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Chapter 1

Charitable Behavior and Public Intervention: a Survey Experiment (joint work with Bence Szabó)

Abstract

In this paper, we measure the extent of charitable behavior crowding out public intervention and how this phenomenon affects the welfare of the poor. To achieve this objective, we collect novel survey data on a representative sample of the U.S. adult population. In the survey, respondents are asked to go through several hypothetical scenarios, constructed on the basis of a simple model of public good contribution to learn about their preferences and expectations regarding donations and taxation. We find that when donations are available, government expenditure on the poor is lower in equilibrium. Yet, households in need are better off due to disproportionately higher donations. Therefore, in our setting, private charity crowds out public intervention only to a limited extent, affecting equilibrium-level taxes only slightly. We also estimate the structural parameters of preferences in our sample and find that individuals assign a sizable weight to both the utility of the poor and to the act of donating itself. The large contribution of the latter component rationalizes why taxation alone cannot fully compensate for the absence of donations.
Keywords: Altruism, Charity, Donation, Public Good, Anti-Poverty, Welfare
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1.1 Introduction

Charitable behavior plays a vital role in nearly all societies. For instance, donations account for more than 2% of the United States GDP (Andreoni and Payne, 2013), and more than 40% of U.S. households are involved in volunteering activities (Charities Aid Foundation, 2019). Similarly to taxation, private charity is a form of contribution to the public good. As such, the activity of charitable organizations is, to some extent, a substitute for public intervention. This is particularly true for areas such as poverty reduction, targeted by both charitable organizations and the public sector.[1] Some evidence of substitution between private charity and public intervention emerges from a cross-country comparison: among Western OECD countries, those that are characterized by a larger size of the government tend to show a lower prevalence of charity.[2]

The existence of some degree of substitution between charitable giving and public intervention has often been investigated in the literature, although most contributions have focused on one direction, that is whether government intervention could affect private donations through tax deductions (see for instance Schiff, 1985; Duncan, 1999; Brooks, 2000; Simmons and Emanuele, 2004; Garrett and Rhine, 2010; Bredtmann, 2016 and Peloza and Steel, 2005 for a meta-analysis of the estimates of the price elasticity of individual donations in the literature).

Whether the opposite direction is also relevant, that is whether the supply of private charity affects the extent of public intervention, has received considerably less attention. Becker and Lindsay (1994) and Sav (2012) find evidence for partial crowding out in the funding of US higher education; Heutel (2014) finds no evidence of private donations crowding out government grants to charities (while confirming that government grants crowd in private donations) while Werfel (2018) provides evidence that individuals are less likely to support higher taxation when informed of the size of charitable contributions in society.

While most contributions agree that the crowding out is not one-to-one in either direction, ruling out perfect substitution[3], answers concerning the size and even the direction of the relationship between charitable giving and public intervention are still discordant. Identifying a causal effect in either direction is difficult using observational data, as charitable giving does not happen in a vacuum; it is affected heavily by several unobserved confounders and equilibrium mechanisms.

In this paper we set to contribute to this debate with a survey experiment, by providing a causal estimate of the degree of crowding out in both directions. We identify and measure the impact of an increase in public intervention on private donations, and of its opposite, namely the effect

[1] In the U.S., 35% of the donations as of 2017 were directed towards organizations in health, education, and human services, while more than 30% targeted religious organizations, most of which are also involved in poverty relief activities according to the nonprofit organization Charity Navigator https://www.charitynavigator.org/, accessed 06/01/2022.

[2] See for instance OECD (2021), Charities Aid Foundation (2019).

[3] Among the possible explanations for the lack of a complete crowding out, Eckel et al. (2005) highlight how individuals do not fully internalize their contribution to the government finances and, therefore, indirectly to the public good through taxation (fiscal illusion).

of 'switching off' donations on tax preferences. To build the survey experiment, we rely on a simple framework that enriches the traditional models of public good contribution (Becker, 1974; Bergstrom et al., 1986) with elements that are typical of the more recent literature that investigates the determinants of private charity, such as impure altruism and reputational concerns (Andreoni, 1988, 1990; Bénabou and Tirole, 2006; Katz and Rosenberg, 2005).

We present a sample of 380 U.S. respondents[4] with hypothetical but realistic scenarios in which we vary the availability of donations and the respondents' gross income to measure the change in their taxation preferences. We also elicit respondents' donation choices at different taxation levels and their expectations about the average level of donations in society. Based on their answers, we simulate equilibrium outcomes in our public good model setting. The results of this exercise allow us to compare equilibrium tax rates and the welfare of the poor with and without donations available. Additionally, we conduct heterogeneity analyses based on the respondents' characteristics and elicited preferences and link them to their in-survey preferred levels of taxes and donations.

We find that government expenditure on the poor is lower when donations are available, but households in need are still better off due to disproportionately higher donations. In our setting, private charity crowds out public intervention only to a limited extent; equilibrium tax rates in the no-donations scenario are not high enough to compensate for the lack of private charity, suggesting that people are also driven by the direct utility of the act of donating (*warm glow*). We confirm this finding by retrieving the structure of preferences which generates the behaviors we elicit in the hypothetical scenarios with individual-level estimates of the main utility parameters of our model (generosity, warm glow and weight of reputational concerns). While the estimated average generosity in our sample is higher than the weight of the direct utility of donations, the latter component is positive and relatively large in magnitude: direct utility from donations (the *warm glow* component) is assigned an average weight of nearly 3% of the utility of one's own consumption, compared with a value of 6.6% for the weight of the utility of the poorest members of society (the generosity component). Reputational concerns are instead assigned a lower weight, at 0.2%. Overall, our results suggest that the widespread availability of private charity in the United States plays a pivotal role in alleviating poverty, which government intervention cannot substitute for due to the structure of voters' preferences.

The paper proceeds as follows: Section 1.2 describes the model and derives some predictions, Section 1.3 describes the survey and the characteristics of the sample, Section 1.4 presents our results, while Section 1.5 concludes.

[4]The sample was selected by the survey company Prolific to be representative of the population of the United States according to gender, age bracket, and ethnicity.

1.2 A simple framework

We now provide an overview of a simple theoretical framework to guide the construction of the hypothetical scenarios in our survey. We are interested in the redistribution effects of the availability of charity in general equilibrium, where households form expectations over the charitable behavior of others which in turn affect their own ideal taxation levels. The latter are then reflected in the social choice of taxation with and without donations: if the expectations of households were substantially higher than the actual donation behavior of others, each household might prefer a suboptimally low level of taxes, leaving the poorest households potentially worse off when donations are available. However, if donations affected individual utility not only through their contribution to the benefit of poor households, but also directly (through a sizable enough *warm glow* component), incentives for charity could be largely beneficial for the poor.

We build a simple public good model where households derive utility from their own consumption, the public good, and their contribution to the public good[5]. In our setting, the society is composed of N_p households earning positive income, and N_z households earning zero income, and the public good is defined as the financial support accruing to zero-income households. Positive-income households can contribute to the public good through two channels: taxation and private donations. Their own donations, the expected level of donations, and the welfare of the households in need enter the optimal consumption choice of households, so that the value of the problem will depend on the level of taxes, allowing to pin down the preferred level of taxation for each household. The utility function of the households reflects inequity, warm glow, and reputational concerns. Finally, a neutral government sets the tax rate in accordance with the preferences of the median voter.

1.2.1 Baseline case: no charity

We first describe a simpler version of our model, where households earning a positive income can contribute to the public good only through taxation. Positive-income households maximize their utility, given by:

$$u(c_i, b) = log(c_i) + \alpha_i log(b).$$

where c_i is consumption, α_i is the *generosity* or *pure altruism* parameter, representing the weight of the public good in the utility function, and b is the public good, i.e. the transfer accruing to each household-in-need:

$$b = \frac{1}{N_z}(\tau - \underline{\tau})W,$$

[5] Adapting the frameworks of Andreoni (1988) and Duncan (1999).

where $W = \sum_{i=1}^{N_p} w_i$ s the total wage mass, τ is the tax rate selected by the government to support the households in need, and $\underline{\tau}$ is the fraction of total taxes devoted to the upkeep of the government, which is fixed at 20% of the gross wage.

Positive-income households cannot consume more than their net income w_i, resulting in the following budget constraint:

$$c_i \leq (1-\tau)w_i.$$

Finally, zero-income households are characterized by the following utility function:

$$u(b) = log(b)$$

Solving for the preferred tax rate

In the baseline case where no charity is allowed, consumption is always set at the maximum available level $c_i = w_i(1-\tau)$. We can therefore solve for the preferred tax rate of each positive-income household, τ_i^*, by maximizing the value of the problem,

$$V(w_i, W, \tau, N_z) = log\big((1-\tau)w_i\big) + \alpha_i log\bigg(\frac{1}{N_z}(\tau - \underline{\tau})W\bigg).$$

This implies the following first-order condition and optimal taxation:

$$\frac{\partial V(w_i, W, \tau, N_z)}{\partial \tau} = -\frac{1}{(1-\tau_i^*)} + \frac{\alpha_i}{(\tau_i^* - \underline{\tau})} = 0 \tag{1.1}$$

$$\tau_i^* = \frac{\alpha_i + \underline{\tau}}{1+\alpha_i}. \tag{1.2}$$

Deriving the preferred tax rate τ_i^* with respect to the degree of inequity aversion α_i, we obtain:

$$\frac{\partial \tau^*}{\partial \alpha_i} = \frac{1-\underline{\tau}}{(1+\alpha_i)^2} > 0, \tag{1.3}$$

meaning that the preferred tax rate is increasing in inequity aversion.

Zero-income households instead simply wish to maximize the amount of public good, and therefore prefer the highest possible tax rate (which we assume bounded above by some amount τ^H). When donations are not allowed, α_i is pinned down by preferred taxes:

$$\alpha_i = \frac{\tau_i^* - \underline{\tau}}{1-\tau_i^*}$$

1.2.2 The government's problem

We close the model by solving the government's problem. The government knows the preferences of each household and sets the tax rate τ to match as closely as possible the preferences of the

median voter. It, therefore, minimizes the sum of absolute deviations from each citizen's preferred tax rate:

$$\tau = \arg\min_{\tau' \geq \underline{\tau}} \sum_{i=1}^{N_p+N_z} |\tau_i^* - \tau'|$$

This expression is indeed minimized by choosing the median of the population's preferences, which is equivalent to the preferred tax rate of the median voter[6].

1.2.3 Complete case: reintroducing private charity

We now reintroduce private charity in the picture and present the complete framework. Positive-income households can contribute to the welfare of the households in need, both paying taxes and engaging in private charity. Their objective function is now:

$$\begin{aligned} u(c_i, d_i; d_{-i}, b) = & \, log(c_i) + \gamma_i log(1 + d_i) + \alpha_i log(\mathbb{E}[b|\tau]) \\ & + \eta_i \Big(log(1 + (d_i - \mathbb{E}[d_{-i}|\tau])^2) \cdot 1\big[d_i \geq \mathbb{E}[d_{-i}|\tau]\big] \\ & - log\big(1 + (\mathbb{E}[d_{-i}|\tau] - d_i)^2\big) \cdot 1\big[d_i < \mathbb{E}[d_{-i}|\tau]\big] \Big), \end{aligned}$$

where, in addition to own consumption and the public good, utility depends on the amount of own donations (d_i) and on the deviation of own donations from the prevailing level of donations in the society, respectively weighted by γ_i, the *warm glow* parameter, that regulates the importance of one's own contribution to the public good in the utility function, and η_i, that is the weight of reputational concerns, or equivalently the cost of deviating from the social norm[7].

The budget constraint is also modified to include donations:

$$c_i \leq w_i(1 - \tau) - d_i.$$

It is important to highlight that now, differently from the simplified case with no donations, agents have to form expectations over the private charitable contributions of others. Indeed, they get utility (disutility) from both positive (negative) deviations between their own donations and the average societal level of donations, and from the total amount of public good, which is composed of taxes, own donations, and the not-yet-determined donations of other positive-income households

[6] Using a quadratic loss function would result in selecting the average of the ideal tax rates instead of the median.

[7] The role of reputational concerns in this context has been emphasized, for instance, by Bénabou and Tirole (2006)

in the society:

$$\mathbb{E}[b|\tau] = \frac{1}{N_z}\Big((\tau - \underline{\tau})W + d_i + \mathbb{E}\big[\sum_{j\neq i} d_j|\tau\big]\Big).$$

We can simplify this expression by allowing individuals to only form beliefs on the average level of donations in the society[8] conditional on the level of taxes:

$$\mathbb{E}[b|\tau] \approx \frac{1}{N_z}\Big((\tau - \underline{\tau})W + d_i + (N_p - 1)\mathbb{E}[d_{-i}|\tau]\Big),$$

The usual assumption of perfect rationality would require that agents' guesses matched the realized outcome. We choose not to make any assumption on the structure of beliefs and instead use our survey to test whether individuals hold accurate beliefs. For the sake of completeness, we will, however, present a brief analysis of the benchmark case, characterized by a representative household with rational expectations.

Benchmark case: representative agent with correct beliefs

In the benchmark case, the representative agent maximizes her utility while knowing that everybody else solves an identical problem. Since, in the benchmark case, all individuals have the same preferences and budget, we can treat expected donations such that the agent has correct beliefs about expected donations as if they were the solution to the individual optimization problem,

$$\begin{aligned} V(w_i, W, \tau, N_z, N_p) = \max_{d_i} & \, log\big((1-\tau)w_i - d_i\big) + \gamma_i log(1 + d_i) \\ & + \alpha_i log\Bigg(\frac{1}{N_z}\Big((\tau - \underline{\tau})W + N_p\mathbb{E}[d_{-i}|\tau]\Big)\Bigg). \end{aligned}$$

Since everybody is the same, the individual level of donation (d_i) coincides with the average societal level ($\mathbb{E}[d_{-i}|\tau]$), implying that the reputational concern term does not play any role. However, the individual decision maker, not internalizing this, still solves for her own level of donations as if her contribution was only infinitesimal for the overall benefit accruing to the unemployed so that the benefit term ($\mathbb{E}[b|\tau]$) is taken as given and does not appear in the first order condition.

