the same level of utility and all the poor agents also must receive the same level of utility. The timing of events is the following:

Stage 1: Agents simultaneously choose their effort levels.

Stage 2: Agents' incomes are realized.

Stage 3: The government chooses a redistributive policy $(u_{b,h}, u_{b,l}, u_{g,h}, u_{g,l})$.

where $u_{i,j}$ represents the consumption utility for agents of ex-post type $i \in \{b, g\}$ that produced the output level y_j (with $j \in \{l, h\}$). The fact that we focus on the case of a government without commitment is clearly observed in the timing of the model: choices about income redistribution are made after effort and output are realized. The model could have an additional Stage 0, in which the government makes an initial policy announcement. Then, agents make effort choices based on expectations of future actual policies, which in principle could be different to the announced policy. If the government lacks commitment power, it will be able to change the policy after effort choices are made. Thus, the initial announcement becomes irrelevant.

The objective is to find the set of Subgame Perfect Equilibria (SPE). For the sake of simplicity, we will focus on SPE in which only a fraction x of agents with low disutility from effort make an effort (and therefore all the high-cost types shirk). We find the set of Subgame Perfect Equilibria by backward induction. For a given level of x chosen at Stage 1, we derive the government's optimal policy at Stage 3. We assume that the government cannot differentiate between ex post good low-income agents and ex post bad low-income agents. The idea is to reflect the fact that effort is unobservable and most welfare programs base their eligibility criteria on observable factors only, such as income.

Once incomes are realized, the government is able to form precise inference about the proportion of agents that made an effort during the first stage, x . Let α denote the relative weight the benevolent government places in its ex post welfare function on individuals who exerted high effort and let $(1 - \alpha)$ denote the relative weight placed on ex post bad types. Here, α measures the degree of *sympathy for the diligent*. The objective of the government is to maximize a weighted average of the agents' *ex post* utilities, taking into account the constraints imposed by the budget constraint and the redistributive mechanism. Whenever $x \in (0, 1]$, so that both ex post types exist, the benevolent government solves the following problem²³

$$\max_{(u_{b,h}^{we}, u_{b,l}^{we}, u_{g,h}^{we}, u_{g,l}^{we}) \in \mathbb{R}^4} \alpha [qx (p_g u_{g,h}^{we} + (1 - p_g) u_{g,l}^{we})] + (1 - \alpha) [(1 - qx) (p_b u_{b,h}^{we} + (1 - p_b) u_{b,l}^{we})]$$

subject to the constraints

$$u_{g,l}^{we} = u_{b,l}^{we} \equiv u_l \tag{1}$$

²³Since at the time the government decides the optimal redistributive policy agents already decided a level of effort and because agent's utility function is separable between consumption utility and effort costs, we can exclude effort costs from the government's objective function for presentation purposes. This would just affect the level of the objective function without affecting the optimal policy.

$$u_{g,h}^{we} = u_{b,h}^{we} \equiv u_h \quad (2)$$

$$qx[p_g\Phi(u_{g,h}^{we}) + (1 - p_g)\Phi(u_{g,l}^{we})] + (1 - qx)[p_b\Phi(u_{b,h}^{we}) + (1 - p_b)\Phi(u_{b,l}^{we})] \leq R(x) \quad (3)$$

where $R(x)$ represents the per capita (total) resources available in the economy and is given by

$$R(x) = qx[p_g y_h + (1 - p_g)y_l] + (1 - qx)[p_b y_h + (1 - p_b)y_l].$$

Equations (1) and (2) impose the restriction that the utility of agents that produced low and high output can only depend on their realized income, which is the only information observable to the government. The following Lemma characterizes the solution to the government's ex-post problem.

LEMMA 1. *Fix any $x \in (0, 1]$. (i) The government's problem has a unique solution $V(x) = (u_h^{we}(x), u_l^{we}(x))$. (ii) If $\alpha \geq (>)1/2$, then $u_h^{we}(x) \geq (>)u_l^{we}(x)$. (iii) If $\alpha \leq (<)1/2$, then $u_h^{we}(x) \leq (<)u_l^{we}(x)$.*

Proof. See the appendix.

Lemma 1 characterizes the direction of the ex post optimal redistribution as a function of the Pareto weight α . When the Pareto weights are tilted towards ex post good agents ($\alpha \geq 1/2$), the government chooses to reward effort by giving the rich a higher utility relative to the utility that bad-type agents receive. The reason for this is that the assumption $p_g > p_b$ implies that the majority of rich agents are going to be ex post good types. If on the other hand, the Pareto weight of ex post bad type agents is higher ($\alpha \leq 1/2$), then redistribution goes in the opposite direction since the poor are more likely to be bad-type agents. The final case involves $\alpha = 1/2$ (i.e., the government has no preference for any particular group of ex post agents). Then the government decides to fully insure agents by choosing $u_h^{we}(x) = u_l^{we}(x)$ (by setting the consumption level of both types of agents equal to per capita resources $R(x)$).

In the case of $x = 0$ (i.e., no agent with low disutility from effort makes an effort), the benevolent government's problem simplifies substantially. It reduces to the maximization of the utility of the unique ex post type subject to the resource constraint. Then, convexity of Φ will require that the solution satisfies $u_l^{we} = u_h^{we}$.

We define an equilibrium of the game between agents and a benevolent government without commitment as follows.

DEFINITION 1. *A welfare equilibrium is a pair (x^{we}, V^{we}) , where $V^{we} = V(x^{we})$ and one of the following conditions holds*

(i) $x^{we} = 0$ and

$$p_g u_{g,h}^{we}(x^{we}) + (1 - p_g) u_{g,l}^{we}(x^{we}) - d_l < p_b u_{b,h}^{we}(x^{we}) + (1 - p_b) u_{b,l}^{we}(x^{we})$$

(ii) $x^{we} \in [0, 1]$ and

$$p_g u_{g,h}^{we}(x^{we}) + (1 - p_g) u_{g,l}^{we}(x^{we}) - d_l = p_b u_{b,h}^{we}(x^{we}) + (1 - p_b) u_{b,l}^{we}(x^{we})$$

(iii) $x^{we} = 1$,

$$p_g u_{g,h}^{we}(x^{we}) + (1 - p_g) u_{g,l}^{we}(x^{we}) - d_l > p_b u_{b,h}^{we}(x^{we}) + (1 - p_b) u_{b,l}^{we}(x^{we})$$

and

$$p_g u_{g,h}^{we}(x^{we}) + (1 - p_g) u_{g,l}^{we}(x^{we}) - d_h < p_b u_{b,h}^{we}(x^{we}) + (1 - p_b) u_{b,l}^{we}(x^{we})$$

The definition of equilibrium is based on the agents' ex ante incentives to make an effort at Stage 1 taking the government's response function as given. Agents form expectations about future redistributive policies and compare the expected utility of working and shirking. There are three types of subgame perfect equilibria that could arise. Two extreme equilibria ($x \in \{0, 1\}$) occur when the agent with low disutility from effort strictly prefers to work/not to work, given the anticipated future redistributive policies. There is also an intermediate type of equilibrium, in which agents with low disutility from effort are indifferent between making an effort or not. Thus, x could be interpreted as the proportion of agents with low disutility from effort choosing to make an effort at Stage 1. This can be interpreted as the result of each individual agent choosing a mixed strategy to exert high effort with probability x .²⁴

For simplicity, we will focus on equilibria in which only agents with low disutility from effort may choose to make an effort at Stage 1 (the reason for doing this will become more clear when we analyze the benefits of workfare). Notice that the definition of equilibrium imposes restrictions on the indifference conditions of agents with high disutility from effort for the case in which $x^{we} = 1$ only. For the other two types of equilibrium ($x^{we} = 0$ and $x^{we} \in [0, 1]$), these restrictions become redundant because the fact that agents with low disutility from effort are indifferent or strictly prefer to shirk at Stage 1 implies that agents with high disutility from effort would strictly prefer to shirk at Stage 1 (due to $d_h > d_l$). Therefore, the indifference conditions of agents with low disutility from effort are enough to characterize equilibria in which no agent with high disutility from effort makes an effort. The following proposition describes the set of

²⁴In this case, our definition of equilibrium can be viewed as the standard indifference condition used to characterize a mixed-strategy equilibria.

equilibria as a function of the Pareto weights.

PROPOSITION 1. *For any parameter values of the model, $(x^{we}, V^{we}) = (0, V(0))$ is a welfare equilibrium. If $\alpha \leq 1/2$, $(x^{we}, V^{we}) = (0, V(0))$ is the unique equilibrium. For any value of $\alpha > 1/2$, there exists a value $\hat{d}_l(\alpha)$ such that there exists at least one additional equilibrium with $x^{we} > 0$ for $d_l \leq \hat{d}_l(\alpha)$.*

If the government's Pareto weights are such that the government wants to ex post redistribute from rich to poor (i.e., $\alpha \leq 1/2$), the set of welfare equilibria becomes a singleton. We showed in the previous lemma that when $\alpha \leq 1/2$, the government will ex post choose $u_h^{we}(x) \leq u_l^{we}(x)$. This clearly eliminates any incentives to make any effort from an ex ante perspective. From our previous result it is easy to see that this allocation still belongs to the set of welfare equilibria when $\alpha > 1/2$. However, if the government's Pareto weights are tilted towards the ex post good types other equilibria might arise, in particular when d_l is below a certain threshold. The reason is that agents' effort costs do not affect the government's ex post choice of the redistributive policy (i.e., $u_h^{we}(x)$ and $u_l^{we}(x)$ are independent of d_l and d_h). Therefore, as long as $u_h^{we}(x) > u_l^{we}(x)$, other equilibria might emerge if $d_l < (p_g - p_b)(u_h^{we}(x) - u_l^{we}(x))$ (i.e., if the effort cost is smaller than the expected net utility gain of making an effort).

3.3.2 Workfare

In this subsection we allow the government to implement a redistributive mechanism that relies on self-selection. We define workfare as a transfer of utility whose delivery is conditional on the realization of a certain task. Low-income agents can choose whether to participate in the workfare program or not, and participation in the program is perfectly observable by the government. Taking part in the program requires making an effort e_w , which will be chosen by the government simultaneously with the decision of u_w^{wo} , the consumption utility received by low-income agents who participate in the workfare program, and u_l^{wo} , the consumption utility received by low-income agents who decide not to participate.