The optimal level of donations thus results from maximizing the following first-order condition

$$\text{w.r.t. } d_i : \frac{1}{w_i(1-\tau) - d_i} = \frac{\gamma_i}{1 + d_i} \tag{1.4}$$

$$d_i^* = max\left\{\frac{\gamma_i w_i(1-\tau) - 1}{1 + \gamma_i}, 0\right\}. \tag{1.5}$$

[8] Excluding themselves, which however, is of little importance for a big enough number of households

The preferred level of donations is positive whenever:

$$\gamma_i \geq \frac{1}{w_i(1-\tau)},$$

meaning that there will be a positive level of donations in society whenever the level of warm glow is above a certain threshold (equal to at least the inverse of the net wage).

From 1.5, the optimal level of consumption can also be retrieved as:

$$c_i^* = min\left\{\frac{w_i(1-\tau)-1}{1+\gamma_i}, w_i(1-\tau)\right\}.$$

Assuming a high enough level of warm glow, we can plug back the values of the interior solution to obtain the value of the problem in the benchmark case:

$$\begin{aligned} V(w_i, W, \tau, N_z, N_p) = log\left(\frac{w_i(1-\tau)-1}{1+\gamma_i}\right) + \gamma_i log\left(\frac{\gamma_i w_i(1-\tau)-1}{1+\gamma_i}\right) \\ +\alpha_i log\left(\frac{1}{N_z}\left((\tau-\underline{\tau})W + N_p\frac{\gamma_i w_i(1-\tau)-1}{1+\gamma_i}\right)\right), \end{aligned}$$

from which we can compute the preferred tax rate of household i, τ_i^*, by finding the tax rate maximizing the value of her problem. Considering that $W = N_p w_i$, the first order condition with respect to τ,

$$\begin{aligned} \frac{\partial V(w_i, W, \tau, N_z, N_p)}{\partial \tau} = -\frac{w_i}{w_i(1-\tau)-1} - \frac{\gamma_i^2 w_i}{\gamma_i w_i(1-\tau)-1} \\ + \frac{\alpha_i w_i}{(1+\gamma_i)(\tau-\underline{\tau})w_i + \gamma_i w_i(1-\tau)-1} = 0 \end{aligned}$$

implies that:

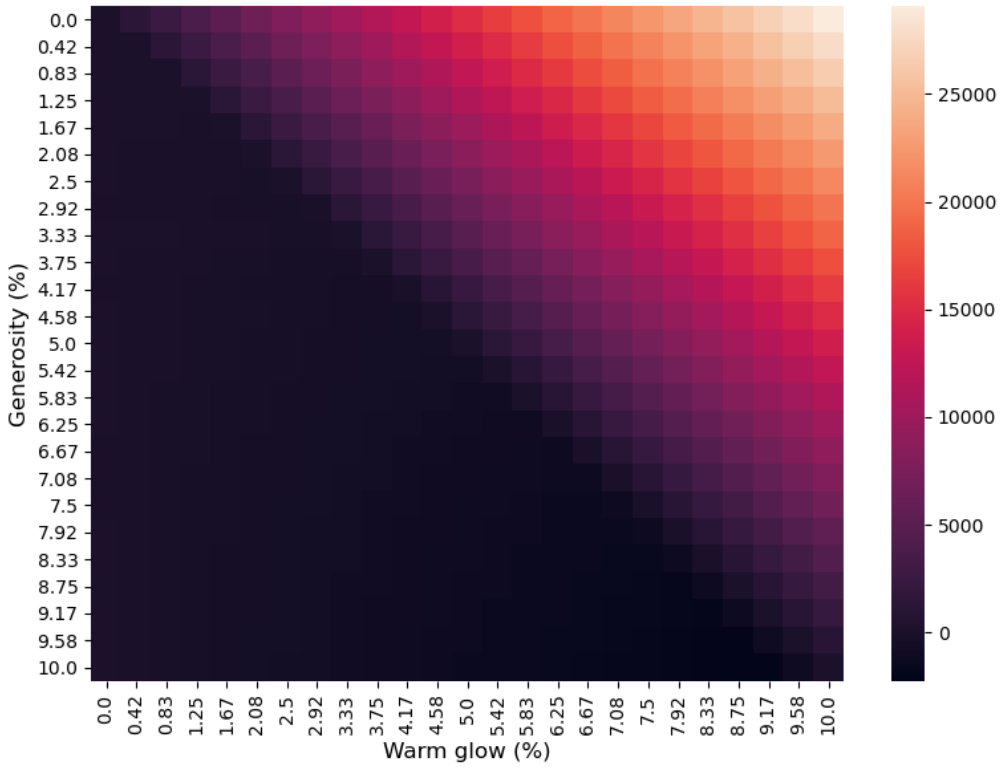
$$\frac{1}{w_i(1-\tau)-1} + \frac{\gamma_i^2}{\gamma_i w_i(1-\tau)-1} = \frac{\alpha_i}{(1+\gamma_i)(\tau-\underline{\tau})w_i + \gamma_i w_i(1-\tau)-1},$$

which can be solved numerically for the preferred tax rate, τ^*.

Solving the problem for different values of the preference parameters governing inequity aversion (α) and warm glow (γ), we can infer their effect on preferred taxes, donations, and the level of benefits households-in-need receive. Preferred tax rates increase in inequity aversion but decrease in warm glow. Donation rates increase in warm glow, but as an individual's donations do not contribute to reducing inequity, inequity aversion does not affect optimal donation rates—consequently, total benefits for the poor increase in both dimensions. However, let's compare it with the scenario where donations are not allowed. We can see that for regions with somewhat high inequity aversion and warm glow, total benefits would decrease by allowing donations in society. So depending on

the preferences representing social values, allowing donations might or might not benefit those that they are designed to target, even if donation expectations are correct, as a consequence of the equilibrium brought by the taxes set by the politician.

Figure 1.1: Benefit accruing to each zero-income household with versus without donations in the RERA benchmark for different levels of generosity and warm glow



Notes: authors' calculations based on solving the problem of the representative agent with rational expectations and correct beliefs about the level of average donations in society. Tax rates are constrained from below at $\underline{\tau} = 0.2$ representing a mandatory minimum level of taxation covering other government expenditures, and household income is set at \$60,000.

General case

We now move away from the representative agent, rational expectations benchmark; that is, we allow for heterogeneous household-level utility parameters and income and household-specific expectations. We treat these as model parameters without imposing any assumption and derive the optimal level of donations again for an employed household i in this general case. Analogously to

the RERA case, households maximize their utility with respect to the donation level d_i:

$$\begin{aligned} V(w_i, W, d_{-i}, \tau, N_z, N_p) = \max_{d_i} & \, log(c_i) + \gamma_i log(1 + d_i) \\ & + \alpha_i log\Big(\frac{1}{N_z}\big((\tau - \underline{\tau})W + N_p \mathbb{E}[d_{-i}|\tau]\big)\Big) \\ & + \eta_i \Bigg(1\big[d_i \geq \mathbb{E}[d_{-i}|\tau]\big] \cdot log(1 + (d_i - \mathbb{E}[d_{-i}|\tau])^2) \\ & - 1\big[d_i < \mathbb{E}[d_{-i}|\tau]\big] \cdot log\big(1 + (\mathbb{E}[d_{-i}|\tau] - d_i)^2\big) \Bigg), \end{aligned}$$

resulting in the following first-order condition for the optimal level of donations:

$$\text{w.r.t. } d_i : \frac{1}{w_i(1-\tau) - d_i} = \frac{\gamma_i}{1 + d_i} + \frac{2\eta_i(d_i - \mathbb{E}[d_{-i}|\tau])}{1 + (d_i - \mathbb{E}[d_{-i}|\tau])^2} \tag{1.6}$$

from which the optimal level of donations can be retrieved as the solution to the third-degree equation:

$$\begin{aligned} 0 = & \Big(1 + \gamma_i + 2\eta_i\Big) d_i^3 \\ & + \Big(1 - 2\mathbb{E}[d_{-i}|\tau](1 + \gamma_i + \eta_i) - w_i(1-\tau)(\gamma_i + 2\eta_i)\Big) d_i^2 \\ & + \Big(1 - \gamma_i - 2\eta_i w_i(1-\tau) + \mathbb{E}^2[d_{-i}|\tau] + 2\mathbb{E}[d_{-i}|\tau]\big(1 - \eta_i + (\eta_i + \gamma_i)w_i(1-\tau)\big)\Big) d_i \\ & + \Big(1 - \gamma_i w_i(1-\tau) + 2\eta_i w_i(1-\tau)\mathbb{E}[d_{-i}|\tau] + \mathbb{E}^2[d_{-i}|\tau](1 - \gamma_i w_i(1-\tau))\Big) \end{aligned}$$

This model setup constitutes the baseline for the hypothetical scenarios we use in our survey. In the survey, we ask respondents to choose their amount of donations conditional on different levels of income (w_i) and taxes (τ), along with the expected value of donations in society given the level of taxes $\mathbb{E}[d_{-i}|\tau]$. Furthermore, we also elicit respondents' preferred level of taxes for two types of society: one where donations are allowed and one where taxation is the only source of support for the households in need. This approach enables us to predict the effect of donations on the equilibrium level of taxes and the welfare of the households in need.

1.3 Survey experiment

To investigate the causal relationship between donations, taxation, and poverty, we implement a survey experiment in the spirit of the model detailed earlier. The data are provided by a sample of 380 U.S. adult residents selected through the professional survey company Prolific[9] to represent

[9] www.prolific.co.

the population at large in terms of age, gender, and ethnicity. The survey requires approximately 40 minutes to complete and asks respondents to go through three main sections. The full text of the questionnaire is available upon request.

To provide context for the survey, we first present some aggregate descriptive evidence for the United States regarding the interrelatedness of charity, local taxation, and poverty at the county level. Table 1.1 and Figure 1.2 show donation rates, property taxes, and poverty rates as relevant proxy measures of these concepts with meaningful variance at the county level.[10] On average, people donate nearly 1.8% of their adjusted gross income, pay approximately 9.7 dollars on a thousand dollars worth of real estate, while the county-level average poverty rate is slightly below 16%. We can see a substantial geographic variation in the country. A look at pairwise correlations reveals that donations are negatively associated with local property taxes (-0.19) and positively with the poverty rate (0.07), while poverty correlates negatively to tax rates (-0.33).

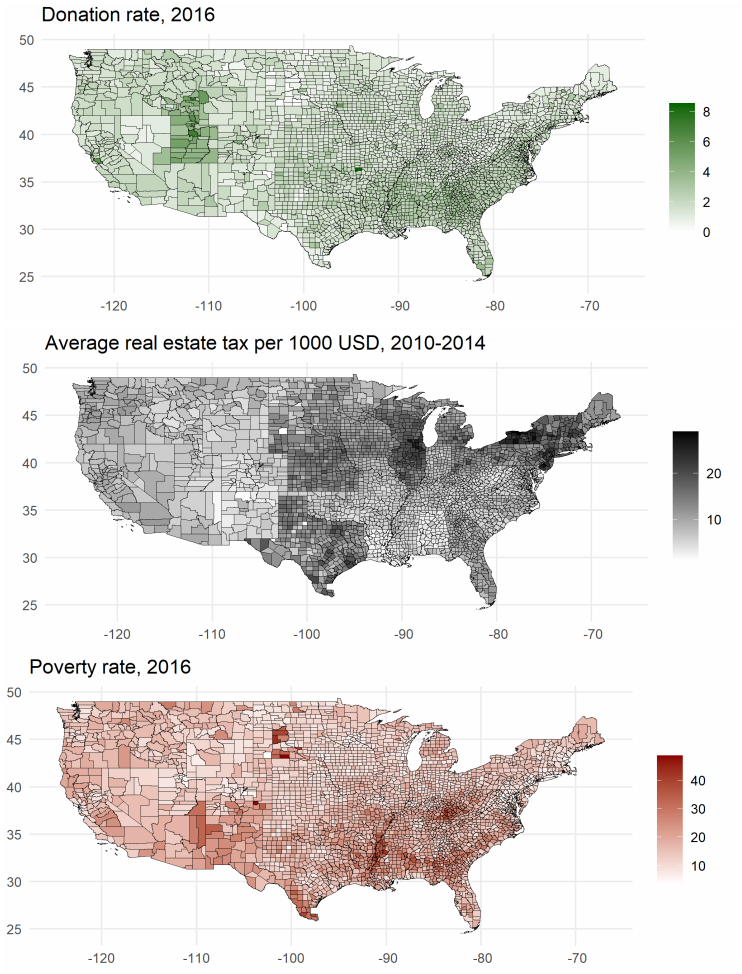
Table 1.1: Descriptive statistics of the key variables

	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Donation rate in 2016	3,129	1.816	0.802	0.000	1.275	2.193	8.552
Property taxes 2010-2014	3,129	9.700	4.635	1.085	6.124	12.503	29.001
Poverty rate in 2016	3,129	15.864	6.263	3.400	11.400	19.100	48.600

Note: The table reports the descriptive statistics for the main variables of the analysis dataset, which is collected by the authors from the following sources. Charitable tax deductions of 2016 are accessed via the website of the Internal Revenue Service, maintained by the Statistics of Income division. Data on property taxes from 2010-2014 are collected by the National Association of Home Builders. Poverty rates are calculated based on the CPS ASEC data by the U.S. Census Bureau.

[10] We measure donation rates at the county level as the total charitable contributions reported in tax filings divided by the total adjusted gross income estimated by the Statistics of Income division, available at the Internal Revenue Service website: https://www.irs.gov/statistics/soi-tax-stats-county-data-2016, accessed 18/05/2021. For local taxation, we employ the five-year average (for 2010-2014) of the property taxes per $1000 worth of real estate collected by the National Association of Home Builders available at: https://www.nahbclassic.org/generic.aspx?genericContentID=250239&fromGSA=1, accessed 27/04/2021. Finally, poverty rates are based on the Annual Social and Economic Supplements of the 2016 Current Population Survey (CPS ASEC). Available at: https://www.census.gov/library/publications/2017/demo/p60-259.html, accessed 10/08/2021.