Since even among the high-income individuals there are individuals who exerted effort and individuals who did not, in principle the government could also try to use work-requirements among the rich. We assume that the government can only use work requirements with low-income individuals, which is a typical assumption in the literature.²⁵

We assume that the cost of making the effort e_w is proportional to the parameter d : i.e., $H(e_w) = e_w \cdot d$. For now, we also assume that the effort required in the workfare program

²⁵Intuitively, we can think the high-income outcome corresponds to an individual with a high-paying full-time job, while the low-income outcome corresponds to unemployment or under-employment. In that case, the assumption that the government can only use work requirements with low-income individuals would be equal to the assumption that full-time individuals cannot comply with work-requirements (Besley and Coate (1995)).

is completely unproductive. That is, the only benefit produced by workfare is the screening mechanism. In the last part of the paper we present numerical results for an alternative scenario in which effort exerted in the workfare program produces output. We will show that by making workfare productive, the main results are even stronger. The timing of events is now:

Stage 1: Agents simultaneously choose their effort levels.

Stage 2: Agents' incomes are realized.

Stage 3: The government chooses a (welfare/workfare) redistributive policy.

Stage 4: If the government chooses $e_w > 0$, low income agents simultaneously choose whether they want to participate in the workfare program or not.

Intuitively, the government may desire to implement a workfare program because it allows to identify the individuals who had more likely exerted high effort among the low-income agents and to give them a different level of utility relative to those who do not participate in workfare (i.e., agents with high disutility from effort). Since welfare does not provide this type of screening, if the government's Pareto weights are tilted towards the good types the utility that ex post good low-income agents receive is lower than what they would receive in the full-information case (in which effort is observable). In this scenario, workfare becomes a useful policy instrument since it allows the government to screen both ex ante types of agents and give a higher utility to ex post good low-income agents.

We find the set of Subgame Perfect Equilibria by backward induction. The effort level e_w is chosen in a way such that low-income agents with high disutility from effort are indifferent between participating in workfare and not (we assume that in equilibrium they do not participate):

$$u_l^{wo} = u_w^{wo} - e_w d_h \quad (4)$$

Since $d_l < d_h$, Equation (4) implies that poor agents with low disutility from effort will strictly prefer to participate in the workfare program. There are many levels of e_w that would allow the government to screen the ex ante type of agents, but there are reasons for choosing this particular level. The restriction imposed by Equation (4) requires the minimum workfare effort level that makes the agents with high disutility from effort indifferent between participating and not, and thus minimizes the effort cost of those agents who actually decide to participate. It is possible to make the agents with high disutility from effort strictly prefer not to participate in workfare by slightly increasing e_w , but this would simply hurt workfare participants without adding any benefit. Because of this, this level of workfare effort can be justified as the level of effort that the benevolent government would choose if he could decide the type of task that

participants need to perform in workfare.²⁶

Given that the government is able to precisely infer the percentage of agents with low disutility from effort that made an effort in Stage 1 and to screen agents with high disutility from effort from agents with low disutility from effort, the benevolent government's problem can be represented by the following maximization problem

$$\max_{(u_{b,h}^{wo}, u_l^{wo}, u_{g,h}^{wo}, u_w^{wo}) \in \mathbb{R}^4, e_w} \alpha [qx(p_g u_{g,h}^{wo} + (1-p_g)(u_w^{wo} - e_w d_l))] + (1-\alpha)[q(1-x)(p_b u_{b,h}^{wo} + (1-p_b)(u_w^{wo} - e_w d_l))] + (1-\alpha)[(1-q)(p_b u_{b,h}^{wo} + (1-p_b)u_l^{wo})]$$

subject to the constraints

$$u_l^{wo} = u_w^{wo} - e_w d_l \tag{5}$$

$$u_{g,h}^{wo} = u_{b,h}^{wo} \equiv u_h^{wo} \tag{6}$$

$$qx[p_g \Phi(u_{g,h}^{wo}) + (1-p_g)\Phi(u_w^{wo})] + q(1-x)[p_b \Phi(u_{b,h}^{wo}) + (1-p_b)\Phi(u_w^{wo})] + (1-q)[p_b \Phi(u_{b,h}^{wo}) + (1-p_b)\Phi(u_l^{wo})] \leq R(x)$$

where $R(x)$ represents per capita resources and is defined in the same way as before.²⁷

Notice that this maximization problem contains the maximization problem with welfare as a special case when $e_w = 0$. The only benefit of workfare over welfare is that workfare allows to introduce a wedge between u_w^{wo} and u_l^{wo} . Thus, it is possible that the maximization problem yields two types of solutions. For some subset of the parameter space and for some values of x , the solution to the government's ex-post problem may require setting $e_w = 0$. This case can be interpreted as the government optimally choosing *not* to implement a workfare program (i.e., simply redistribute via a welfare program). The second case involves $e_w > 0$, in which case we say that the government *wants* to implement a workfare program. Next, we characterize the solution to this problem.

LEMMA 2. *Fix any $x \in (0, 1]$. (i) The government's problem has a unique solution $V(x) = (u_h^{wo}(x), u_w^{wo}(x), u_l^{wo}(x))$. (ii) If $e_w(x) > 0$, then $u_h^{wo}(x) > u_l^{wo}(x)$ and $u_w^{wo}(x) - e_w d_l > u_l^{wo}(x)$.*

The characterization of the solution omits the case in which $e_w(x) = 0$, because this implies that the government is choosing to redistribute through a welfare program (whose solution

²⁶This restriction is in line with the assumption of lack of commitment from the government's side.

²⁷In this model we let the degree of sympathy for the diligent (denoted by α) to depend on the level of effort agents made in the first stage but not on the level of effort that workfare participants exert in the last stage. An interesting extension would be to allow α to depend on the level of workfare effort e_w , which would generate extra demand for workfare, in addition to the screening mechanism. We focused on the screening mechanisms because we think it is the first order issue.

was previously characterized by Lemma 1). If the government ex post optimally decides to implement a workfare program, then it must be the case that the government redistributes utility towards agents that produced the high level of output and towards agents that decided to participate in workfare. The following two lemmas characterize the government's optimal decision to implement workfare as a function of the Pareto weights and the proportion of agents with low disutility from effort that made an effort at Stage 1.

LEMMA 3. *If $\alpha < 1/2$, the government chooses $e_w(x) = 0$ for all values of x .*

If the government decided to implement workfare, it must have been the case that the Pareto weights assigned to ex post good agents are higher than the weights assigned to ex post bad agents. In our setting this means that the government needs to have particular fairness concerns towards those who made an effort at Stage 1 (as opposed to those who shirked) in order to prefer a workfare over a welfare redistributive mechanism. If this was not the case, there would be no reason to hurt low-income ex post bad types by creating a utility wedge between workfare participants and non-participants. The following lemma complements the intuition behind the usefulness of workfare programs.

LEMMA 4. *If the government uses workfare for some $x \in [0, 1]$, then there exists a value $\tilde{x} \in [0, 1]$ such that the government will choose $e_w(x) > 0$ for all $x > \tilde{x}$ and $e_w(x) = 0$ for all $x \leq \tilde{x}$.*

Lemma 4 demonstrates that a benevolent government will choose not to implement workfare when x is below a certain threshold. The intuition of this result is straightforward. When a small proportion of agents with low disutility from effort made an effort in Stage 1, the government infers that the majority of low-income agents are not going to be ex post good types, making the screening benefits of workfare unappealing. Furthermore, in the appendix we show that the government is more likely to choose $e_w(x) > 0$ when d_h is high compared to d_l . The higher the wedge between effort costs, the lower the effort requirement the government needs to impose in the workfare program in order to screen workers' ex ante type and the larger the desirability to redistribute via workfare.

Analogously to the case of welfare, we define a workfare equilibrium as a fixed point between agents' effort choices and the government's optimal redistributive policy.

DEFINITION 2. *A workfare equilibrium is a pair (x^{wo}, V^{wo}) , where $V^{wo} = V(x^{wo})$ and one of the following conditions holds*

(i) $x^{wo} = 0$ and

$$p_g u_h^{wo}(x^{wo}) + (1 - p_g) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l) - d_l < \\ p_b u_h^{wo}(x^{wo}) + (1 - p_b) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l)$$

(ii) $x^{wo} \in [0, 1]$ and

$$p_g u_h^{wo}(x^{wo}) + (1 - p_g) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l) - d_l = p_b u_h^{wo}(x^{wo}) + (1 - p_b) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l)$$

(iii) $x^{wo} = 1$,

$$p_g u_h^{wo}(x^{wo}) + (1 - p_g) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l) - d_l > p_b u_h^{wo}(x^{wo}) + (1 - p_b) (u_w^{wo}(x^{wo}) - e_w(x^{wo})d_l)$$

and

$$p_g u_h^{wo}(x^{wo}) + (1 - p_g) u_l^{wo}(x^{wo}) - d_h < p_b u_h^{wo}(x^{wo}) + (1 - p_b) u_l^{wo}(x^{wo}).$$

The definition of a workfare equilibrium differs slightly from the definition of a welfare equilibrium. The indifference condition of agents with low disutility from effort is now modified to take into account the fact that they will optimally choose to participate in workfare if they end up producing a low level of output. For agents with high cost of effort, the indifference condition also has the (no) participation choice embedded in it. Given this definition, we now proceed to characterize the set of workfare equilibria.

PROPOSITION 2. *For any parameter values of the model, $(x^{wo}, V^{wo}) = (0, V(0))$ is a workfare equilibrium. If $\alpha \leq 1/2$, $(x^{wo}, V^{wo}) = (0, V(0))$ is the unique equilibrium. There exists a set of values (α, d_l, d_h) such that if α and d_h are high and d_l is low enough, then there exists at least one additional equilibrium with $x^{wo} > 0$ and $e_w(x^{wo}) > 0$.*

We find again that when $\alpha \leq 1/2$, $(x^{wo}, V^{wo}) = (0, V(0))$ is the unique equilibrium. This is simply due to the fact that when $\alpha \leq 1/2$ the government optimally chooses $e_w = 0$. The proof to the second part of the Proposition is straightforward. The proof of Lemma 3 shows that the optimality condition for $e_w > 0$ is more likely to be satisfied for high values of d_h . The result holds because higher values of d_h lead to lower levels of effort that need to be made by workfare participants, which means that workfare becomes “cheaper” to implement in terms of effort cost. Similar to the case of welfare, the effort cost paid at Stage 1 does not enter the government’s maximization problem. Therefore, for each level of α , one can find a threshold value for d_l such that additional equilibria with $x^{wo} > 0$ and $e_w(x^{wo}) > 0$ emerge.

3.4 Comparison between Welfare and Workfare

3.4.1 Equilibrium Effort

Having characterized the set of welfare and workfare equilibria, we now proceed to compare both sets focusing on the aggregate level of effort that can be sustained in equilibrium. Given the possibility of multiple equilibria with both redistributive schemes, we focus on the highest level of effort that can be sustained in each scheme. In order to prove our main Theorem, we need to make an additional assumption regarding the utility function:

ASSUMPTION 1. *The utility function $U(\cdot)$ satisfies the following condition*

$$\frac{\partial}{\partial u} \frac{\Phi''(u)}{\Phi'(u)} \leq 0 \quad (7)$$

A similar version of this condition has been imposed in the literature (Fudenberg and Tirole (1990), Netzer and Scheuer (2010)).²⁸ This condition is sufficient but not necessary for the result of the Theorem to hold, and it is meant to simplify the proof of the Theorem. With this condition in hand, we now present the main result of the paper:

THEOREM 1. *If condition (7) is satisfied and if d_h is high enough, then the highest effort level that can be sustained in a welfare equilibrium \hat{x}^{we} is at least as large as any effort level sustained in a workfare equilibrium x^{wo} (i.e., $\hat{x}^{we} \geq x^{wo}$). Furthermore, if $\hat{x}^{we} < 1$, then $\hat{x}^{we} > x^{wo}$.*

Theorem 1 states that, for high values of d_h ²⁹ and whenever condition (7) is satisfied³⁰, the largest level of effort that can be sustained in a welfare equilibrium is always as high as the largest level of effort that can be sustained with workfare. Furthermore, if the largest level of effort that can be sustained in a welfare equilibrium is interior, then it must be strictly higher than *any* effort level that can be sustained in a workfare equilibrium.

Intuitively, Theorem 1 means that with workfare agents with low disutility from effort will have a weaker ex ante incentive to exert a high effort. This lower incentive can be decomposed

²⁸For example, this condition is satisfied by utility functions with constant relative risk aversion of one or below one (Fudenberg and Tirole (1990), Lemma 3.2).

²⁹ This condition is introduced for two reasons. In the first place, as we previously mentioned, the government is more likely to choose $e_w > 0$ for high values of d_h . The second reason is more relevant. Because workfare programs give a higher utility to workfare participants than what they would get in welfare (for a given value of x), it might be that $u_l^{we}(x) > u_l^{wo}(x)$. If ex post agents with high disutility from effort receive a very low utility when the government chooses $e_w > 0$ (because the government wants to redistribute away from these agents), then it might become optimal for some of these agents to decide to work at Stage 1. In order to avoid this type of unrealistic equilibria, we focus on cases in which d_h is high enough, so that agents with high disutility from effort would never want to make an effort at Stage 1.

³⁰ The condition we impose is a sufficient but not a necessary condition for the main result to hold. We numerically experimented with other utility functions (CARA, CRRA with coefficient greater than 1) and the results of the Theorem still apply. However, the assumption we impose allows us to prove the Theorem analytically.

into two channels. The first channel has to do with how agents with low disutility from effort expect to benefit from workfare in case they end up poor. In the proof of Theorem 1 we show that, for a given x , $u_w^{wo}(x) - e_w(x)d_l > u_l^{we}(x)$. From an ex ante perspective, workfare increases the utility of agents with low disutility from effort, but the corresponding increase in expected utility will be higher for agents who do not make an effort at Stage 1, since in the future they will become workfare participants with a higher probability (due to $p_g > p_b$). The second channel has to do with how agents with low disutility from effort expect to loose with workfare. In the proof we show that, for a given x , the government chooses $u_h^{we}(x) \geq u_h^{wo}(x)$. This means that the government, relative to welfare, gives a lower utility to the rich, which decreases expected utility relatively more for agents who exert a higher effort, because in the future they will have high income with a higher probability.

3.4.2 Implications for Social Welfare

So far we showed that, provided some fairly general conditions hold, the availability of workfare leads to an equilibrium with lower incentives to exert a high level of effort. In this subsection we use a numerical example to illustrate the potential implications in terms of social welfare. Additionally, we use this numerical example to discuss the introduction of “productive” workfare.

Define surplus as the ex-ante expected utility: S_h for an agent with high disutility from effort, S_l for an agent with low disutility from effort. If a first equilibrium had higher S_h and S_l than a second equilibrium, it would imply that the first equilibrium Pareto-dominates the second equilibrium. Introducing the availability of workfare has the following effect on the surplus of a given type j :

$$\Delta^j = S_j^{wo}(x_{wo}^*) - S_j^{we}(x_{we}^*) = \underbrace{S_j^{we}(x_{wo}^*) - S_j^{we}(x_{we}^*)}_{\equiv \Delta_1^j} + \underbrace{S_j^{wo}(x_{wo}^*) - S_j^{we}(x_{wo}^*)}_{\equiv \Delta_2^j}$$

The first term, Δ_1^j , is the change in surplus from reducing equilibrium effort in a welfare setting, which corresponds to an efficiency channel. Due to the moral hazard problem brought by the government’s lack of commitment, effort in welfare equilibria is below the social optimum. As a result, decreasing equilibrium effort due to the introduction of workfare is expected to make matters even worse. This channel reduces the aggregate amount of resources produced in the second stage, and therefore harms both types of individuals (i.e., $\Delta_1^j < 0$ for every j).

The second term, Δ_2^j , is a distributional channel. Conditional on a given effort level - and thus a given total output - the workfare contract will distribute that given output differently among the two types of agents than the welfare contract. Since workfare is used to redistribute

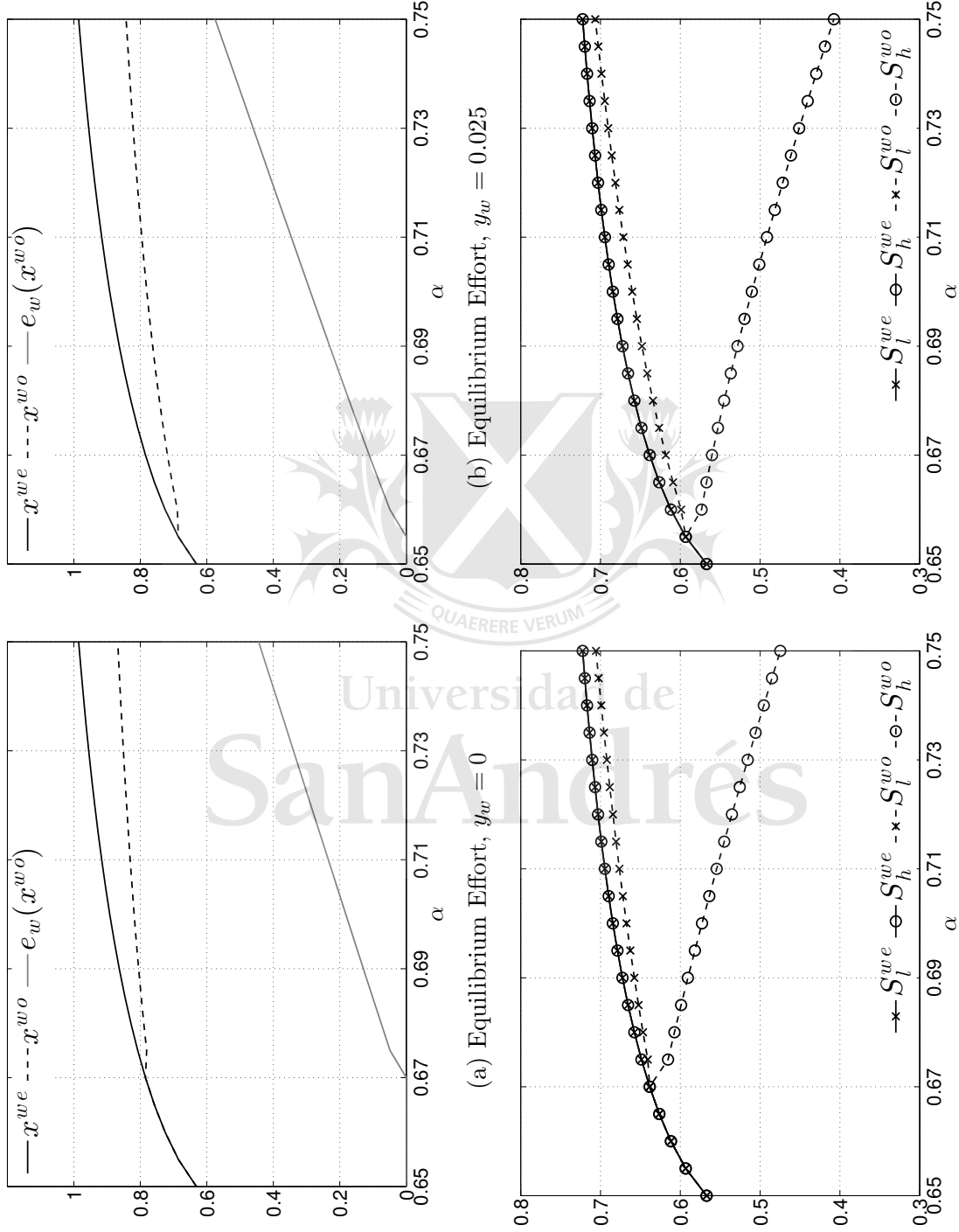
resources from agents with high disutility from effort to agents with low disutility from effort, this means that $\Delta_2^l > 0$ and $\Delta_2^h < 0$. Agents with high disutility from effort are expected to loose from workfare in net terms, since both the efficiency and distributional channels are negative for them. The net effect on the surplus of agents with low disutility from effort will depend upon the relative magnitude of the efficiency and distributional channels. It is then possible that the availability of workfare will lead to a Pareto-dominated equilibrium. In order to illustrate this possibility, we present numerical results for the sets of welfare and workfare equilibria, including their corresponding levels of ex-ante expected utility for both types of agents.

Figures 4(a) and 4(c) show the equilibrium effort levels and the surpluses for different values of α . The solid black lines correspond to the case in which workfare is not available, and the dashed black lines denote the scenario in which workfare becomes available. When $\alpha \leq 0.67$, outcomes are identical for the two cases.³¹ Intuitively, if sympathy for the diligent is too low, the incentives to screen low-type individuals are low as well and thus the government does not want to use the option of workfare in equilibrium. When $\alpha > 0.67$, then equilibria are different depending on the availability of workfare. As predicted by Theorem 1, the largest effort level that can be sustained in equilibrium with workfare is lower than the largest effort level that can be achieved with welfare. Figure 4(b) shows the comparison of surpluses between workfare and welfare. When workfare is not available, the surpluses are equal between the two types because the equilibria are interior (and therefore, agents with low disutility from effort are indifferent between making an effort or not). The introduction of workfare introduces a gap between the surpluses of agents with low and high disutility from effort. More importantly, the availability of workfare reduces the surpluses of both types of agents, therefore leading to a Pareto-dominated outcome.