Figure 1.2: The geographic variation in the key variables



Note: Figure shows the authors' calculations based on the following publicly available datasets. The donation rate for 2016 is calculated as donations over adjusted gross income. The data are accessed via the website of the Internal Revenue Service, maintained by the Statistics of Income division. Data on property taxes from 2010-2014 are collected by the National Association of Home Builders. Poverty rates are calculated based on the CPS ASEC data by the U.S. Census Bureau. Alaska and Hawaii are omitted from the map but are part of the dataset.

In order to shed light on the causal mechanisms behind these relationships, we ask respondents to imagine their preferences on taxation and their expectations and behavior concerning donations in six hypothetical scenarios. This first section of the survey replicates the game's structure presented in Section 1.2. In each scenario, respondents are asked to take up the roles of employed, income-earning households and to indicate their preferred contribution to the welfare of zero-income households (described as 'households in need'), which account for 15% of the overall population. In three out of six scenarios, respondents can contribute to the welfare of the households in need

through additional taxation collected for that purpose or through private donations (complete scenarios). In addition to their own behavior and preferences, they are also asked to state how much they expect other employed households to donate. In the remaining three scenarios, individuals can only contribute through additional taxation, while donations are not allowed (no-charity scenarios). Within each category (with and without charity), scenarios differ according to the level of income accruing to the respondent's household: low, middle, or high.

The last two sections of the survey respectively ask for demographic information such as gender, age, ethnicity, state of birth, education level, occupation, income category and religion, and respondents' real-life charitable behavior (volunteering experiences and private donations) and elicit political preferences, personal attitudes towards economic redistribution and charitability, time- and risk-related preferences.

1.3.1 Descriptive statistics of the survey sample

Consistently with the 2019 American Community Survey estimates[11], our sample contains slightly more female than male respondents (51%) and is predominantly white (69%). Concerning age, the most represented category is the 58+ constituting 30% of the respondents, while the remaining categories all contain between 16 and 19% of the sample. Moving on to variables not targeted by the representative sample requirements, high-income households (that we defined as reporting a gross income of more than $90,000, consistently with the hypothetical scenarios of the first section of the survey) are over-represented in the sample, 40% versus 31% in the U.S. population.[12] The fraction of middle-income households (reporting a gross income of between $50,000 and $90,000) is slightly under-estimated, representing 27% of our sample but 30% of the overall population. Finally, low-income individuals (reporting a gross income below $50,000) represent 33% of our sample versus 38% of the U.S. population.

Hence, unsurprisingly, the sample has a low fraction of individuals with less than a high school diploma and high school graduates (0.3% and 7.9% versus 10% and 28% in the overall population). At the same time, more than 30% of respondents hold a master's or professional degree, versus 10.2% in the population at large. Concerning religion, more than 30% of the sample declared having no religious identity. Among those indicating some religious affiliation, the most prevalent creed is Catholicism (26% of the sample), followed by other Christian denominations (18%) and mainline Protestantism (11%).

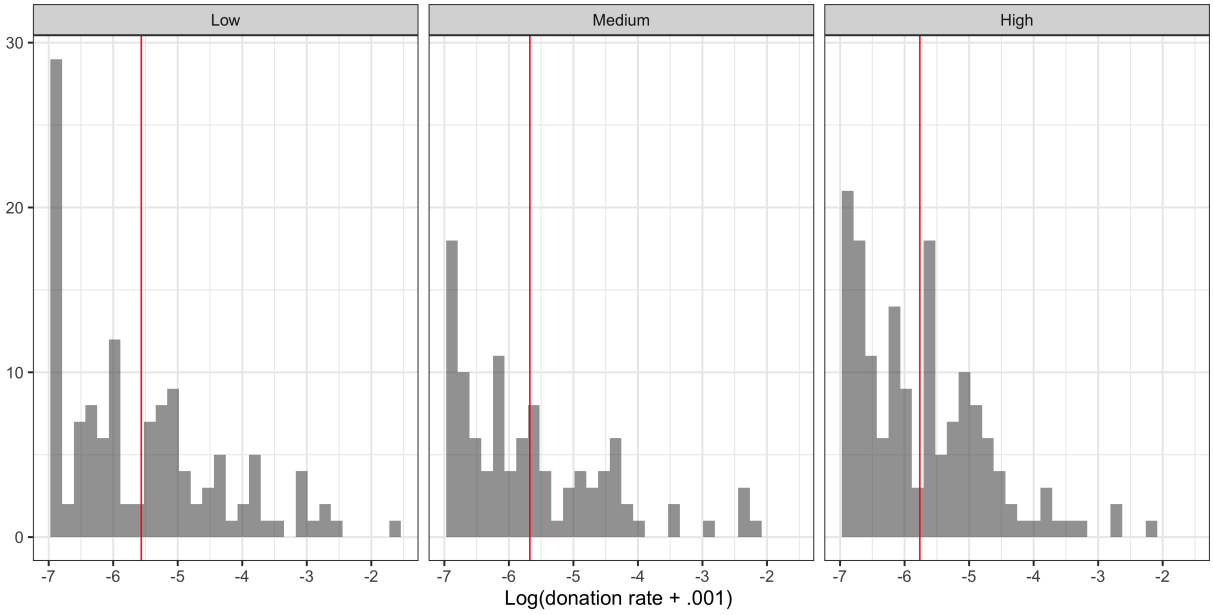
Finally, concerning the reported patterns of charitable behavior, slightly less than 30% of the respondents report no experience with volunteering, and less than 15% have never engaged in monetary donations. More than half of the respondents volunteer occasionally and report having donated a few times. A sizable fraction (21% of the respondents) reports engaging in regular

[11] Aggregate demographic information is available at: https://data.census.gov.

[12] Data on income brackets available at: https://censusreporter.org/topics/income/.

donations. The following graphs show the distribution of estimated yearly donations by income category. Although respondents from the lowest income category are more likely not to donate, the average donation rate slightly decreases with income.

Figure 1.3: Estimated in-life donation rate by income category



Note: We estimate donation rates in real life by combining survey responses on the frequency of donations and the average donation size. To compute total donations, we impute the middle value of the donation brackets available in the survey and multiply it by the reported number of yearly donations. To compute yearly income, we impute the middle value of the selected income bracket.

Table 1.2: Demographic characteristics of the sample

Category		Count	Fraction
Gender	Female	194	51%
	Male	186	49%
Age category	18-27	72	19%
	28-37	70	18%
	38-47	61	16%
	48-57	64	17%
	58+	113	30%
Ethnicity	White	264	69%
	Black	55	14%
	Other	61	16%
Education level	Less than high school degree	1	0%
	High school graduate	30	8%
	Some college but no degree	74	19%
	Bachelor or associate degree in college	130	37%
	Master's or professional degree	121	32%
	Doctoral degree	14	4%
Income category	Low income ($< \$50k$)	125	33%
	Middle income ($50k-$90k)	102	27%
	High income ($> \$90k$)	153	40%
Religion	No religious identity	120	32%
	Roman Catholic	96	26%
	Protestant (mainline)	41	11%
	Evangelical Protestant	21	6%
	Other Christian religion	68	18%
	Other non-Christian religion	34	9%
Frequency of volunteering	Never	105	28%
	Occasionally	202	53%
	At least once per month	46	12%
	At least once per week	27	7%
Frequency of donations	Never	56	15%
	Once	44	12%
	A few times	199	52%
	Regular donations	81	21%

1.3.2 Preferences and predicted behaviors in hypothetical scenarios

To analyze the effect of charity on economic redistribution, we analyze survey responses to the six hypothetical scenarios in the first section, where respondents are asked to report as truthfully as possible how much they would donate, what their preferred tax rate would be, and how much they would expect others to donate. The main components of each scenario are summarized in the table below.

Table 1.3: Scenarios description

Common elements						
Fraction of households-in-need	15%					
Baseline tax rate	20%					
Additional tax rate to support households-in-need	0%, 2.5%, 5%, 7.5%, 10%					
Elements differing across scenarios						
Donations allowed	Yes	Yes	Yes	No	No	No
Gross income	\$40k	\$60k	\$120k	\$40k	\$60k	\$120k
Tasks for respondents						
Choosing preferred additional tax rate	Yes	Yes	Yes	Yes	Yes	Yes
Selecting own donations	Yes	Yes	Yes	No	No	No
Declaring expected donation of the typical household	Yes	Yes	Yes	No	No	No

As shown in Table 1.3, respondents perform between one and three tasks in each scenario. First, for scenarios where charity is allowed, respondents are asked to select the dollar amount that they expect the typical middle-income household (where the middle income is set at \$60,000) to donate for each level of additional tax rate.[13] Secondly, in these scenarios, respondents are asked to state how much they would be willing to donate to support households in need, given each of the five levels of additional tax rates.[14] finally, they are asked to assign preference points across these five levels of additional tax rates (the table reports the options between 0% and 10%). Their preferred tax rate is then computed as a weighted average of their preferences. Afterward, they similarly provide taxation preferences for scenarios without donations available.

When facing these questions, respondents are explicitly reminded of the amount of benefits households-in-need would receive and the net income their own household would end up with, conditional on each tax level and their previous answers about donation expectations in society. For instance, we use built-in survey tools to calculate the implication of a tax level choice on total unemployment benefits, given the respondent's own expectations elicited earlier. This ensures that respondents do not need to engage in complicated calculation exercises and can express their preferences in a self-consistent manner.

1.4 Results

This section presents the main results obtained from the survey analysis. We first measure the extent of the substitution between taxes and donations in both directions (namely, the effect of taxes on preferred donations and the availability of charity on preferred taxes), and then we rationalize these results by retrieving the respondents' structure of preferences. To do so, we estimate the three main utility parameters of the model (generosity, warm glow, and weight of reputational concerns)

[13] In all the described scenarios, respondents are reminded that tax rates are flat and that donations cannot be deducted from their taxable income (i.e., they are subtracted from their net income).

[14] Dollar amounts are selected on a slider between a minimum of \$0 and a maximum of \$6,000.

for each respondent and present aggregate statistics for the whole sample.

1.4.1 First direction of crowding out: taxes on donations

Our first result is that taxes do crowd out donations in our setting, but to a very limited extent. By regressing donations and donation rates on in-survey income and tax rate, and including individual fixed effects, we obtain that a 1% increase in tax rates results in a 0.058% decrease in donation rates (column 1 of Table 1.4), implying a crowding out the magnitude of less than 6%. This result is very far from the 100% rate implied by the full crowding out hypothesis, suggesting that individuals are not only interested in the total amount of public good (pure altruism) but also in the extent of their own contribution (*warm glow*).

Table 1.4: In-survey donations, donation rate, and expected donation rate on tax rates and income

	Donations (in $ 1000)	Donation rate (%)	Expected donation rate (%)
Income (in $1000)	0.011***	-0.021***	
	(0.001)	(0.002)	
Tax rate (%)	-0.048***	-0.058***	-0.076***
	(0.011)	(0.018)	(0.028)
Individual F.E.	Yes	Yes	Yes
Observations	5,700	5,700	1,900
R^2	0.536	0.505	0.498
Note:		*p<0.1; **p<0.05; ***p<0.01	

The last column of Table 1.4 reports the result of an analogous regression, but with expected donation rates as the outcome variable (which, differently from own donations, are independent of income). The coefficient of the explanatory variable (in-survey tax rates) is negative and significant, but its magnitude is larger (by almost 2% in absolute terms) than for one's own donation rates. This discrepancy suggests that respondents' beliefs might be inaccurate, which we will now test more formally.

1.4.2 Correct beliefs

We now test whether respondents hold correct beliefs about the average level of donations in the hypothetical society described in the survey. Since we do not provide information on the income distribution in the society, but only a measure of central tendency[15], we aggregate actual donations by levels of income by using several sets of weights. For the primary analysis, we use the prevalence of low, middle, and high-income households[16] in the actual U.S. population, based on the 2019 version of the American Community Survey[17], but results are robust to using equal income weights,

[15] Respondents are told that the typical income in society is $60,000

[16] Low income is defined as less than $50,000, middle income as between $50,000 and $90,000 and high income as more than $90,000

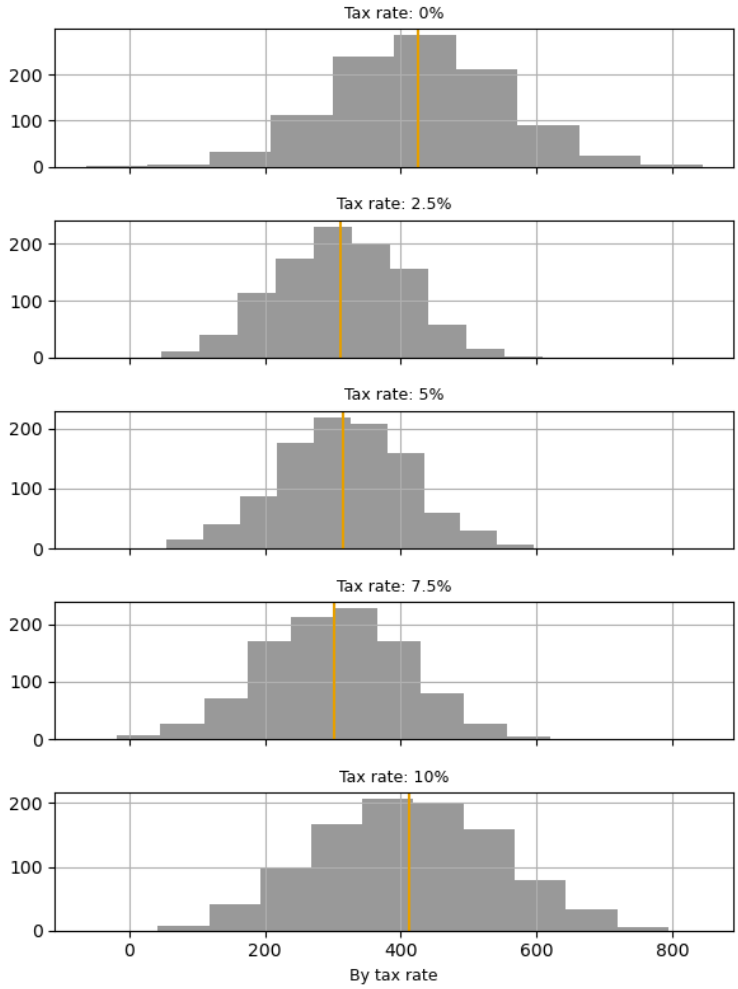
[17] Available at: https://censusreporter.org/topics/income/.

as well as to considering middle-income households only or to excluding middle-income households and considering equal weights for the remaining two categories. Figure 1.4 shows the distribution of the average difference between expected and realized donations for each level of the additional tax rate (0% to 10%). Standard errors are bootstrapped. Table 1.5 also reports the p value for the paired t-test for the difference in means, which leads us to reject the null hypothesis of accurate beliefs for all levels of taxes. Despite the difference between expected and actual donations being consistently positive and significant (implying overestimation of others' donations), the magnitude is larger for more extreme tax rates (on average \$420 versus \$310), suggesting that individuals tend to form better predictions in more realistic or preferable situations.