We can use this numerical example to illustrate the sensitivity of the results to the assumption that workfare programs do not generate any output. Here we assume that the effort exerted in workfare programs produces some output $e_w \cdot y_w$, where $y_w > 0$ is a constant representing the productivity of workfare. The model with productive workfare cannot be compared to the original model in an straightforward way. Intuitively, when y_w is low enough, the only reason for using workfare would be for screening purposes. But when y_w is high enough, a government would like to use workfare even if it was not interested in screening agents' types. For instance, in the extreme case in which workfare is more productive than the effort made at Stage 1, the social optimum would involve exerting no effort in the first stage and mandatory participation in workfare at stage two.

³¹Even though the figure only shows $\alpha \geq 0.65$, the solid and dashed curves are identical for values of $\alpha < 0.65$.

Figure 4: Comparison of Welfare and Workfare Equilibria



Notes: The figures characterize the equilibrium outcomes of welfare and workfare programs that produce the highest level of effort in equilibrium. The utility function is $U(c) = \ln(c)$ and the parameters were fixed at the following levels: $d_l = 0.1$, $d_h = 0.75$, $q = 0.75$, $y_l = 0.5$, $y_h = 4$, $p_b = 0.2$ and $p_g = 0.6$.

Figures 4(b) and 4(d) reproduce Figures 4(a) and 4(c), but allowing for productive workfare. The figures with $y_w > 0$ look like a simple translation to the left of the figures with $y_w = 0$. Intuitively, $y_w > 0$ is equivalent to a subsidy for screening. When such a subsidy was absent, the government was not interested in using workfare for α slightly below 0.67. When the subsidy is introduced, the government becomes interested in using workfare. For a given value of α , the introduction of $y_w > 0$ exacerbates the differences between the workfare and welfare equilibria, either by introducing a gap where there was none (as in $\alpha = 0.67$), or by exacerbating the gap (as in $\alpha > 0.67$).

4 Conclusion

We discussed the role of fairness concerns in the demand for redistribution through workfare. First, we presented survey evidence that individuals are more sympathetic toward the diligent poor than they are toward the lazy poor and, moreover, that such preferences generate a demand for workfare. Second, we incorporated our empirical findings into a model of income redistribution. Our model consists of a benevolent government with fairness concerns that prioritizes the well-being of those individuals who exert greater effort. A purely utilitarian government would never find it optimal to use work requirements if the effort was entirely wasteful. However, a government with fairness concerns would find it optimal to introduce such work requirements, because of their capability to discriminate between poor individuals who exerted great effort and poor individuals who did not. Second, we showed that the availability of workfare, under lack of commitment power, can lead to a lower equilibrium effort and, possibly, to a Pareto-dominated allocation.

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A Appendix

Proof of Lemma 1

In order to prove the lemma we will make use of the following claim.

CLAIM 1. *The solution $V = (u_{b,h}^{we}, u_{b,l}^{we}, u_{g,h}^{we}, u_{g,l}^{we})$ to the government's problem must satisfy constraint (3) with strict equality.*

Proof. Suppose that $V = (u_{b,h}^{we}, u_{b,l}^{we}, u_{g,h}^{we}, u_{g,l}^{we})$ is a solution, but that constraint (3) is satisfied with strict inequality. Consider the alternative allocation $\tilde{V} = (u_{b,h}^{we} + \epsilon, u_{b,l}^{we} + \epsilon, u_{g,h}^{we} + \epsilon, u_{g,l}^{we} + \epsilon)$, with $\epsilon > 0$ small enough so that constraint (3) evaluated at \tilde{V} is still satisfied with strict inequality (such an ϵ exists by the continuity Φ). Then, the allocation \tilde{V} still satisfies constraints (1) and (2), and gives a strictly higher value of (1). Then, V cannot be a solution to the government's problem.

With this result we can reformulate the benevolent government's problem as

$$\max_{(u_h^{we}, u_l^{we})} \alpha [qx (p_g u_h^{we} + (1 - p_g) u_l^{we})] + (1 - \alpha) [(1 - qx) (p_b u_h^{we} + (1 - p_b) u_l^{we})]$$

subject to the constraints

$$(qxp_g + (1 - qx)p_b) \Phi(u_h^{we}) + (qx(1 - p_g) + (1 - qx)(1 - p_b)) \Phi(u_l^{we}) = R(x) \quad (\text{A.1})$$

Equation (A.1) implicitly defines u_h^{we} as a bijective function of u_l^{we} . Lets denote this relationship by $u_h^{we} \equiv \Gamma(u_l^{we})$ with

$$u_h^{we} \equiv \Gamma(u_l^{we}) = U \left(\frac{R(x) - [qx(1 - p_g) + (1 - qx)(1 - p_b)] \Phi(u_l^{we})}{qxp_g + (1 - qx)p_b} \right) \quad (\text{A.2})$$

It can be easily shown that $\Gamma'(u_l^{we}) < 0$ and $\Gamma''(u_l^{we}) < 0$. Thus, we can re-express the original problem as

$$\max_{u_l^{we} \in [-\infty, u(R)]} \alpha [qx (p_g \Gamma(u_l^{we}) + (1 - p_g) u_l)] + (1 - \alpha) [(1 - qx) (p_b \Gamma(u_l^{we}) + (1 - p_b) u_l)] \quad (\text{A.3})$$

which is a strictly concave problem in u_l^{we} . Thus, there exists a solution to the government's problem and it is unique. We rewrite the benevolent government's problem as the following Lagrangian

$$\begin{aligned} \mathcal{L} = & \alpha [qx (p_g u_h^{we} + (1 - p_g) u_l^{we})] + (1 - \alpha) [(1 - qx) (p_b u_h^{we} + (1 - p_b) u_l^{we})] \\ & + \lambda (R(x) - \Phi(u_h^{we}) (qxp_g + (1 - qx)p_b) - \Phi(u_l^{we}) (qx(1 - p_g) + (1 - qx)(1 - p_b))) \end{aligned}$$

The solution to this problem is characterized by the first order conditions

$$\frac{\partial \mathcal{L}}{\partial u_h^{we}} = \alpha qx p_g + (1 - \alpha)(1 - qx)p_b - \lambda \Phi'(u_h^{we}) (qxp_g + (1 - qx)p_b) = 0 \quad (\text{A.4})$$

$$\frac{\partial \mathcal{L}}{\partial u_l^{we}} = \alpha qx(1 - p_g) + (1 - \alpha)(1 - qx)(1 - p_b) - \lambda \Phi'(u_l^{we}) (qx(1 - p_g) + (1 - qx)(1 - p_b)) = 0 \quad (\text{A.5})$$

and the budget constraint. Equations (A.4) and (A.5) can be combined into the following expression

$$\frac{\Phi'(u_h^{we})}{\Phi'(u_l^{we})} = \frac{(\alpha q x p_g + (1 - \alpha)(1 - q x) p_b)(q x (1 - p_g) + (1 - q x)(1 - p_b))}{(\alpha q x (1 - p_g) + (1 - \alpha)(1 - q x)(1 - p_b))(q x p_g + (1 - q x) p_b)}$$

Given that $p_g > p_b$, it can be easily checked that $\frac{\Phi'(u_h^{we})}{\Phi'(u_l^{we})} > (<)1$ if $\alpha > (<)1/2$. This completes our proof.

Proof of Lemma 2

Following the steps of Claim 1, one can easily show that the solution of the government's problem with workfare must satisfy the budget constraint with strict equality. After imposing restrictions (5) and (6), we can state the following problem

$$\begin{aligned} & \max_{(u_h^{wo}, u_l^{wo}), e_w} \alpha [q x (p_g u_h^{wo} + (1 - p_g)(u_l^{wo} + e_w(d_h - d_l)))] \\ & + (1 - \alpha) [q(1 - x)(p_b u_h^{wo} + (1 - p_b)(u_l^{wo} + e_w(d_h - d_l)))] + (1 - \alpha) [(1 - q)(p_b u_h^{wo} + (1 - p_b)u_l^{wo})] \end{aligned}$$

subject to the budget constraint

$$\begin{aligned} q x [p_g \Phi(u_h^{wo}) + (1 - p_g) \Phi(u_l^{wo} + e_w(d_h - d_l))] + q(1 - x) [p_b \Phi(u_h^{wo}) + (1 - p_b) \Phi(u_l^{wo} + e_w(d_h - d_l))] + \\ (1 - q) [p_b \Phi(u_h^{wo}) + (1 - p_b) \Phi(u_l^{wo})] = R(x) \quad (\text{A.6}) \end{aligned}$$

Equation (A.6) implicitly defines u_h^{wo} as a bijective function of u_l^{wo} and e_w . Lets denote this relationship by $u_h^{wo} \equiv \Omega(u_l^{wo}, e_w)$ with

$$u_h^{wo} \equiv \Omega(u_l^{wo}, e_w) = U \left(\frac{R(x) - [q x (1 - p_g) + q(1 - x)(1 - p_b)] \Phi(u_l^{wo} + e_w(d_h - d_l)) - (1 - q)(1 - p_b) \Phi(u_l^{wo})}{q x p_g + (1 - q x) p_b} \right)$$

It is easy to verify that $\frac{\partial \Omega(u_l^{wo}, e_w)}{\partial u_l^{wo}} < 0$, $\frac{\partial \Omega(u_l^{wo}, e_w)}{\partial e_w} < 0$, $\frac{\partial^2 \Omega(u_l^{wo}, e_w)}{\partial^2 u_l^{wo}} < 0$ and $\frac{\partial^2 \Omega(u_l^{wo}, e_w)}{\partial^2 e_w} < 0$. Since $U(\cdot)$ is strictly increasing and strictly concave, in order to prove that $\Omega(u_l^{wo}, e_w)$ is strictly concave we only need to show that the following function is strictly concave:

$$g(u_l^{wo}, e_w) = -[q x (1 - p_g) + q(1 - x)(1 - p_b)] \Phi(u_l^{wo} + e_w(d_h - d_l)) - (1 - q)(1 - p_b) \Phi(u_l^{wo})$$

Since $\Phi''(\cdot) >$, it is easy to see that $\frac{\partial^2 g(u_l^{wo}, e_w)}{\partial^2 u_l^{wo}} < 0$ and $\frac{\partial^2 g(u_l^{wo}, e_w)}{\partial^2 e_w} < 0$. The last step consists on determining the sign of the determinant of the Hessian:

$$\begin{aligned} & \frac{\partial^2 g(u_l^{wo}, e_w)}{\partial^2 u_l^{wo}} \frac{\partial^2 g(u_l^{wo}, e_w)}{\partial^2 e_w} - \left(\frac{\partial^2 g(u_l^{wo}, e_w)}{\partial e_w \partial u_l^{wo}} \right)^2 = \\ & [q x (1 - p_g) + q(1 - x)(1 - p_b)] \Phi''(u_l^{wo} + e_w(d_h - d_l)) (d_h - d_l)^2 (1 - q)(1 - p_b) \Phi''(u_l^{wo}) > 0 \end{aligned}$$

Then, the function $\Omega(u_l^{wo}, e_w)$ is strictly concave. We can now reduce the previous problem to the following two-dimensional maximization problem

$$\max_{(u_l^{wo}) \in [-\infty, u(R)], e_w} \alpha [q x (p_g \Omega(u_l^{wo}, e_w) + (1 - p_g)(u_l^{wo} + e_w(d_h - d_l)))]$$

$$\begin{aligned}
& + (1 - \alpha)[q(1 - x)(p_b\Omega(u_l^{wo}, e_w) + (1 - p_b)(u_l^{wo} + e_w(d_h - d_l))] \\
& + (1 - \alpha)[(1 - q)(p_b\Omega(u_l^{wo}, e_w) + (1 - p_b)u_l^{wo})]
\end{aligned}$$

which is a strictly concave problem in u_l^{wo} and e_w . Thus, there exists a solution to the government's workfare problem and it is unique. In order to derive the remaining results we rewrite the benevolent government's problem as the following Lagrangian

$$\begin{aligned}
\mathcal{L} = & \alpha[qx(p_g u_h^{wo} + (1 - p_g)(u_w^{wo} - e_w d_l))] + (1 - \alpha)[q(1 - x)(p_b u_h^{wo} + (1 - p_b)(u_w^{wo} - e_w d_l))] \\
& + (1 - \alpha)[(1 - q)(p_b u_h^{wo} + (1 - p_b)u_l^{wo})] + \eta(u_w^{wo} - e_w d_h - u_l^{wo}) \\
& + \mu(R(x) - \Phi(u_h^{wo})[qx p_g + (1 - qx)p_b] - \Phi(u_w^{wo})[qx(1 - p_g) + q(1 - x)(1 - p_b)] - \Phi(u_l^{wo})(1 - q)(1 - p_b))
\end{aligned}$$

where the restriction $u_w^{wo} - e_w d_h = u_l^{wo}$ has not been replaced and the government chooses e_w as well. The solution to this problem is characterized by the first order conditions

$$\frac{\partial \mathcal{L}}{\partial u_h^{wo}} = \alpha q x p_g + (1 - \alpha)(1 - qx)p_b - \mu \Phi'(u_h^{wo})(q x p_g + (1 - qx)p_b) = 0 \quad (\text{A.7})$$

$$\frac{\partial \mathcal{L}}{\partial u_w^{wo}} = \alpha q x(1 - p_g) + (1 - \alpha)q(1 - x)(1 - p_b) + \eta - \mu \Phi'(u_w^{wo})(q x(1 - p_g) + q(1 - x)(1 - p_b)) = 0 \quad (\text{A.8})$$

$$\frac{\partial \mathcal{L}}{\partial u_l^{wo}} = (1 - \alpha)(1 - q)(1 - p_b) - \eta - \mu \Phi'(u_l^{wo})(1 - q)(1 - p_b) = 0 \quad (\text{A.9})$$

$$\frac{\partial \mathcal{L}}{\partial e_w} = -\alpha q x(1 - p_g)d_l - (1 - \alpha)q(1 - x)(1 - p_b)d_l - \eta d_h = 0 \quad (\text{A.10})$$

and the budget constraint. Equations (A.7), (A.9) and (A.10) can be combined into the following expression

$$\frac{\Phi'(u_h^{wo})}{\Phi'(u_l^{wo})} = \frac{(\alpha q x p_g + (1 - \alpha)(1 - qx)p_b)((1 - q)(1 - p_b))}{\left((1 - \alpha)(1 - q)(1 - p_b) + (\alpha q x(1 - p_g) + (1 - \alpha)q(1 - x)(1 - p_b)) \frac{d_l}{d_h}\right)(q x p_g + (1 - qx)p_b)} \quad (\text{A.11})$$

We want to show that if $e_w(x) > 0$ then $u_h^{wo}(x) > u_l^{wo}(x)$, which is equivalent to showing that

$$\frac{(\alpha q x p_g + (1 - \alpha)(1 - qx)p_b)((1 - q)(1 - p_b))}{\left((1 - \alpha)(1 - q)(1 - p_b) + (\alpha q x(1 - p_g) + (1 - \alpha)q(1 - x)(1 - p_b)) \frac{d_l}{d_h}\right)(q x p_g + (1 - qx)p_b)} > 1$$

The previous inequality can be rewritten as

$$\begin{aligned}
(1 - q)(1 - p_b)q x(1 - p_g)(2\alpha - 1) & > \\
\frac{(1 - p_g)}{p_g}(\alpha q x(1 - p_g) + (1 - \alpha)q(1 - x)(1 - p_b)) \frac{d_l}{d_h} (q x p_g + (1 - qx)p_b) & \quad (\text{A.12})
\end{aligned}$$

Below we show that when the government strictly prefers to use workfare (i.e., $e_w > 0$) the following condition must hold

$$\begin{aligned}
(1 - q)(1 - p_b)q x(1 - p_g)(2\alpha - 1) & > \\
(\alpha q x(1 - p_g) + (1 - \alpha)q(1 - x)(1 - p_b)) \frac{d_l}{d_h} (q x(1 - p_g) + (1 - p_b)(1 - qx)) &
\end{aligned}$$

Therefore, inequality (A.12) holds if

$$(\alpha qx(1-p_g) + (1-\alpha)q(1-x)(1-p_b)) \frac{d_l}{d_h} (qx(1-p_g) + (1-p_b)(1-qx)) > \frac{(1-p_g)}{p_g} (\alpha qx(1-p_g) + (1-\alpha)q(1-x)(1-p_b)) \frac{d_l}{d_h} (qxp_g + (1-qx)p_b)$$

After rearranging and canceling terms out, the previous inequality is simplified to $p_g > p_b$, which is our maintained assumption. Then, since inequality (A.12) holds when $e_w(x) > 0$, we have that $\frac{\Phi'(u_h^{wo})}{\Phi'(u_l^{wo})} > 1$, which implies that $u_h^{wo}(x) > u_l^{wo}(x)$ when the government implements a workfare program.

Proof of Lemma 3

From the previous characterization we can find the set of parameters for which the government would strictly prefer to implement workfare (i.e., when $e_w > 0$). In order to do this, we find the set of parameters for which $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0} > 0$. The steps are as follows. First, solve for η from $\frac{\partial \mathcal{L}}{\partial u_l^{wo}}$:

$$\eta = (1-\alpha)(1-q)(1-p_b) - \mu \Phi'(u_l^{wo})(1-q)(1-p_b)$$

Replace this expression in $\frac{\partial \mathcal{L}}{\partial u_w^{wo}}$, set $u_w^{wo} = u_l^{wo}$ (which is equivalent to setting $e_w = 0$) and solve for μ :

$$\mu|_{e_w=0} = \frac{\alpha qx(1-p_g) + (1-\alpha)(1-p_b)(1-qx)}{\Phi'(u_l^{wo})(qx(1-p_g) + (1-p_b)(1-qx))}$$

Next, replace this expression in the expression previously derived for η :

$$\eta|_{e_w=0} = \frac{(1-q)(1-p_b)qx(1-p_g)(1-2\alpha)}{qx(1-p_g) + (1-p_b)(1-qx)}$$

Finally, put this expression in $\frac{\partial \mathcal{L}}{\partial e_w}$:

$$\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0} = -d_l (\alpha qx(1-p_g) + (1-\alpha)q(1-x)(1-p_b)) + d_h \frac{(1-q)(1-p_b)qx(1-p_g)(2\alpha-1)}{qx(1-p_g) + (1-p_b)(1-qx)}$$

The previous derivative will be positive only if $\alpha > 1/2$, otherwise $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0} < 0$ for all parameter values.

Proof of Lemma 4

Here we show that if there exists a value of $x \in (0, 1)$ such that $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0,x} > 0$ (which implies $\alpha > 1/2$), then there also exists a value $\tilde{x} \in (0, 1)$ such that for all $x > \tilde{x}$ we have $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0,x} > 0$ and for all $x \leq \tilde{x}$ we have $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0,x} \leq 0$. This result has the implication that $e_w = 0$ for all $x \leq \tilde{x}$ and that $e_w > 0$ for all $x > \tilde{x}$. For this purpose, we compute the second derivative of $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0}$ with respect to x

$$\frac{\partial^2 \left(\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0} \right)}{\partial^2 x} = 2d_h \frac{(1-q)(1-p_b)^2 q^2 (1-p_g)(2\alpha-1)(p_g-p_b)}{(qx(1-p_g) + (1-p_b)(1-qx))^3} > 0$$

Thus, the desired result follows from $\frac{\partial^2(\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0})}{\partial^2 x} > 0$ and the fact that $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0, x=0} < 0$. These two results imply that there exists a single value \tilde{x} such that $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0, \tilde{x}} = 0$ and that $\frac{\partial \mathcal{L}}{\partial e_w}|_{e_w=0, x} > 0$ only if $x > \tilde{x}$.