Table 1.5: Differences in expected and realized donations, and testing for accurate beliefs

Tax rate	Donations			
	Expected (in 1000 \$)	Realized (in 1000 \$)	Difference (in 1000 \$)	Paired t-test p-value
0%	2.618	2.191	0.427	0.00
2.5%	2.299	1.987	0.313	0.00
5%	2.173	1.862	0.312	0.00
7.5%	2.070	1.759	0.311	0.00
10%	2.161	1.741	0.421	0.00

Figure 1.4: Distribution of the difference between expected and realized donations



Distribution of the bootstrapped difference between expected and realized donations. Income weights are 0.38, 0.30, 0.32

1.4.3 Second direction of crowding out

We next estimate the effect of the availability of donations on preferred tax rates, representing the second direction of crowding out. As all respondents are asked to state their preferences for all three imagined levels of household income, with and without donations available, we can interpret the estimates causally within the survey game's setup. Figure 1.5 shows the distribution of preferred tax rates for the two main scenarios (with versus without charity) and each level of in-survey income. Answers concentrate around 5%, especially for middle and higher income levels, while maximal levels appear more frequent with higher income and minimal levels with lower incomes. As expected, Table 1.6 reveals that respondents tend to prefer lower additional tax rates when donations are allowed: compared to the baseline of around 4.53% ideal tax rate for low-income households, donations decrease ideal taxes by 0.74% on average, while higher in-game income

results in higher preferred tax rates. The availability of donations does not interact with the in-game income levels on average for the entire sample, so the effect of income on the ideal tax rate seems to be independent of donation availability.

Figure 1.5: Ideal tax rate with and without donations

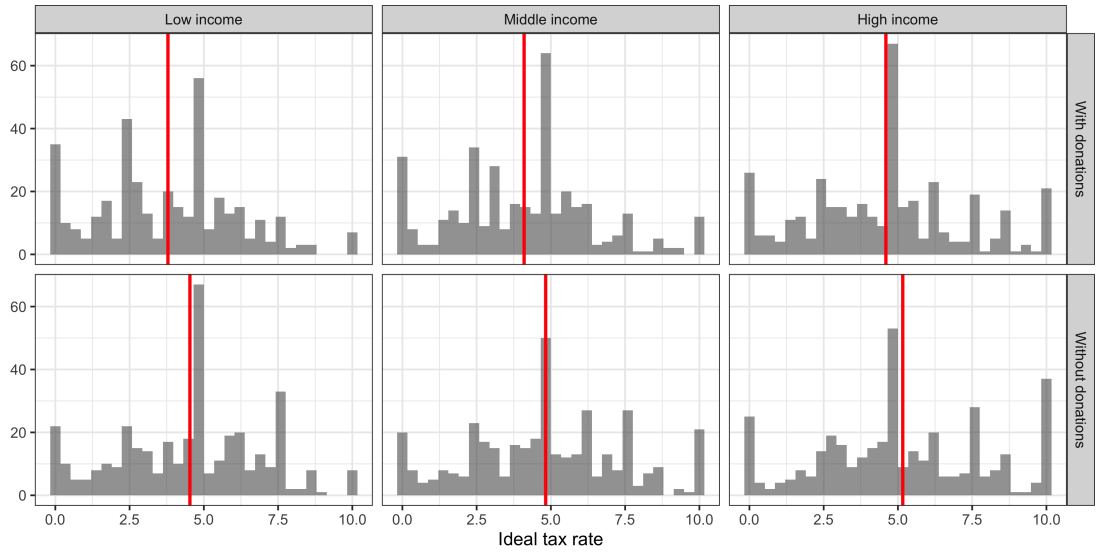


Table 1.6: Ideal tax rates regressed against in-game income and donation availability

	Ideal tax rate
Middle income (60k)	0.29378**
	(0.09288)
High income (120k)	0.63237***
	(0.10622)
Donations allowed	-0.73905***
	(0.12930)
Middle income (60k) X Donations allowed	0.01309
	(0.12726)
High income (120k) X Donations allowed	0.17031
	(0.13485)
Multiple R-squared (full model):	0.6719
Adjusted R-squared:	0.6054

Notes: The table displays the regression of ideal tax rates on in-game income level interacted with whether donations are allowed, using respondent-level fixed effects. Standard errors are clustered on the respondent level. *p<0.1; **p<0.05; ***p<0.01

Despite the usefulness of these individual-level results, which already point to some crowding out of donations on preferred public support for zero-income households, we are ultimately interested in the equilibrium tax rate at the societal level. Therefore, based on our model, we aggregate individual preferences by solving the neutral government's problem, which results in selecting the preferred tax rate of the median voter.

We rely on bootstrapping to simulate our hypothetical society repeatedly, where the bootstrapped preferences of survey respondents account for 85% of the votes (i.e., the proportion of positive-income households in society) while the remaining 15% of the votes are for the highest available additional tax rate(10%) since zero-income households optimize their utility by maximizing public support.

Table 1.7: Average realizations of the outcomes of interest

Variable	Private charity	Mean	SD
τ_a^{med} (%)	No	5.249	0.160
Benefit (in 1000 $)	No	21.167	0.646
τ_a^{med} (%)	Yes	4.848	0.110
Benefit (in 1000 $)	Yes	30.170	$0.608
Average donation rate (%)	Yes	2.966	0.103
Average donation (in 1000 $)	Yes	1.874	0.006
Average expected donation (in 1000 $)	Yes	2.183	0.007

Table 1.8: Average difference in the outcomes of interest

Difference	Mean	SD
τ_a^{med} (%)	-0.401	0.156
Benefit (in 1000 $)	9.003	0.747

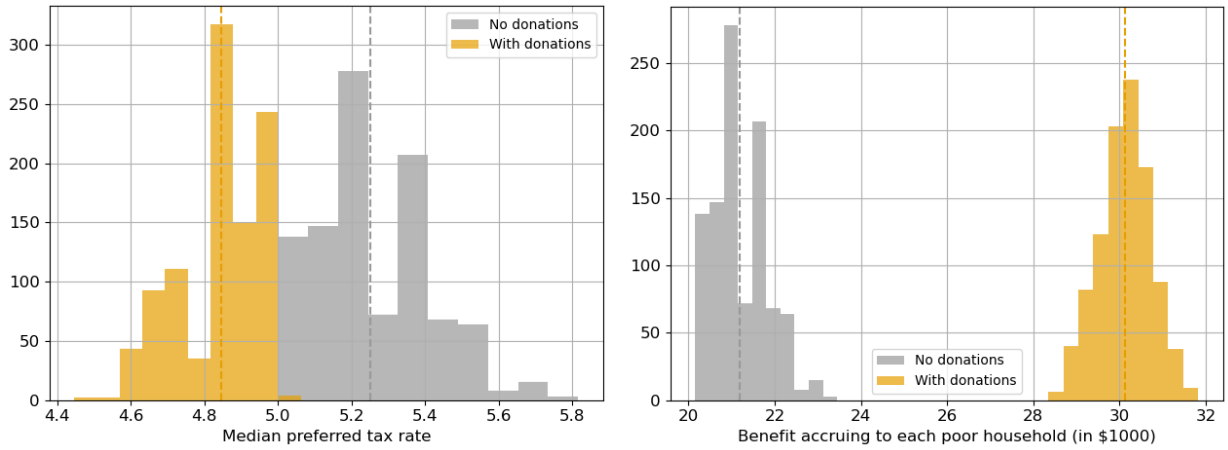
The resulting distribution of the equilibrium tax rate in the two main cases (with and without charity) and of the benefit accruing to each poor household are reported in figure 1.6, alongside the distribution of the difference in the two outcomes of interest. The average values and bootstrapped standard deviations are reported in table 1.7, while table 1.8 reports the average difference in equilibrium tax rate and benefit. The equilibrium tax rate is 5.25% in the taxation-only case compared to 4.85% when donations are allowed. Private donations (on average $1,874 per positive-income household) more than compensate for the loss in public support, resulting in a much higher benefit per zero-income household in the case with charity ($30,000 versus $21,000)[18].

[18]To retrieve the average level of donations in the case with charity available we consider the preferred donation of each respondent for the two discrete levels of tax rate which are closest to the equilibrium level, weighting each by its distance to the equilibrium level.

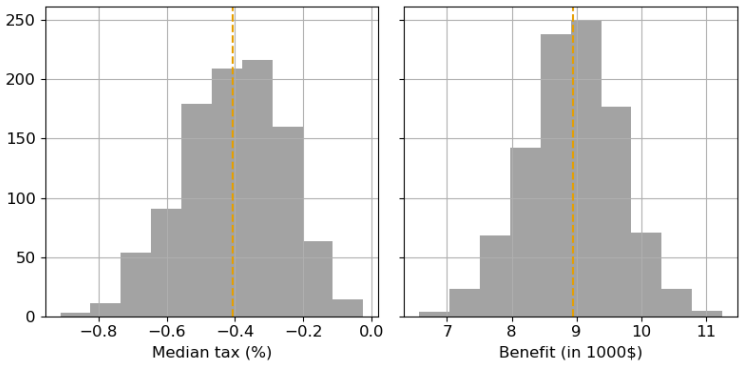
Figure 1.6: Equilibrium tax rates and benefits of the simulations

(a) Additional tax rate in equilibrium

(b) Poor household benefit in equilibrium



(c) Difference in equilibrium outcomes



1.4.4 Estimation of individual utility parameters

In order to better understand the structure of preferences leading to these results, we also estimate the individual utility parameters of our theoretical model, namely generosity (α), taste for donations (γ), and weight of reputational concerns (η). First, the value of generosity (α) is obtained from the no-donation case, by solving Equation 1.1 for each individual and each of the three possible levels of wage in the scenarios where donations are not allowed. We then average out the three individual-level observations to obtain the final estimate. Second, we retrieve the remaining parameters (γ and η) as the result of the minimization of the sum of squared deviations of observed in-game donations from the theoretical donations implied by solving the individual utility maximization problem with the given utility parameter values.[19]

[19]The problem is solved for each level of wage and tax rate available in the hypothetical scenarios. Additional details on the estimation procedure are presented in the Appendix.

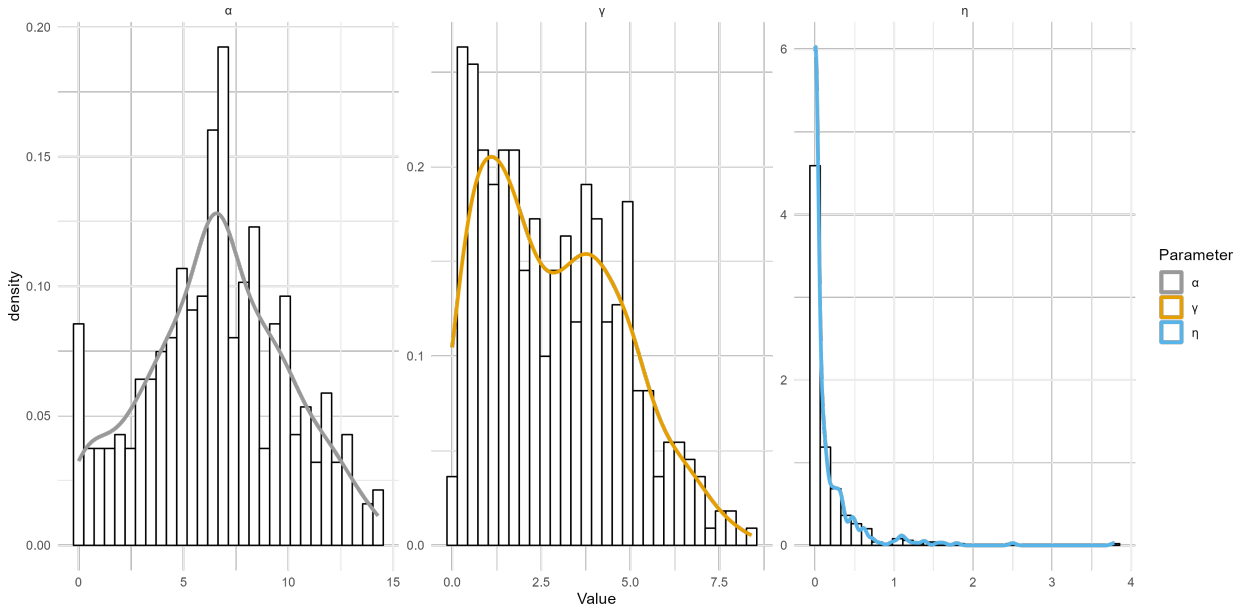
Table 1.9 reports the main summary statistics for the estimated parameters, while figure 1.7 shows the distribution for the entire sample. On average, generosity has a value of 6.6%, meaning that individuals assign to the utility of the poorest members of society a weight of 6.6 percentage points compared to the weight of their own utility from consumption. Estimates at the individual level range from a minimum value of 0 to a maximum value of 14.3 percentage points. Direct utility from donations, or *warm glow*, is estimated to be 2.8% of the utility from one's own consumption for the average respondent, with a minimum of 0 and a maximum of 8.4 percentage points in the whole sample. Finally, the weight of reputation, proxied by the deviation of own donations from the expected societal level, is on average 0.2 percentage points, ranging from a minimum of 0 to a maximum of 3.8%.