Proof of Theorem 1

We want to show that the highest equilibrium level of effort that can be attained in welfare, denoted by \hat{x}^{we} , is higher than any equilibrium level of effort attainable in workfare, denoted by x^{wo} . The proof focuses in cases in which there exist workfare equilibria in which the government optimally uses workfare, i.e. $e_w(x^{wo}) > 0$ (otherwise the comparison is trivial and not interesting). Let

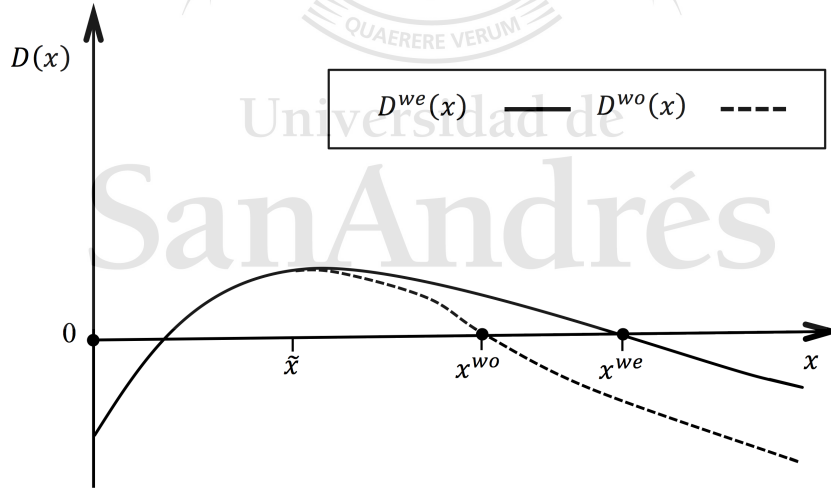
$$D^{we}(x) = (p_g - p_b)(u_h^{we}(x) - u_l^{we}(x)) - d_l$$

and

$$D^{wo}(x) = (p_g - p_b)(u_h^{wo}(x) - (u_w^{wo}(x) - e_w^{wo}(x)d_l)) - d_l$$

be the indifference conditions of the agent with low disutility from effort described in the definitions of welfare and workfare equilibria, respectively. By definition, interior welfare and workfare equilibria have to satisfy the conditions $D^{we}(x) = 0$ and $D^{wo}(x) = 0$, respectively. Similarly, welfare and workfare equilibria with $x = 1$ must satisfy $D^{we}(x) > 0$ and $D^{wo}(x) > 0$, respectively. Figure 5 illustrates the general idea of the proof.³²

Figure 5: Comparison of Welfare and Workfare Equilibria



To prove that $x^{wo} \leq \hat{x}^{we}$, we need to show that $D^{we}(x) \geq D^{wo}(x)$ for all x , both with strict inequality if the government uses workfare (i.e., when $e_w(x) > 0$). To see why this is the case let us consider two scenarios. If $\hat{x}^{we} = 1$, the result that $x^{wo} \leq \hat{x}^{we}$ trivially holds. In the case in which the highest level of effort attainable in a welfare equilibrium is interior ($\hat{x}^{we} < 1$), by continuity of $D^{we}(x)$ (shown below), the condition $D^{we}(x) \geq D^{wo}(x)$ implies that $D^{wo}(x) < 0$ for all $x \geq \hat{x}^{we}$ when $e_w(x) > 0$ (as shown in Figure 2). Therefore, if there exists any

³²Notice that, by the definition of \tilde{x} , the government only uses workfare when $x > \tilde{x}$. This means that for $x \leq \tilde{x}$ the welfare and workfare optimization problems are identical. Thus $D^{we}(x) = D^{wo}(x)$ for $x \leq \tilde{x}$.

workfare equilibria it must satisfy $x^{wo} < \hat{x}^{we}$. The condition $D^{we}(x) \geq D^{wo}(x)$ can be expressed as

$$(p_g - p_b)(u_h^{we}(x) - u_h^{wo}(x) - u_l^{we}(x) + (u_w^{wo}(x) - e_w^{wo}(x)d_l)) \geq 0$$

This inequality will be satisfied if the following conditions hold

- (1) $u_w^{wo}(x) - e_w^{wo}(x)d_l \geq u_l^{we}(x)$.
- (2) $u_h^{we}(x) \geq u_h^{wo}(x)$

The proof that both conditions hold follows from a series of claims.

CLAIM 2. Fix any $x \in (0, 1)$. If the government uses workfare, the solution to the government's problem must satisfy $u_l^{we}(x) < u_w^{wo}(x)$.

Proof. The proof goes by contradiction. Suppose that $u_l^{we}(x) \geq u_w^{wo}(x)$. Equations (A.4), (A.5), (A.7), (A.8) and (A.9) can be arranged in a way to obtain the following inequality

$$\frac{\Phi'(u_l^{we}(x))}{\Phi'(u_w^{wo}(x))} < \frac{\Phi'(u_h^{we}(x))}{\Phi'(u_h^{wo}(x))}$$

Given that $u_l^{we}(x) \geq u_w^{wo}(x)$ and that $\Phi''(\cdot) > 0$, this condition implies $u_h^{we}(x) > u_h^{wo}(x)$. We also know that when the government uses workfare $u_w^{wo}(x) > u_l^{wo}(x)$. Thus, $u_l^{we}(x) \geq u_w^{wo}(x) > u_l^{wo}(x)$ and $u_h^{we}(x) > u_h^{wo}(x)$. This means that ex post all agents are weakly worse off with the workfare scheme and some are strictly worse off. This is a contradiction because $V^{wo}(x) \geq V^{we}(x)$ for all x (with strict inequality when $e_w(x) > 0$). Then it must be that $u_l^{we}(x) < u_w^{wo}(x)$.

CLAIM 3. Fix any $x \in (0, 1)$. If the government uses workfare, the solution to the government's problem must satisfy $u_h^{we}(x) \geq u_h^{wo}(x)$.

Proof. The proof goes by contradiction. Suppose that $u_h^{we}(x) < u_h^{wo}(x)$. From our previous claim we know that $u_l^{we}(x) < u_w^{wo}(x)$. This inequality and the equality of resources across redistributive models (for a given x) imply that $u_l^{we}(x) > u_l^{wo}(x)$. From the budget constraint we get the following inequality

$$\begin{aligned} \Phi(u_l^{we}) (qx(1 - p_g) + (1 - qx)(1 - p_b)) > \\ \Phi(u_w^{wo}) (qx(1 - p_g) + q(1 - x)(1 - p_b)) + \Phi(u_l^{wo})(1 - q)(1 - p_b) \end{aligned}$$

which can be rewritten as

$$\Phi(u_l^{we}) > \frac{\Phi(u_w^{wo}) (qx(1 - p_g) + q(1 - x)(1 - p_b)) + \Phi(u_l^{wo})(1 - q)(1 - p_b)}{(qx(1 - p_g) + (1 - qx)(1 - p_b))}$$

Note that the right hand side is a weighted average between $\Phi(u_w^{wo})$ and $\Phi(u_l^{wo})$, where the weights sum up to one. Let $CE(\Phi)$ represent the certainty equivalent of the above random variable when the utility function is $\Phi(\cdot)$. Then, $\Phi'(\cdot) > 0$ implies $u_l^{we} > CE(\Phi)$. On the other hand, the condition $u_h^{we}(x) < u_h^{wo}(x)$ implies $\lambda > \mu$

(see equations (A.4) and (A.7)). Then, combining equations (A.5), (A.8) and (A.9) we obtain the following inequality

$$\begin{aligned} \Phi'(u_l^{we}(x)) (qx(1-p_g) + (1-qx)(1-p_b)) &< \\ \Phi'(u_l^{wo}(x))(1-q)(1-p_b) + \Phi'(u_w^{wo}(x)) (qx(1-p_g) + (1-x)(1-p_b)q) \end{aligned}$$

which can also be rewritten as

$$\Phi'(u_l^{we}(x)) < \frac{\Phi'(u_l^{wo}(x))(1-q)(1-p_b) + \Phi'(u_w^{wo}(x)) (qx(1-p_g) + (1-x)(1-p_b)q)}{(qx(1-p_g) + (1-qx)(1-p_b))}$$

Let $CE(\Phi')$ represent the certainty equivalent of the above random variable when the *utility* function is $\Phi'(\cdot)$. Since $\Phi''(\cdot) > 0$, the previous inequality implies that $u_l^{we} < CE(\Phi')$. This is a contradiction. The condition

$$\frac{\partial}{\partial u} \frac{\Phi''(u)}{\Phi'(u)} \leq 0$$

implies that

$$-\frac{\Phi'''(u)}{\Phi''(u)} \geq -\frac{\Phi''(u)}{\Phi'(u)}$$

, which states that the Arrow-Pratt coefficient of absolute risk aversion is higher with *utility* $\Phi'(\cdot)$ than with *utility* $\Phi(\cdot)$. This, in turn implies that $CE(\Phi) \geq CE(\Phi')$. Combining all the inequalities we get the contradiction $u_l^{we} > u_l^{we}$.

CLAIM 4. Fix any $x \in (0, 1)$. If the government uses workfare, the solution to the government's problem must satisfy $u_w^{wo}(x) - e_w^{wo}(x)d_l > u_l^{we}(x)$.

Proof. The proof goes by contradiction. Assume $u_w^{wo}(x) - e_w^{wo}(x)d_l \leq u_l^{we}(x)$. From our previous claim we know that $u_h^{we}(x) \geq u_h^{wo}(x)$. From the condition that makes agents with high disutility from effort indifferent between participating in workfare or not we also know that $u_w^{work}(x) - e_w^{wo}(x)d_l > u_l^{wo}(x)$. Therefore all ex post types of agents are weakly worse off with workfare and the bad-poor agents are strictly worse off. This is a contradiction since $V^{wo}(x) \geq V^{we}(x)$ for all x (with strict inequality when $e_w^{wo}(x) > 0$).

CLAIM 5. The function $D^{we}(x)$ is continuous on $[0, 1]$.

Proof. We apply Berge's Maximum Theorem to show that the function $D^{we}(x)$ is continuous for $x \in (0, 1)$. This amounts to showing that $u_h^{we}(x)$ and $u_l^{we}(x)$ are continuous functions of x , for $x \in (0, 1)$. First, notice that the government's objective function (A.3) is continuous in x and in u_l (because the function $\Gamma(x, u_l^{we})$ ³³ in (A.2) is continuous in both arguments). Second, the domain $u_l^{we} \in [-\infty, u(R(x))]$ is not compact. However, the Inada condition $\lim_{c \rightarrow 0} U'(c) = \infty$ implies that there always exists a constant k small enough such that the constraint $u_l^{we} \in [k, u(R(x))]$ does not affect the result of the maximization program (A.3). Thus, the constraint $u_l^{we} \in [k, u(R(x))]$ becomes compact-valued for each $x \in (0, 1)$ and continuous (the level of aggregate resources $R(x)$ is also a continuous function of x). Then, by Berge's Maximum Theorem, the argument that maximizes the problem (A.3) $u_l^{we}(x)$ is upper semi-continuous. Furthermore, since the government's problem has a unique solution (Lemma 1), the solution $u_l^{we}(x)$ must be continuous in x . Then, $u_h^{we}(x) = \Gamma(x, u_l^{we})$ and

³³The dependency of $\Gamma(x, u_l^{we})$ on x has been suppressed in earlier proofs.