While generosity follows a unimodal shape, with the majority of the sample being centered around the mean with the exception of bunching around 0 for those people who do not derive utility from the welfare of the poor. The shape of the warm glow parameter distribution suggests the presence of two different groups, one centered at approximately 2% and one assigning a larger weight of nearly 5% to the direct utility from donations. Finally, the weight of reputational concerns is very close to zero for the vast majority of the sample, with a longer tail, and some bunching around the value of 1%, suggesting the existence of a specific subset of respondents that care highly about social expectations.

Table 1.9: Summary statistics for the estimated utility parameters

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
α	380	0.066	0.034	0.000	0.044	0.089	0.143
γ	380	0.028	0.019	0.000	0.012	0.042	0.084
η	380	0.002	0.004	0.000	0.000	0.002	0.038

Figure 1.7: Societal distribution of utility parameters



1.4.5 Background characteristics and in-game behavior

Four key in-game behavioral variables (donation rates, expectations about donation rates, the difference between the two, and preferred tax levels) determine the simulation results, for which we can examine partial correlations with respect to other relevant background characteristics. We average through the values across scenarios for each individual, then regress them on demographic information, attitudes towards inequity and fairness, the preferred size of unemployment benefits, and psychological factors (risk-aversion and patience as in Falk et al., 2016, along with self-reported real-life charitable behavior. We construct principal components based on the variable groups of inequity attitudes and unemployment benefits due to their high cross-correlation, and we include those in the regressions.

Table 1.10 presents the OLS estimates of the regressions described above and displays the means and standard deviations for the outcome variables at the bottom. We can see that, on average, the in-game donation rates are close to the aggregates we observe in county-level data. As we already noted, the expectations of survey participants about the average donation rates do not match the realized average, as people overestimate how much others would donate by around 0.8 percentage points (23%). As a baseline, the positive relationship between real-life and in-game donation rates and the negative relationship between conservatism and preferred tax levels provide evidence of consistency between the survey respondents' in-game behavior and their in-life attributes.

Our results suggest that in-game donation rates are lower for women. Conservative opinions also seem to be associated negatively with the propensity to donate and the preferred level of taxes. In

contrast, more inequity-averse individuals prefer lower donations and have higher ideal tax rates. Surprisingly, Protestant self-identification does not seem to correlate strongly with own in-game donations or ideal tax rates; however, it negatively relates to expected donation rates. In addition, living in a predominantly Protestant area negatively correlates with preferred tax rates, showing the importance of majority religion on regional social norms as described by Pugh (1980). Volunteering also negatively correlates with in-game own and expected donations, suggesting that donation and volunteering might be substitutes rather than complements. Finally, being more forward-looking and risk-averse are also negatively associated with donations, which is consistent with behavior that prioritizes higher savings against present expenditures, in this case, donations.

Table 1.10: In-survey behavior outcomes and participant background

	Dependent variable:			
	Donation rate	Expected donation rate	Preferred taxes	Donation difference
	(1)	(2)	(3)	(4)
Tertiary educated	−0.150	0.450*	−0.124	−0.519*
	(0.237)	(0.273)	(0.261)	(0.266)
Female	−0.466**	−0.507**	−0.366	0.007
	(0.209)	(0.241)	(0.231)	(0.235)
Age 28-37	−0.554	−0.887**	−0.723*	0.044
	(0.357)	(0.411)	(0.394)	(0.401)
Age 38-47	0.244	−0.238	−0.216	0.038
	(0.393)	(0.452)	(0.433)	(0.441)
Age 48-57	−0.179	0.142	−0.344	−0.675
	(0.390)	(0.449)	(0.430)	(0.438)
Age 58+	−0.584	−0.519	−0.494	−0.397
	(0.354)	(0.408)	(0.391)	(0.398)
Black	0.277	0.508	−0.492	−0.339
	(0.307)	(0.353)	(0.339)	(0.344)
Asian	−0.249	0.837**	−0.713*	−1.307***
	(0.364)	(0.419)	(0.402)	(0.408)
Hispanic	0.441	0.472	0.235	0.018
	(0.430)	(0.495)	(0.475)	(0.483)
Other	0.010	−0.671*	−0.148	0.693*
	(0.343)	(0.395)	(0.379)	(0.385)
Majority religion is Protestant	−0.246	0.041	−0.598**	−0.350
	(0.234)	(0.270)	(0.258)	(0.263)
Own religion is Protestant	−0.038	−0.653*	−0.022	0.649*
	(0.295)	(0.339)	(0.325)	(0.331)
Goes to church at least monthly	0.115	0.249	0.200	−0.128
	(0.228)	(0.262)	(0.251)	(0.256)
Conservative scale	−0.126**	−0.064	−0.173***	−0.047
	(0.054)	(0.062)	(0.060)	(0.061)
log(real life donation rate+0.001)	0.190***	0.089	0.130	0.109
	(0.072)	(0.083)	(0.079)	(0.081)
Real life donation rate is 0	0.378	0.547	0.201	−0.387
	(0.466)	(0.537)	(0.514)	(0.523)
Real life regular volunteering	−0.411*	−0.489**	−0.021	−0.074
	(0.210)	(0.242)	(0.232)	(0.236)
Inequity aversion princ. comp.	−0.348***	−0.188**	0.135	−0.097
	(0.079)	(0.091)	(0.087)	(0.089)
Unemployment benefit princ. comp.	0.190***	0.041	0.147**	0.196***
	(0.064)	(0.074)	(0.071)	(0.072)
Number of right answers	−0.441***	−0.499***	0.032	0.111
	(0.119)	(0.137)	(0.132)	(0.134)
Forward-looking preferences	−0.070	−0.038	0.083	−0.012
	(0.049)	(0.056)	(0.054)	(0.054)
Risk-loving preferences	−0.096**	−0.086*	−0.052	0.002
	(0.043)	(0.050)	(0.048)	(0.049)
Married or cohabiting	−0.033	−0.532*	−0.095	0.612**
	(0.250)	(0.288)	(0.276)	(0.281)
Number of children	0.128	0.267**	0.030	−0.118
	(0.098)	(0.113)	(0.108)	(0.110)
Constant	4.673***	4.185**	5.618***	0.995
	(1.547)	(1.782)	(1.706)	(1.735)
Observations	380	380	380	380
R^2	0.302	0.234	0.148	0.154
Adjusted R^2	0.246	0.173	0.080	0.086
Residual Std. Error (df = 351)	1.790	2.062	1.975	2.009

Notes: The population size of the respondent's area and the log of their estimated real-life income are also included in the regressions. We omitted them from the table to ease visibility as they are not statistically significant at the 10% level. Standard errors are in parentheses. Donation difference refers to the difference between the individual's own donation rate vs. their expected donation rate for the aggregate level.
*p<0.1; **p<0.05; ***p<0.01

1.5 Conclusion

Our results corroborate and extend several previous findings in the literature regarding the crowd-out between charity and the state, the drivers of charitable behavior, and individual behavior in public good games. By collecting and analyzing novel survey data, we provide evidence for the less-studied direction of charity crowding out the state in an abstract setting, connecting to the findings of Sav (2012), and Werfel (2018) amongst others. In our survey, we document that the other direction is also present: when taxes are higher, respondents choose to donate less. However, the relationship is not strictly monotonous for individual respondents or, on average. It suggests that even under the stylized and simplified conditions of our hypothetical scenarios, crowd-out might be only partial as people do not internalize the full effect of their choices on the public good provision, in line with the experimental findings of Eckel et al. (2005). We also find survey respondents to systematically overestimate the average donation rate in society compared to their realized average contribution, which might result in a sub-optimal public choice regarding poverty reduction. Our survey results are also in accord with aggregate evidence, suggesting a negative association of donations with poverty and taxes.

In our stylized setting, the higher equilibrium tax rates characterizing the no-donations scenario are not enough to compensate for the loss of private charity in terms of the benefit accruing to the poor. Retrieving the structure of preferences that generate the observed in-survey behavior, we confirm that individuals are not only interested in the welfare level of the poorest members of society but are also positively affected by the direct utility of contributing. This result corroborates the findings of Null (2011) that only a few donors are willing to pay to check whether their donations reach their declared target.

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Appendix

1.5.1 Additional survey results

Figure 1A1: Donation rate by additional tax rate and level of income

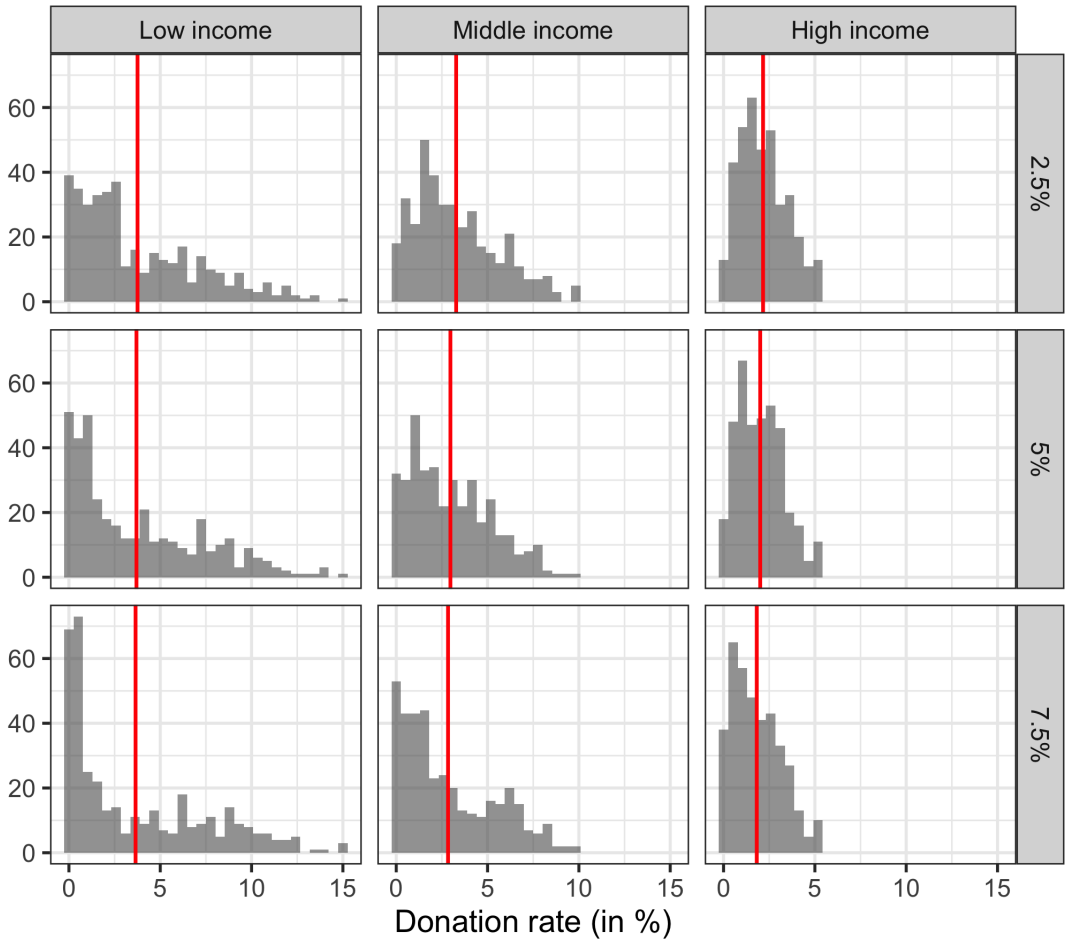
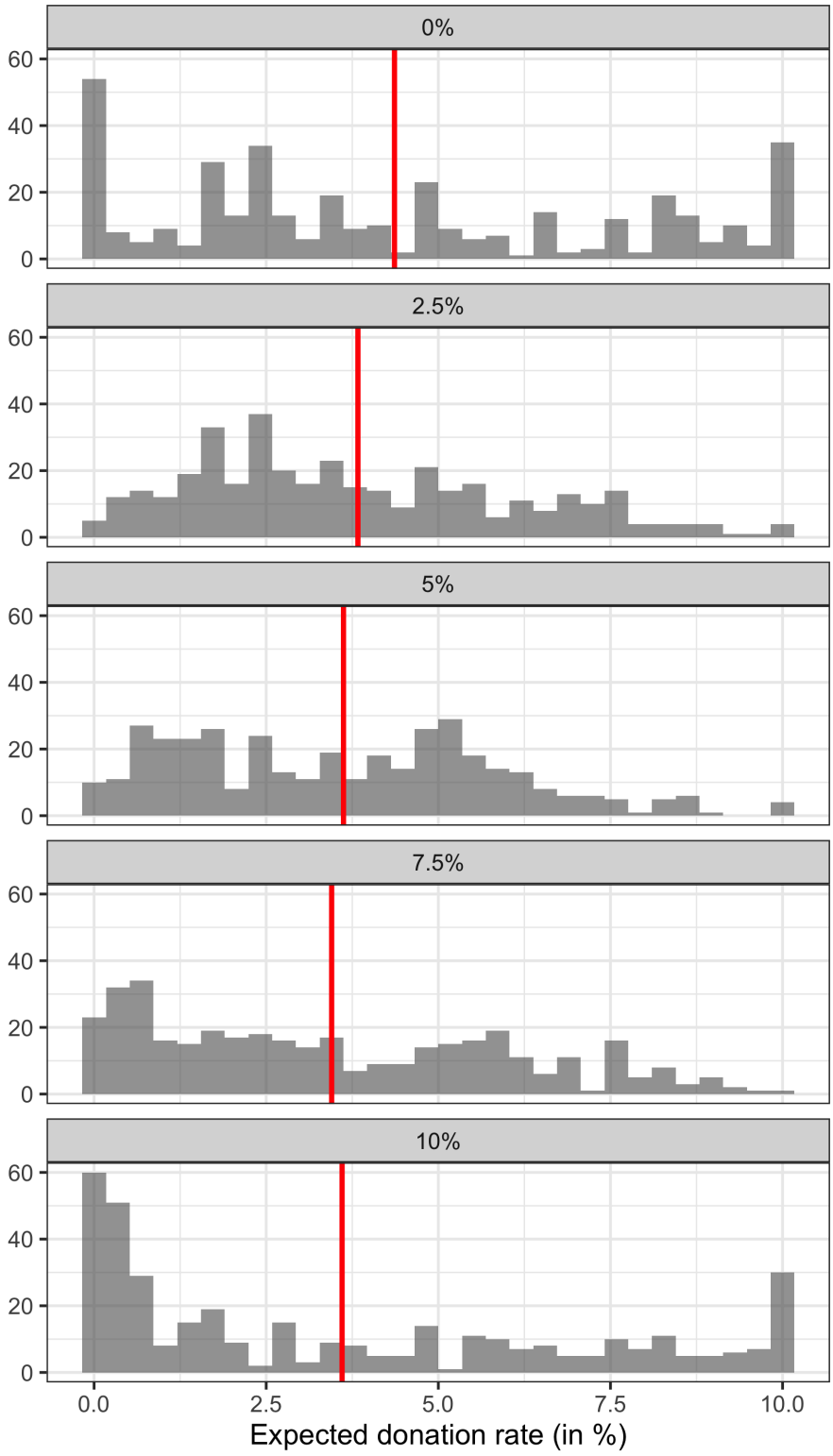