$D^{we}(x)$ are continuous as well. Continuity of the $D^{we}(x)$ function at $x \in \{0, 1\}$ is given by: (i) $\lim_{x \rightarrow 0} u_h^{we}(x) = \lim_{x \rightarrow 0} u_l^{we}(x) = u_h^{we}(0) = u_l^{we}(0)$ and (ii) $\lim_{x \rightarrow 1} u_h^{we}(x) = u_h^{we}(1)$ and $\lim_{x \rightarrow 1} u_l^{we}(x) = u_l^{we}(1)$, which are easy to obtain from equations (A.1), (A.4) and (A.5).

Combining the results from the previous claims we can conclude that $D^{we}(x) \geq D^{wo}(x)$, with strict inequality if $e_w^{wo}(x) > 0$. Let \hat{x}^{we} be the highest effort level that can be sustained in a welfare equilibrium. If $\hat{x}^{we} = 1$ ($D^{we}(\hat{x}^{we}) > 0$), the result $D^{we}(x) \geq D^{wo}(x)$ implies that any workfare equilibria x^{wo} must satisfy $x^{wo} \leq 1$. On the other hand if $\hat{x}^{we} < 1$, by definition of \hat{x}^{we} being the highest effort level that can be sustained in a welfare equilibrium and by continuity of $D^{we}(x)$, we know that $D^{we}(\hat{x}^{we}) = 0$ and that $D^{we}(x) < 0$ for all $x > \hat{x}^{we}$, which implies that $D^{wo}(x) < 0$ for all $x > \hat{x}^{we}$. If $e_w^{wo}(\hat{x}^{we}) > 0$ (i.e., the government uses workfare when $x = \hat{x}^{we}$), then $D^{wo}(\hat{x}^{we}) < 0$. Therefore if there exist a workfare equilibrium it must satisfy $x^{wo} < \hat{x}^{we}$. The last step of the proof consists on verifying that agents with high disutility from effort do not want to make an effort in the first period. This is equivalent to showing that

$$\begin{aligned} D^{wo}(x) &= p_g u_h^{wo}(x) + (1 - p_g) u_l^{wo}(x) - d_h - (p_b u_h^{wo}(x) + (1 - p_b) u_l^{wo}(x)) \\ &= (p_g - p_b) (u_h^{wo}(x) - u_l^{wo}(x)) - d_h < 0 \end{aligned}$$

The last inequality can be rearranged as

$$\frac{u_h^{wo}(x) - u_l^{wo}(x)}{d_h} < \frac{1}{p_g - p_b}.$$

If the numerator is a bounded function of d_h , then the condition will hold for high values of d_h . It is easy to verify from equation (A.11) that $\lim_{d_h \rightarrow \infty} \frac{x \Phi'(u_h^{wo}(x))}{\Phi'(u_l^{wo}(x))} = \bar{k}$, where \bar{k} is a positive and bounded constant. Since $\Phi'(\cdot) > 0$ and $\Phi''(\cdot) > 0$, $u_h^{wo}(x)$ and $u_l^{wo}(x)$ are bounded functions of d_h . This completes our proof.

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B Online Appendix (NOT FOR PUBLICATION)

B.1 Further Evidence from the Online Experiment

This Appendix provides some additional evidence from the experimental survey about the link between sympathy for the diligent and the demand for workfare. After respondents recommended the level of the unconditional cash transfer, they were told that the government was going to offer the cash transfer recommended by the subject as Program A. In addition to Program A, the government could also offer Program B, which would involve a larger cash transfer, but the beneficiary would be required to work a fixed number of hours per week for the local government. We purposely presented the respondents with an extreme scenario in which the effort under workfare was costly to the beneficiary but completely wasteful, stressing (in boldface) that: “Due to over-staffing and management costs, even though the individual will need to work hard in Program B, his efforts will not produce any value for society whatsoever.” The purpose of this statement was to assess whether the demand for a work requirement was because of the cost that it imposes on the beneficiary rather than because of the benefits that it provides to society.

Even though it was wasteful, around 50% of respondents still chose to offer a workfare program. This evidence is consistent with our argument that fairness concerns can create a demand for work requirements even in the extreme case where workfare is completely wasteful.³⁴ Additionally, after eliciting the respondents’ preferences about Program B, we asked an open-ended question requesting an explanation for their choice. As expected, a majority of the explanations included references to fairness concerns. Indeed, this evidence is consistent with Falk et al. (2006), who conducted a laboratory experiment in which subjects voted on whether to use welfare or workfare for social assistance. They found that, when asked about their motivation to support workfare, more than two-thirds of the supporters of workfare mentioned variations of fairness concerns, while only one quarter mentioned self-interested motives.

In the survey experiment, subjects who recommended that the government offer a Program B were further asked to choose a specific level of cash transfer and a number of hours for the work requirement. Table 2 shows average outcomes divided by treatment groups. These outcomes can be used to proxy the extent to which subjects demanded workfare. For example, the additional workfare cash is the gap between the cash offered in Program B and the cash offered in Program A (which, by definition, is zero if no Program B is offered). In the No-Info group, this additional

³⁴Of course, there are other reasons why individuals may demand workfare in a situation like this. For example, individuals may have the paternalistic view that working in exchange for the cash transfer will be enriching for the beneficiary (Moffitt (2006)), because of a feeling of fulfillment or because it can serve as training for future jobs.

cash was about \$40 per week, equivalent to 36% of the amount offered in Program A. If we focus on the subset of subjects who offered a Program B, then the average cash in Program B is \$85 more than the cash in Program A (or 77% more cash). In both comparisons, the additional cash offered under the condition of work requirements was substantial. Also, we included a question about the perceived probability that the beneficiary would choose Program B over Program A. The last row from Table 2 shows the average of an outcome defined as 0 if choosing Program B was very unlikely and 1 if choosing Program B was very likely. In the No-Info treatment, individuals thought that there would be a 50%-50% chance that Program B was chosen. Thus, the evidence suggest that individuals designed the programs such as they are both likely to be chosen by beneficiaries.

It is also possible to compare the recommended design of Program B across treatment groups. There is, however, an important caveat. In this survey experiment, individuals first chose Program A; then, without anticipating it, respondents were offered Program B as an option. The ideal conditions for workfare to act as a screening device are different: the individual should choose the designs of Program A and Program B simultaneously. We did not pursue this latter design, because it seemed too complicated for an online survey. We can examine how the signals about the hard-working spirt of the beneficiary affected the demand for workfare. First, individuals demand workfare even when they have a signal that the beneficiary is hard working or lazy. One interpretation is that respondents do not fully trust the government's claim that the beneficiary is lazy or hard-working, so that even conditional on that signal they still demand work requirements for screening purposes. A more interesting pattern is the difference in demand for workfare between individuals described as lazy and individuals described as hard-working. Conditional on not expecting Program B, subjects were much more generous in Program A with hard-working beneficiaries than with lazy beneficiaries. When they are given the option of offering Program B, the question is whether subjects would be willing to "close" part of the gap in assistance to the individuals described as lazy if they are willing to "prove" that they are not lazy by complying with the work requirement. Consistent with this prediction, the additional cash offered in Program B was 30% higher when the beneficiary was described as lazy, compared to when he was described as hard-working ($p\text{-value} = 0.066$). In contrast, signals about the race and nationality of the beneficiary did not have a significant effect on the demand for workfare. The case of disabilities is also interesting, because (as discussed in the model) these individuals are probably perceived as having a "fair" reason not to work. Consistent with this view, informing the respondent that the beneficiary is disabled caused a statistically significant drop in the demand for workfare of almost 20%.

Table 2: Summary Statistics for Experimental Survey
across Treatment Arms

	Treatment								
	No Info	Hard-Working	Lazy	African American	White	Mexican	American Disabled	Not Disabled	
Welfare cash (\$)	111.76 (4.67)	121.95 (4.63)	65.98 (4.75)	108.60 (4.82)	100.00 (4.58)	96.73 (4.76)	103.42 (4.72)	120.10 (4.47)	106.91 (4.93)
% of Individuals implementing Workfare	0.47 (0.04)	0.50 (0.04)	0.60 (0.04)	0.47 (0.04)	0.46 (0.03)	0.47 (0.04)	0.48 (0.04)	0.43 (0.03)	0.46 (0.04)
Additional Workfare cash (\$)	40.40 (4.10)	41.23 (4.28)	52.27 (4.31)	37.90 (3.95)	36.70 (3.72)	38.88 (4.10)	33.58 (3.33)	32.56 (3.46)	39.36 (4.04)
Hours of work in Workfare	3.72 (0.31)	3.78 (0.31)	4.90 (0.32)	3.42 (0.29)	3.51 (0.30)	3.80 (0.31)	3.69 (0.31)	3.19 (0.29)	3.76 (0.32)
Implicit hourly wage in Workfare	13.54 (1.46)	14.96 (1.47)	12.74 (1.22)	12.98 (1.29)	12.08 (1.49)	11.89 (1.21)	11.27 (1.22)	11.87 (1.19)	10.99 (1.16)
Expected participation in Workfare	0.45 (0.03)	0.53 (0.03)	0.35 (0.03)	0.51 (0.03)	0.55 (0.03)	0.50 (0.03)	0.48 (0.03)	0.45 (0.04)	0.54 (0.03)

Notes: $N = 1,778$. Data from the survey experiment. Respondents were put in the hypothetical position in which the United States government appoints them to choose policies that would aid poor families. We provided the respondent with a description of the household that would benefit from the social assistance, and we randomized some information in this description. Each column represents a treatment arm. No-Info corresponds to the baseline information (i.e., no further information added). Each row corresponds to a different choice made by the respondent. Welfare cash corresponds to the amount of unconditional cash transfer (in U.S. \$) the respondent chose for the beneficiary. Respondents were also given the possibility to additionally offer a workfare program (the hypothetical beneficiary would choose one social program among those two). The second row shows the percentage of respondents that wanted to offer the additional workfare program. Additional workfare cash corresponds to the difference between the weekly cash transfer chosen in the workfare and welfare programs. The fourth row reports the amount of work requirement (in hours per week at a local government) that respondents chose for the workfare program (if the respondent decided not to offer workfare, hours of work were coded as zero). The implicit hourly wage is the ratio between additional workfare cash and the hours of work in workfare. Expected participation in workfare is a variable that goes from 0 to 1 where 0 indicates that the respondent believed that the hypothetical beneficiary would “very likely choose welfare” and 1 that she/he believed the beneficiary would “very likely choose workfare.” Averages computed within each treatment arm listed in the column names, with standard errors shown in parenthesis. For more details see the Questionnaire in the Online Appendix.