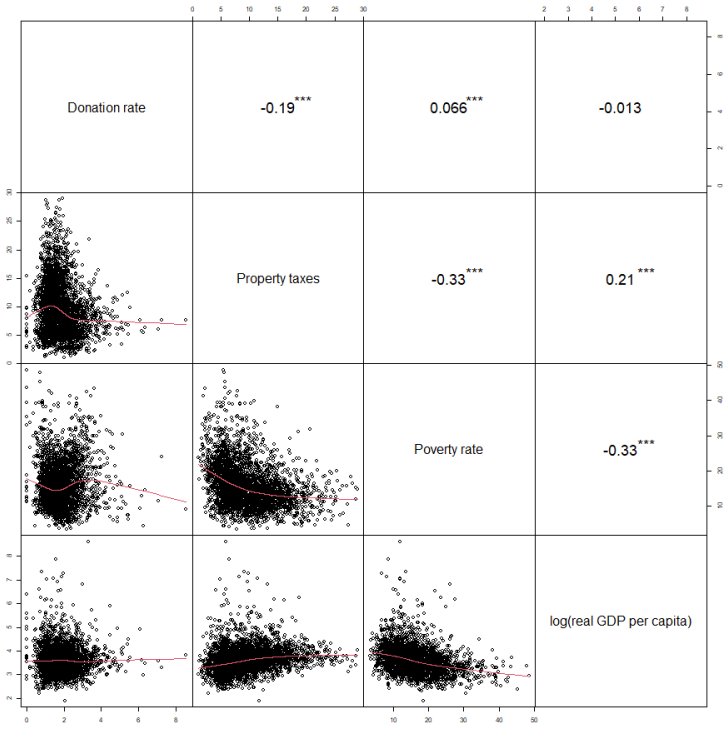
Figure 1A2: Expected donation rate by additional taxation level



1.5.2 Additional county-level descriptives

Figure 1A3 displays the pairwise correlations between the key variables relevant to the analysis on the county level.

Figure 1A3: Bivariate relations between the key variables



Note: Figure shows the bivariate relations of the county-level variables of the authors' calculations based on the following publicly available datasets. The donation rate for 2016 is calculated as donations over adjusted gross income. The data are accessed via the website of the Internal Revenue Service, maintained by the Statistics of Income division. Data on property taxes from 2010-2014 are collected by the National Association of Home Builders. Poverty rates are calculated based on the CPS ASEC data by the U.S. Census Bureau.

The causal links behind these correlations are unclear. Hence, as an additional exploratory step, we show regression results intended to provide a basic understanding before examining the question in more depth with our survey analysis. Indeed, regressions might not reveal causal links, as the actual mechanism could be driven by unobservable characteristics of the counties, such as different levels of inequity aversion or moral codes behind altruistic behavior (Enke et al., 2020), or by simultaneity as these variables are equilibrium outcomes.

In our first setup, we regress poverty rates on donation rates, property taxes, county-level characteristics, and state fixed effects. The first column of Table 1A1 reports the results of the simplest specification, where the poverty rate is regressed only on donation rate and property taxes. We can see that without additional covariates, there seems to be no statistically significant relationship

between donations and poverty. At the same time, there is a strong negative partial association between taxes and the poverty rate. Including state fixed effects (column 2) results in a negative partial correlation between the poverty rate and donations and taxes. Columns 3 to 6 include an increasingly comprehensive set of controls, with column 6 controlling for real GDP per capita, population size, and demographic composition according to religion[20], age group, ethnicity and educational level, and presidential election results. The additional covariates turn the relationship between taxes and poverty insignificant while preserving the sign and significance of the negative correlation with donation rates. Other controls improve the precision of the estimated donation rate coefficient (-0.8). If we were to interpret this estimate as causal, increasing donations by one standard deviation (0.8) would result in a relatively small decrease in the poverty rate of 0.64 percentage points, which is approximately 4% of the mean poverty rate and 10% of its standard deviation.

Table 1A1: County-level regression associations of poverty rate with property taxes and donation rates

	Dependent variable:					
	Poverty rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Donation rate	0.034	−1.725***	−0.916*	−1.048**	−0.931***	−0.806***
	(0.691)	(0.406)	(0.508)	(0.493)	(0.244)	(0.250)
Property taxes	−0.448***	−0.232***	−0.092	−0.050	−0.023	−0.039
	(0.090)	(0.084)	(0.108)	(0.096)	(0.039)	(0.037)
State FE	No	Yes	Yes	Yes	Yes	Yes
GDP per capita, population size	No	No	Yes	Yes	Yes	Yes
Religious composition	No	No	No	Yes	Yes	Yes
Age, ethnicity, education composition	No	No	No	No	Yes	Yes
Election results	No	No	No	No	No	Yes
Observations	3,129	3,129	3,129	3,129	3,128	3,128
R^2	0.110	0.367	0.400	0.422	0.781	0.786

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors clustered at the state level in parentheses.

In our second setup (whose results are reported in Table 1A2), we take the local property tax as the outcome variable, and we examine its partial correlations with the two remaining key variables (donation rate and poverty rate). Here, even the coefficients' sign reacts substantially to the set of controls we include in the regressions. In the simplest specification, which does not control for county characteristics nor state fixed effects, higher poverty rates and donation rates are associated with lower property taxes. Including state fixed effects reduces the coefficient on poverty rate by a magnitude and flips the sign on donation rates while accounting for most of the explained variance

[20]In Christianity, the role of charity is central, however, due to the different historical institutional evolution Protestants are expected to donate more than Roman Catholics (Pugh, 1980; Hoge and Yang, 1994; Pullan, 2005; van Elk et al., 2017).

fraction of 0.78. The inclusion of demographic controls reverts the partial correlation between tax and donations to negative, while the impact of the poverty rate becomes non-significant. If we were to interpret the estimates causally, a standard deviation increase of donation rates would imply a slight decrease in local taxes of around 0.288 per 1000$ of property value, around 3% of the mean.

Table 1A2: County-level regression associations of property taxes with poverty and donation rates

	Dependent variable:					
	Property taxes					
	(1)	(2)	(3)	(4)	(5)	(6)
Donation rate	−0.960**	0.518***	−0.058	−0.101	−0.407***	−0.360***
	(0.374)	(0.149)	(0.116)	(0.120)	(0.102)	(0.099)
Poverty rate	−0.238***	−0.045***	−0.016	−0.009	−0.009	−0.016
	(0.051)	(0.015)	(0.019)	(0.017)	(0.015)	(0.014)
State FE	No	Yes	Yes	Yes	Yes	Yes
GDP per capita, population size	No	No	Yes	Yes	Yes	Yes
Religious composition	No	No	No	Yes	Yes	Yes
Age, ethnicity, education composition	No	No	No	No	Yes	Yes
Election results	No	No	No	No	No	Yes
Observations	3,129	3,129	3,129	3,129	3,128	3,128
R^2	0.138	0.778	0.814	0.816	0.837	0.839

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors clustered at the state level in parentheses.

The evidence we presented so far suggests that the inter-relatedness of poverty, charity, and taxation is challenging to clarify. According to these preliminary findings, higher donations seem to be associated with lower poverty and local property taxes, while the suggested magnitudes are relatively small. However, the sign and magnitude of these estimates are not robust to the inclusion of different controls, nor can we claim that they capture causal relationships.

1.5.3 Individual-level parameter estimation

Generosity parameter

The generosity parameter is obtained at the individual level by solving equation 1.1 for each individual and each level of wage in the scenarios when donations are not allowed:

$$\alpha_i(w_n) = \frac{\tau_i^*(w_n) - \underline{\tau}}{1 - \tau_i^*(w_n)}$$

$$\alpha_i^* = \frac{\sum_{n=1}^{3} \alpha_i(w_n)}{3}$$

Warm glow and reputation weight parameters

The remaining two parameters, measuring the weight of the direct utility from donations (γ_i) and of reputation (η_i), are estimated numerically via a non-linear optimization algorithm which minimizes

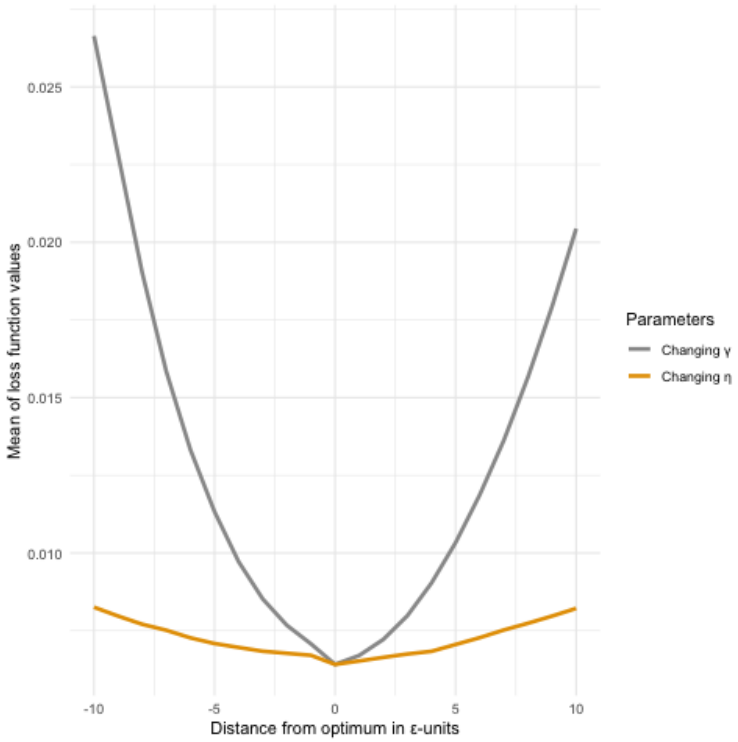
the normalized sum of squared deviations of the observed in-survey donations from the theoretical solution of the utility maximization problem for each wage and tax rate level proposed in the hypothetical scenarios. For each individual i, (γ_i, η_i) is chosen to minimize the following expression given the levels of in-game taxation, income, and α_i, the previously estimated utility weight for generosity:

$$\min_{(\gamma_i,\eta_i)} \sum_{n=1}^{5} \sum_{m=1}^{3} \left(d_i(\tau_n, w_m) - d_i^*(\gamma_i, \eta_i; \alpha_i, \tau_n, w_m)\right)^2,$$

where $\tau_n \in \{0, 0.025, 0.05, 0.075, 0.1\}$ and $w_m \in \{40,000; 60,000; 120,000\}$.

While for each of the 380 respondents, we cannot show that the objective functions' minima were indeed reached, we can display in Figure 1A4 the average values of the objective function across respondents. We calculate them for a $\pm 10 \times 10\%$ neighborhood of the selected values for the two utility parameters. We can see that the γ and η values found indeed minimize the optimization problems on average.

Figure 1A4: Average value of the objective function in a neighborhood of the solution



Chapter 2

Extra-curricular internships and sorting by socio-economic status

Abstract

This paper investigates whether, and due to which channels, university students from different socioeconomic backgrounds differ in their propensity to choose an internship as their access point to the labor market. After presenting evidence that individuals from wealthier backgrounds are more likely to start an extra-curricular internship, I collect novel survey data on a sample of university students to estimate a model of contract choice. In the survey, I elicit both career choices in hypothetical but realistic scenarios and expected labor market returns of different initial contract types. I find that individuals from different socioeconomic backgrounds have a comparable structure of beliefs but differ in their preference parameters and face different constraints.

Keywords: Belief, Expectation, Information, Intergenerational mobility, Socioeconomic inequality

JEL Classification: D81, D83, D84, J24, J62

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2.1 Introduction

The prevalence of internships as the first access point to the labor market for young workers has substantially expanded in recent years. According to the Italian national agency for the analysis of active labor market policies (Agenzia Nazionale Politiche Attive Lavoro, 2018), the number of internships has constantly increased between 2014 and 2017, with 1.2 million being activated over the period. Focusing on extra-curricular internships, aggregate data from Almalaurea[1] show that a consistently high percentage of university graduates participates in an internship or traineeship in the five years following graduation, with figures ranging from slightly less than 20% for scientific degrees to more than 35% for Economics and Statistics. At the European level, the 2013 Eurobarometer survey (European Commission, 2013) reported that 45% of all EU citizens aged 18–35 had undertaken at least one internship, either during or after the studies.

Nevertheless, due to the very low compensation associated with internship contracts[2], the increasing diffusion of this contractual type as a first form of access to the labor market for young workers can represent an entry barrier for individuals from less wealthy backgrounds, contributing to widen income inequality and raising concerns for policy makers.

While several pieces of anecdotal evidence hint at the existence of a socioeconomic barrier to participation in the internships market (see, for instance, Curiale, 2010; Bennett, 2011; Leonard et al., 2016), more systematic evidence on the relationship between individuals' socioeconomic status and the likelihood of accepting an internship offer is still scant and not conclusive. In this paper, I thus set to identify the channels driving prospective graduates' choice of accepting an extra-curricular internship, measuring the differential impact of financial constraints[3], individual beliefs concerning the effectiveness of internships in improving future labor market prospects and residual preferences.

The presence of a socioeconomic divide is all the more relevant to the extent that extracurricular internships do lead to substantially better outcomes in the labor market, as the increased prevalence of internship contracts would exacerbate income inequality by facilitating the access of wealthier young workers to higher-quality jobs (especially in the case in which such access becomes as a matter of fact conditional on having gone through an underpaid internship experience, as noted for instance by Curiale, 2010; Bennett, 2011; Leonard et al., 2016).

From a theoretical point of view, there are several channels through which internships could positively affect workers' labor market prospects. First, internships can enrich workers' skill set, by complementing the almost exclusively theoretical education provided by high schools and universi-

[1] https://www2.almalaurea.it/cgi-php/universita/statistiche/tendine.php?LANG=it&config=occupazione

[2] Recently, following EU guidelines, national and regional governments in Europe have started imposing minimum monthly compensations, which however are still below the corresponding minimum wage for employment contracts.

[3] Coffman et al. (2019) highlights how even short-term liquidity constraints can affect long-term career choices, supporting the idea that even a short period of foregone earnings can play a pivotal role in shaping the decision between different contracts

ties (Kapareliotis et al., 2019). Already in Becker (1962), and more recently in Garicano and Rayo (2017), unpaid or very low paid training periods at the beginning of employment contracts were indicated as a possible solution to the trade-off faced by firms needing to provide transferable skills to their employees but unwilling to face a risky upfront investment which could benefit other firms in case of workers' resignation. Secondly, the fixed-term nature and short duration of internship contracts[4] suggest that alongside training, internships are also likely to act as a screening mechanisms for firms, allowing them to test the fit of potential employees at very low costs[5]. Symmetrically, internships allow young workers to test their own compatibility with the job, sending a positive signal to other firms in the same sector. On the other hand, internships might send a negative signal of workers' ability if the best workers are more likely to enter the labor market directly with a job contract.

The coexistence of several theoretical channels with potentially opposite effects has left large scope for the empirical assessment of the sign and magnitude of the returns to internships for labor market outcomes, with no conclusive answer.

Nunley et al. (2016) and Baert et al. (2019) address the question with an experimental resume-study design. Limiting their analysis to curricular internships, they find evidence in favor of the positive signalling hypothesis, showing how the presence of a curricular internship in students' resumes results in a higher probability of being offered an interview for a job position. Similarly, Bittmann and Zorn (2020) compare the effect of mandatory versus voluntary curricular internships and find a positive impact only for the latter, adding support to the signalling role (the considered outcomes in the labor market are wages, degree of matching between job and skills, and overall on-the-job satisfaction). Differently from the studies mentioned so far, Cappellini et al. (2019) and Cerulli-Harms (2017) focus on extra-curricular internships, employing a propensity score matching design to control for observable drivers of selection. While Cappellini et al. (2019), focusing on the Italian labor market, finds that extracurricular internships positively affect the probability of obtaining a higher-quality, better paid job, despite a negative effect on the likelihood of finding any job, Cerulli-Harms (2017) highlights the existence of a negative short-term effect (vanishing within 5 years) of internships on both employment status and job quality, as measured by wage and satisfaction for other non-pecuniary aspects of the job, in the German context. These opposite findings can be reconciled by allowing for heterogeneity across countries, particularly concerning labor market structures and regulations, which might result in different subsets of population selecting into different contracts. In the Italian case, the fact that young workers are disproportionately offered

[4]Recent European-level regulations aimed at homogenizing the maximum duration of extra-curricular internships set a limit of 6 months, or 12 months in exceptional cases.

[5]The screening and signalling mechanisms are not qualitatively dissimilar from the ones explored by the seminal contribution of Spence (1973) for higher education, or by (Katz and Rosenberg, 2005) for time contributions to charitable organizations. Agenzia Nazionale Politiche Attive Lavoro (2018) also provides evidence supporting this channel, as only 60 % of the graduate interns who found a job within six months after the end of the internship did so in the same company.

fixed-term, low-protection contracts at the beginning of their career[6], makes internships relatively more attractive, possibly resulting in a lower, if any, negative selection on ability.

In this paper, focusing on the Italian setting, I first find empirical evidence that university graduates[7] choosing internships are, if anything, positively selected in terms of ability (as measured by the high school grade) and socioeconomic background. Building on this evidence, I employ a survey experimental design on a sample of 500 university students from the Bocconi University in Milan, Italy, to identify the main factors driving individual contract-related choices. Italy provides a compelling case study: first, the critical conditions of its labor market, particularly for young workers, makes it essential to devise effective legislative tools to promote school-to-work transitions. Secondly, internships have become increasingly prevalent, especially among highly educated young workers[8], calling for an evaluation of the ability of this contract to enhance labor market perspectives and its potential for generating inequitable outcomes.

In the survey, I elicit both students' choice between different job offers in hypothetical but realistic scenarios, and their beliefs on future outcomes conditional on the type of contract chosen. On top of distinguishing between internships and job offers, I also add a second layer by specifying whether internships are for hiring purposes or not, as well as firm size to proxy for the offer quality. This allows to distinguish if internships are seen, from the students' perspective, as a trial period before hiring in the same firm, or a way to enrich one's cv by signalling higher motivation and job-readiness, and whether different socioeconomic groups are likely to differ in their motives for choosing an internship.

The presence of several different scenarios for each respondent allows to estimate a structural choice model controlling for individual-level factors, while the explicit elicitation of individual expectations allows to measure the role of beliefs in informing individual choices without imposing strong assumptions on the formation process and accuracy of individual expectations on conditional future outcomes.[9] To address the possible endogeneity concerns which arise from the elicitation of individual beliefs, which might be correlated with unobserved preferences for different contract types, I implement an information treatment to create an exogenous variation in beliefs. In particular, I present some relevant descriptive statistics on the labor market outcomes of Italian graduate workers conditional on having done an internship at the beginning of their career or not to a random sub-sample of two thirds of the respondents. The treatment allows to achieve clean estimates of the preference parameters in the model by removing the time-invariant, individual-specific component

[6] See Appendix figure 2A2 for the prevalence of open-term versus fixed-term contracts across cohorts.

[7] Although university graduates are arguably an already positively selected category in terms of socioeconomic background (see for instance Boneva et al., 2021; Boneva and Rauh, 2017 for the UK), they are an increasingly sizable fraction of the population. For instance, according to ISTAT, 33% of individuals aged 25 held at least one university degree in 2017 (http://dati.istat.it/Index.aspx?DataSetCode=INDUNIVLang=en).

[8] As shown by Figure 2A1

[9] A large and growing strand of literature has highlighted how individual beliefs, and students' beliefs in particular, are often very different from the actual outcomes observed in comparable populations. See for instance Giustinelli (2022) for a review of the literature on students' expectations on the returns to education.

of beliefs.[10]

I find that individuals from different socioeconomic backgrounds do not differ substantially in their beliefs on future outcomes conditional on different types of entry in the labor market (an internship or job contract in firms of different size). However, they are driven by different factors when choosing their preferred contract option, as students from wealthier backgrounds assign a relatively higher value to stability (probability of having a permanent contract) and long-term outcomes than to immediate financial compensation. Furthermore, while preferences for different contract types are distributed similarly across socioeconomic backgrounds, wealthier individuals have a higher evaluation of the monetary benefits of unemployment, which in our context is mostly associated with parental support in the absence of public unemployment benefits for individuals who have not yet accessed the labor market.

These results contribute, first, to the literature on the impact of expectations on individual choices (Jensen, 2010; Stinebrickner and Stinebrickner, 2008; Wiswall and Zafar, 2015; Giustinelli, 2016; Arcidiacono et al., 2020; Boneva et al., 2021; Delavande et al., 2022), complementing the existing evidence on the impact of the socioeconomic background on the decision to invest in higher education[11], by focusing on post-graduation, job-related decisions. Secondly, this paper contributes to the growing strand of literature that investigates the role of individual preferences for different contract features on labor market outcomes (Chapman, 1981; Maestas et al., 2017; Mas and Pallais, 2017; Wiswall and Zafar, 2018) by incorporating individual beliefs on conditional future outcomes.

The paper proceeds as follows: section 2 provides an overview of the setting and some motivating evidence based on existing administrative and survey data. Section 3 presents the model of contract choice, section 4 describes the structure of the survey and the sample of university students, and section 5 presents the main results of the reduced form analysis of the survey data and the model estimation. Section 6 concludes.

2.2 An overview of the context

Given the trade-off which is inherent in the defining characteristics of the internship contract, aimed at facilitating the transition of young graduates into the labor market while at the same time offering a very low or no compensation, policymakers have been trying to regulate the scope and conditions of such contracts. Problems related to the inequitable compensation accruing to interns have been recognized, among others, by the Italian National Agency for Active Labor Policies (Agenzia Nazionale Politiche Attive Lavoro, 2018), and by the US Department of Labor (US Department of Labor, 2018). In order to address these issues in the context of the European Union,

[10] Wiswall and Zafar (2015) use this technique in the context of college major choices.

[11] For instance Boneva and Rauh (2017) and Boneva et al. (2021) investigate the channels driving the difference in the choice of pursuing post-graduate education between first and continuing-generation students

the European Parliament has, since 2014, adopted several resolutions stressing the importance of a unified framework across the member states aimed at ensuring a certain educational value for internship periods, while preventing any related abuse (European Parliament. Directorate General for Parliamentary Research Services., 2022).

In the Italian context, legislation concerning internships and traineeships has evolved constantly over the last decades, also in response to the European effort at ensuring consistence across the different national frameworks. Starting with Law 196/97 (or *Treu*), article 18, which provided a first definition of the concept of internship, the most important steps include the Labor Ministry note of 2007[12], introducing the distinction between curricular and extra-curricular internships (only the second being subject to compulsory communication to the government) and the January 2013 Agreement between the central government and the regional governments. In particular, the latter updated the definition of extra-curricular internships as active labor policy measures consisting of on-the-job training periods that are inherently different from job contracts, and introduced a minimum compensation for interns (€300 per month). Finally, the 2017 Guidelines were issued in compliance with EU recommendations to homogenize, among other aspects, the maximum duration of internships to 12 months.

Although some regional governments have internalized the national guidelines and raised the minimum compensation (up to €800 per month in Lazio), implementation of the national measures was discontinuous across regions, with the minimum statutory allowance often remaining well below the cost of living.

2.2.1 Motivating evidence

In this section, I derive some evidence on the selection into internships and on the relevance of internship contracts for Italian graduates based on an existing survey conducted by the Italian statistical institute (ISTAT) on a representative sample of the population of Italian university graduates. First, I document that respondents from a higher socioeconomic background are more likely to start their career with an internship rather than with a job contract. Secondly, I show that those who start their career with an internship are more likely to have a job but also to be paid less conditional on working three years after graduation. However, this effect might be driven by the short time frame considered, which is likely to mechanically lower the last observed wage due to career timing effects.

The survey on the professional placement of graduates

The ISTAT survey on the professional placement of university graduates (*Indagine Campionaria sull'Inserimento Professionale dei Laureati*) was conducted in 2011 and 2015 on respondents who

[12]Nota del Ministero del Lavoro n.4746, 14 Febbraio 2007

had obtained a university degree in an Italian university four years before the interview (2007 for the 2011 wave, and 2011 for the 2015 wave). Respondents were selected to be representative of the population of university graduates in the considered year. Aside from general information on the demographic characteristics and university curriculum of each respondent, the questionnaire asked a detailed account of individual university experiences (reasons for choosing a certain field of study, regularity of class attendance, grades) and subsequent labor market outcomes (wage, type of contract, satisfaction with different aspects of the job). Finally, a set of questions covering the respondents' family background (in terms of parental education and occupation) allows for conducting separate analyses by socioeconomic status. Table 2.1 reports the main descriptive statistics for the 2015 sample: women account for slightly more than half of the sample, while 99 percent of the respondents holds an Italian citizenship. Less than one fifth have university-educated parents. As expected, more than half of the sample comes from a scientific or classical high school, which are preparatory for university, one quarter comes from a technical high school, and only 4 percent has a professional high school diploma. More than half of the sample obtained either a Master's or a five-years degree[13], while an overwhelming majority had some working experience during their studies. After graduation, 35 percent of the respondents started and concluded some form of traineeship, and the fraction remains relevant (26 percent) when excluding compulsory traineeship associated with professional licences (for graduates in medicine, architecture, law and psychology). At the moment of the interview, more than 70 percent of the respondents were working, while 30 percent had a permanent contract. The average net monthly wage for employed individuals was approximately €1300.

[13] *Laurea a Ciclo Unico*, equal in duration and educational value to the sum of a Bachelor's and Master's degree, and the only available format in some disciplines, such as Medicine, Law and Architecture.

Table 2.1: Descriptive statistics for the 2015 ISTAT sample

Demographics	
Female	0.55
Italian citizenship	0.99
Father has at least a university degree	0.19
Mother has at least a university degree	0.16
High school and university experience	
Average high school grade	83.6 (12.6)[2]
High school type	
Scientific	0.42
Classical	0.14
Other *liceo*	0.13
Technical	0.25
Professional	0.04
Average degree grade	103 (7.9)[2]
More than Bachelor's degree	0.53
Did a study period abroad	0.09
Worked during degree	0.80
Graduated in time	0.55
Degree field	
Medicine, psychology, architecture and law[1]	0.31
Engineering and scientific degrees	0.26
Humanities	0.24
Economics	0.13
Post-graduation experience	
Concluded an internship after graduation	0.35
Is currently working	0.72
Works as an employee	0.49
Works in the private sector	0.59
Has a permanent contract	0.30
Average monthly net wage	1307 (652)[2]
Count	58400

(1) When excluding these fields of study, in which traineeships are compulsory to obtain the corresponding professional licenses, the percentage of individuals concluding an internship goes down to 0.26.