B.2 Description of Online Surveys

This appendix provides the structure and set of questions used in the online survey. The survey was divided into 4 blocks. The first block gathers standard background information and was administered to all participants. The second block consists of the complementary (non-experimental) section and it was randomly assigned to 502 individuals. The third block consists of the experimental section of the survey. This section was randomly assigned to 1,778 individuals. The last block contains attention checks and was administered to all participants. Next we provide a full transcript of the survey. Text in italics are our notes about the survey and was not seen by respondents.

Background Questions (Shown to All Respondents)

Introduction Hi. We are a non-partisan group of academic researchers from Stanford University and Microsoft Research. Our goal is to understand individuals' perceptions and preferences. This survey should take about five minutes to complete. Your participation in this study is purely voluntary, and you may withdraw from the study and retract the responses you have provided at any time without any penalty whatsoever. Your name will not be recorded in any fashion. Since this study is related to the United States, you must be a resident of that country aged 18 years old or older in order to participate.

Q1.1 Question: To get a general picture of our survey group, we would like to request some background information. Please remember that your answers will remain confidential and that the survey will not collect any names. Please indicate your gender: *Options:* [Female, Male]

Q1.2 Question: How old are you? *Options:* [18-24, 25-29, 30-34, 35-39, 40-44, 45 or over]

Q1.3 Question: What state do you live in? *Options:* [List of all U.S. States]

Q1.4 Question: Please indicate the highest level of formal education that you have completed: *Options:* [Less than high school diploma, High school degree or equivalent, College degree, Post-graduate degree]

Q1.5 Question: Please indicate your current annual household income in U.S. dollars: *Options:* [Under \$10,000, \$10,000 - \$29,999, \$30,000 - \$59,999, \$60,000 - \$90,000, Over \$90,000]

Q1.6 Question: On economic policy matters, where do you see yourself on the liberal/conservative spectrum? *Options:* [Very conservative, Conservative, Moderate, Liberal, Very liberal]

Q1.7 Question: Generally speaking, do you usually think of yourself as a Republican, Democrat or Independent? *Options:* [Strong Republican, Moderate Republican, Independent, Moderate Democrat, Strong Democrat]

Q1.8 This is an attention check. Question: Recent research on decision making shows that choices are affected by the context in which they are made. Differences in how people feel, in

their previous knowledge and experience, and in their environment can influence the choices they make. To help us understand how people make decisions, we are interested in information about you, specifically whether you actually take the time to read the instructions; if you don't, some results may fail to tell us very much about decision making in the real world. To help us confirm that you have read these instructions, please ignore the question below about how you are feeling and instead check only the 'none of the above' option. Thank you very much. *Options:* [Interested, Distressed, Excited, Upset, Strong, Scared, Hostile, Enthusiastic, Proud, Irritable, Alert, Inspired, Nervous, Determined, Attentive, Jittery, Active, None of the above]

Complementary Section (Shown to 20% of Subjects)

Q2.1 Question: Do you agree with the following statement? "One's income is mostly the result of one's individual effort rather than luck." *Options:* [Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree]

Q2.2 Question: Here are two opinions about poor people in this country. Which comes closest to your view? *Options:* [They are poor because they have been unlucky, They are poor because of laziness and lack of will power]

Q2.3 Question: Should government spending on aid to poor families increase, decrease, or stay the same? *Options:* [Increase by 50% or more, Increase by 40%, Increase by 30%, Increase by 20%, Increase by 10%, Stay the same, Decrease by 10%, Decrease by 20%, Decrease by 30%, Decrease by 40%, Decrease by 50% or more]

Q2.4 Question: Now imagine that you were appointed by the United States government to choose policies about aid to poor families.

The government is considering giving a cash transfer to low income households. The government is evaluating these transfers on a case-by-case basis. Consider the following two cases:

Individual A: a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household. He has worked very hard his entire life. However, he cannot find a full-time job because his line of work has been dramatically affected by the recent economic crisis.

Individual B: a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household. He has been lazy for his entire life and as a result cannot find a full-time job. Which of these two individuals is more deserving of a cash transfer of \$5,000 per year? *Options:* [Individual A is much more deserving, Individual A is slightly more deserving, They are both equally deserving, Individual B is slightly more deserving, Individual B is much more deserving]

Q2.5 Question: There are different ways for the government to distribute money to poor families. Some programs provide unconditional cash transfers, while other programs make the

amount of the cash transfer conditional on some characteristics - such as how much the recipient works.

The Earned Income Tax Credit (EITC) is an example of the latter option. The EITC is a refundable tax credit for low- to moderate-income working individuals and couples' particularly those with children. In a nutshell, it gives more money to low-income individuals who work more.

To illustrate how the EITC works, consider a first individual who works 15 hours per week at \$10 per hour, making an annual gross income of \$7,800. A second individual works 20 hours per week at the same job for \$10 per hour, making an annual gross income of \$15,600. Under an unconditional cash transfer, both individuals would get the same cash transfer from the government. Under the Earned Income Tax Credit, the second individual would get a cash transfer that is twice as high as the first individual's because he worked twice as many hours.

Imagine that you have been appointed by the U.S. government to decide how the government should spend the fixed amount of money it has for these two programs. What percentage of this fixed funding would you assign to each program? The percentages must add up to 100.

Unconditional Cash Transfers ----- *Options:* [Any integer between 0 and 100]

Earned Income Tax Credit ----- *Options:* [Any integer between 0 and 100]

Q2.6 Question: Do you agree with the following statement? "Beneficiaries of social programs should be required to do some work in exchange for government aid. For example, they could perform a few hours of work per week for their local governments." *Options:* [Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree]

Q2.7 Question: Could you please tell us why you agree/disagree with the previous statement?

Q2.8 Question: Do you agree with the following statement? "If beneficiaries of social programs were required to do some work in exchange for government aid (for example, perform a few hours of work per week for their local governments), that would prevent lazy people from participating in social programs." *Options:* [Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree]

Experimental Section (Shown to Remaining 80% of Subjects)

Q3.1 Instructions: Now imagine that you were appointed by the United States government to choose policies that would aid poor families. Below we ask you about your policy preferences. Please pay close attention to the description, because this is your main role in this survey. The government is considering giving cash transfers to low income households on a case-by-case basis. Consider the case of a married individual with 2 small children. He has a part-time job. He earns \$20,000 per year (net after taxes), and this is the sole source of income for his household.

An additional text is shown, chosen with equal probability from the following groups:

No-Info Treatment Arm.

Hard-Working Treatment Arm: He has worked very hard his entire life. However, he cannot find a full-time job because his line of work has been dramatically affected by the recent economic crisis.

Lazy Treatment Arm: He has been lazy for his entire life and as a result cannot find a full-time job.

African-American Treatment Arm: He is African American.

White Treatment Arm: He is White.

Mexican Treatment Arm: He was born in Mexico.

American Treatment Arm: He was born in the United States.

Disabled Treatment Arm: He has a disability.

Non-Disabled Treatment Arm: He does not have a disability.

Q3.2 Question: Please remember that your choice applies to this individual only, because the government is making decisions on a case-by-case basis. What amount of cash transfer would you give to this individual? *Options:* [\$0 per week (\$0 per year), \$20 per week (\$1,040 per year), \$40 per week (\$2,080 per year), \$60 per week (\$3,120 per year), \$80 per week (\$4,160 per year), \$100 per week (\$5,200 per year), \$120 per week (\$6,240 per year), \$140 per week (\$7,280 per year), \$160 per week (\$8,320 per year), \$180 per week (\$9,360 per year), \$200 per week (\$10,400 per year)]

Q3.3 Question: The government followed your advice and will offer this individual a cash transfer of [*Here goes choice to question Q3.2*] in accordance with Program A. In addition to Program A, the government can offer Program B.

Program B also involves a cash transfer, but in this program the individual will receive more money and in exchange will be required to work a fixed number of hours per week for the local government. If this individual does not comply with the work requirement, he will not receive the cash transfer. Due to overstaffing and management costs, even though the individual will need to work hard in Program B, his efforts will not produce any value for society whatsoever.

If the government offered Program B, it would be up to the individual to choose Program A or Program B, but he could not choose both.

Please remember that your choice applies to this individual only: the government is making decisions on a case-by-case basis. Given that Program A was already offered to the individual, would you recommend that the government offer Program B as an alternative? *Options:* [Yes, I would recommend that the government offer Program B as an alternative to Program A, No, I would recommend that the government offer Program A only]

Q3.4 Question: *If answer to question Q3.3 was positive, the respondent is asked the following*

question. Please tell us which combination of cash transfer and work requirement you would offer to this individual for Program B. Recall that the individual could choose either Program A or Program B, but not both:

Options: Amount of cash transfer

[Amount chosen in Q3.2+\$20 per week,...,Amount chosen in Q3.2+\$200 per week]

Options: Number of hours of work in a local governmental agency in exchange of cash transfer

[1 hour per week, 2 hours per week, 3 hours per week, 4 hours per week, 5 hours per week, 6 hours per week, 7 hours per week, 8 hours per week, 9 hours per week, 10 hours per week]

Q3.5 Question: *If answer to question Q3.3 was positive, the respondent is asked the following question.* Do you think the individual will choose Program A (unconditional cash transfer) or Program B (larger cash transfer conditional on work requirement)? *Options:* [Very likely Program A, More likely Program A, Equally likely Program A or B, More likely Program B, Very likely Program B]

Q3.6 Question: Previously you had the option of recommending that the government offer Program B, which combined a cash transfer with a work requirement. Could you please explain why you did or did not recommend the Program B option?

Concluding Questions (Shown to All Respondents)

Q4.1 Question: In the past three months, have you donated some of your time to an organization that supports those in need? *Options:* [Yes, No]

Q4.2 This is an attention check. *Question:* Individuals have different ways of following news. Nevertheless, we would like you to skip this question to show that you are reading carefully. Please do not check any of the following options: *Options:* [Print Newspapers, TV News, Online Newspapers, Other Online Sources (e.g., blogs, social networks)]

Q4.3 Question: In your opinion, were the questions included in this survey easy or difficult to understand? *Options:* [Easy to understand, Neither easy nor difficult, Difficult to understand]

Thank you for your time. Please click on the arrow below to finish.