(2) Standard deviations in parentheses.

Selection into internships

Figure 2.1 reports the percentage of respondents having concluded an internship or traineeship after graduation[14], divided by the socioeconomic status of the family of origin in terms of education and job position[15]. The two groups are divided by a sizable and significant difference, with respondents from higher socioeconomic backgrounds being nearly eight percentage points more likely to conclude an internship.

Appendix figure 2A4 shows the difference in internships take-up by gender and ability as proxied by high school grade[16]. Without controlling for other factors, ability has a slightly positive effect on doing an internship. Concerning gender, women are, *ceteris paribus*, slightly more likely than men to start an internship.

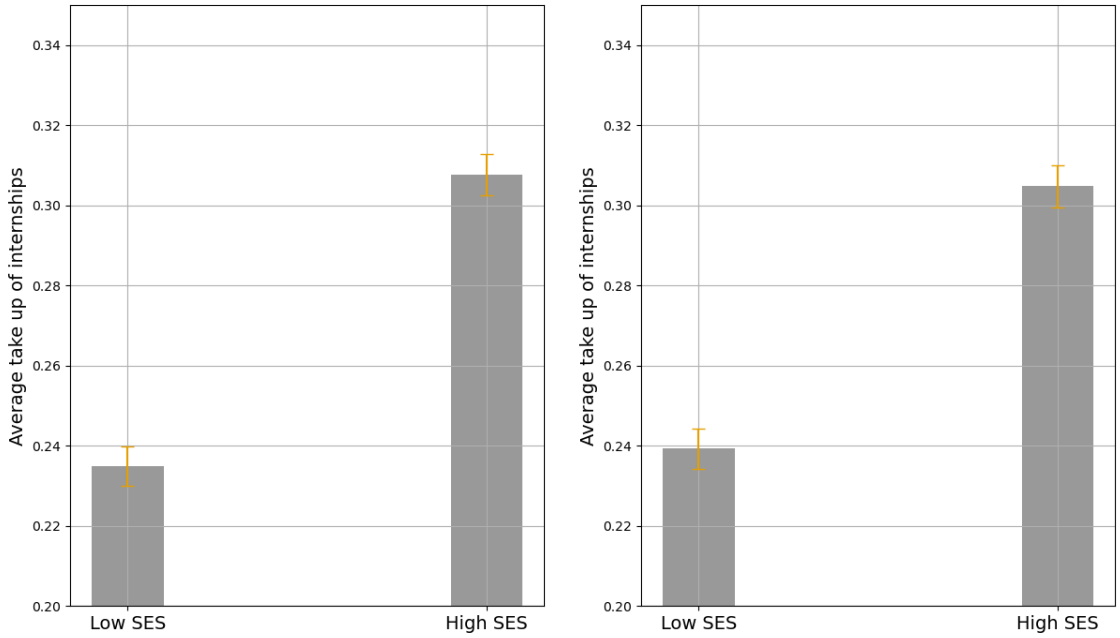


Figure 2.1: Internship take up by level of education (on the left) and level of job position (on the right) of the family of origin. Low and High Socioeconomic Status are defined as being below and above the average level in the sample.

Since socioeconomic status and ability might be correlated with other factors which can also affect the decision to start an internship (such as grades, graduation timing, choice of the field of study, and place of residence), I also run a logistic regression in order to control for a comprehensive

[14] I exclude degree types requiring compulsory traineeships, i.e. Medicine, Psychology, Architecture and Law. Results are robust when including respondents who started an internship without concluding it.

[15] Socioeconomic status is measured, on a scale of 0 to 7, as a combination of parental level of education and job position. On the education scale, the lowest value corresponds to elementary school or less, while the highest corresponds to a university degree or more; on the job position scale, the lowest level corresponds to laborers, while the highest corresponds to entrepreneurs or managers. The categories of *low* and *high SES* refer to individuals below and above the average level of the measure for socioeconomic status

[16] The chosen threshold is 90 out of 100

set of observable characteristics[17].

The regression results (Appendix Table 2A1) confirm the unconditional evidence on the positive effect of the socioeconomic background on the probability of starting an internship presented in Figure 2.1. Both parental education and occupation are significant and positive predictors of completing an internship; being a woman is also associated with a significantly higher probability of starting an internship, while the effect of ability (as measured by high school grades) becomes insignificant[18]. The field of study is also a relevant predictor of the probability of starting an internship, with graduates in Economic disciplines being significantly more likely to start an internship than graduates in other disciplines.

Short-term outcomes

Once established that graduates from higher socioeconomic backgrounds are more likely to participate in an internship after graduation, it is now interesting to measure the impact of internships on labor market outcomes at the time when the questionnaire is conducted, approximately three years after graduation.

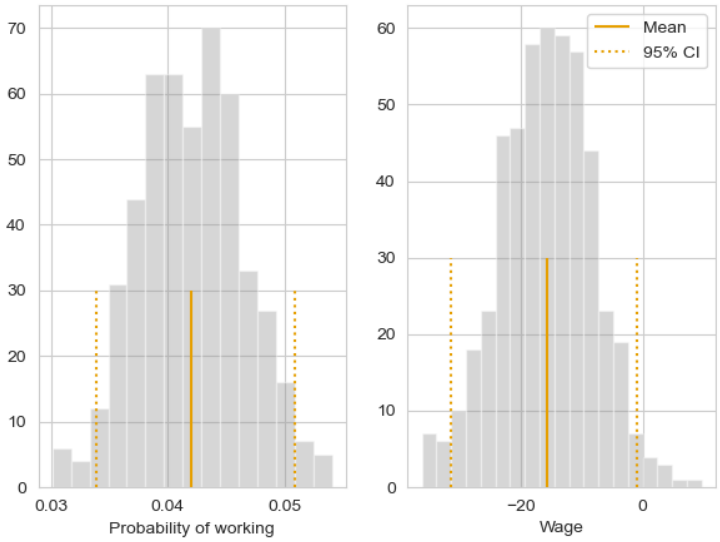
Since selection into internships is a relevant concern (as shown by figure 2.1 in terms of socioeconomic background), I control for the observable dimensions of selection with a propensity score matching analysis[19]. Figure 2.2 shows the results of this exercise in terms of probability of employment, wage, and satisfaction for non-pecuniary aspects of the job. These results suggest that, when comparing individuals with similar observable characteristics[20], internships have a mixed effect on outcomes. In particular, they increase the probability of employment but decrease the average wage given employment. At the same time, they seem to have a positive effect on satisfaction for the level of on-the-job learning and career prospects, but a slightly negative effect on the overall reported satisfaction.

[17] I control for gender, high school grade, socioeconomic status as proxied by both education and job position of parents, region of residence, field of study and age at graduation.

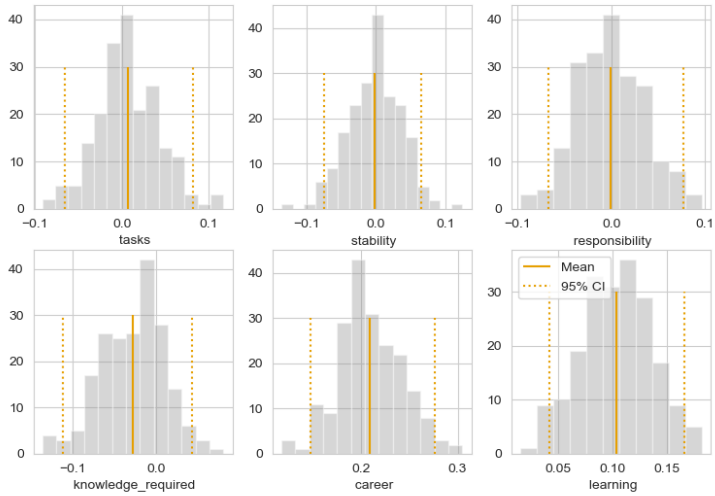
[18] In the preferred specification I exclude degrees for which the internship variable is artificially set to 0 as a period of compulsory traineeship is required, involving no self-selection.

[19] Most empirical evidence on the effects of extra-curricular internships on subsequent labor market outcomes employ some form of propensity score matching, see for instance Cerulli-Harms (2017).

[20] The propensity score is computed based on gender, citizenship status, graduation age, residence region, socioeconomic background, type of degree, field of study, final grade, class attendance, working while studying, and studying or working abroad.



(a) Probability of being employed and wage given employment.



(b) Satisfaction with different aspects of the job.

Figure 2.2: Average Treatment Effects of internships on short-term labor market outcomes. Standard errors are bootstrapped.

Although Propensity Score Matching cannot entirely rule out endogeneity concerns due to unobservable omitted variables, such as ability, which we can only approximate with indirecte measures[21], these results still represent interesting correlational evidence.

Unfortunately, the nature of the ISTAT survey does not allow to address a second concern, namely the lack of evidence on long-term outcomes, as I only observe individuals at one point in

[21] In this case ability is approximated by the final grade in High School

time after graduation, three years later.

The lack of medium- and long-term evidence could at least partially explain why internships seem to have a positive effect on the probability of having a job and on the satisfaction for relevant non-monetary characteristics of the job (learning opportunities and career prospects), but a negative effect on the wage given employment status. Indeed, the delay in the start of the first job contract due to the internship period could translate into a later start in the wage progression, without ruling out a convergence (and possibly an overtaking) in the long term. Support for this explanation is also provided by the shorter duration of current job spells for graduates starting their career with an internship, shown in figure 2A5.

2.3 A model of discrete choice

To provide an interpretation of the stylized facts presented so far, and in particular to rationalize the observed choice differential across socioeconomic backgrounds, I develop a simple estimable model of contract choice.

In doing so, I will limit my analysis to supply-side factors, that is features, beliefs and preferences characterizing young graduate workers, and the role of these factors in shaping their contract choices. The hypothetical nature of the choice scenarios presented in the survey allows to abstract from firms' decision processes, focusing instead on the impact of relevant individual characteristics, and particularly their socioeconomic background, and their beliefs and preferences. The same would of course not apply to observed choices, which result from the interaction of demand and supply-side factors[22].

2.3.1 Model

In this framework, individuals maximize their utility by choosing a contract option j out of a choice set $\mathbb{J}$.

Each choice set contains three different options: a contract A, a contract B and an outside option U. Contracts A and B are characterized by a contract type (internship with hiring purposes, internship with no hiring purposes, or fixed term contract), a firm type (small-medium enterprise or multinational firm) and a wage (or compensation in the case of internships). Internships last 6 months, while fixed term contracts last 12 months. The contracts are comparable in every other aspect that is not specified in the option type. Finally, the outside option is characterized as a waiting period of τ_U months before receiving any other job offer.

[22] In particular, demand-side factors could contribute to explain the higher observed take-up of internships among higher socioeconomic groups if networks developed thanks to the family of origin were particularly effective in obtaining an internship. While testing this channel is beyond the scope of this paper, it is certainly an interesting subject for future research.

Given the choice set $\mathbb{J}$, decision makers select the option which results in the highest total expected utility, which is composed of the sum of the current utility from the contract and the future expected utility conditional on having chosen that particular contract at the beginning of one's career.

Decision makers are heterogeneous, and have different utility parameters. For estimation purposes, I allow structural utility parameters to vary according to the socioeconomic status of the respondent's family of origin, indexed by $g \in \{L, H\}$, where L stands for low and H for high socioeconomic background of the family of origin.[23]

The total utility from option j for an individual i of socioeconomic status g can be expressed as follows:

$$V_{ij} = \frac{1-\beta_g^{\tau_j}}{1-\beta_g}\left[\frac{w_j^{1-\rho_g}}{1-\rho_g} + \gamma_{ij}\right] + EV_{ij}, \tag{2.1}$$

where w_j is the wage or compensation characterizing option j, β_g is the time discount factor, ρ_g is the degree of relative risk aversion implicit in the constant relative risk aversion utility function, τ_j is the duration of contract j, EV_{ij} is the expected future utility conditional on choosing contract j after graduation and γ_{ij} is the taste for option type j which cannot be explained with wage nor with future utility accruing from the choice of contract j. γ_{ij} represents a residual idiosyncratic component which is both individual and contract-specific.

The second component of the total utility is the expected future utility from choosing contract j to access the labor market, EV_{ij}, and can be expressed as follows[24]:

$$EV_{ij} = \int_{t=\tau_j}^{\infty} \beta^t \left[\frac{E_i(w_t|j)^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_t = 1|j)\right] dt, \tag{2.2}$$

where η_g represents the group-specific weight of the non-pecuniary component l (the probability of having an open-term contract, as a proxy for future stability), while $E_i(w_t|j)$ and $Pr_i(l_t = 1|j)$[25] are individual beliefs concerning the expected wage and the probability of having a permanent

[23] I use family income as a proxy, and a net monthly income of €4000 as threshold. Since the average net wage is approximately €2000 (from a gross figure of $40,800 according to OECD statistics, accessed at https://data.oecd.org/earnwage/average-wages.htm), the threshold is descriptive of a family where both parents earn the average wage.

[24] Since I cannot elicit the complete distribution of conditional outcomes over time, I only elicit two points of the distribution: right after the end of the first contract (6 or 12 months after graduation) and further on in the future, when respondents are aged 35 (when they should have achieved a more stable position in the labor market). Then, we can rewrite EV_{ij} as follows:

$$EV_{ij} = \frac{\beta_g^{\tau} - \beta_g^{T}}{1-\beta_g}\left[\frac{E_i(w_\tau|j)^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_\tau = 1|j)\right] + \frac{\beta_g^{T}}{1-\beta_g}\left[\frac{E_i(w_T|j)^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_T = 1|j)\right]$$

[25] No assumption is made on the structure of individual beliefs, which are directly elicited in the survey.

contract at time t conditional on having chosen contract j to access the labor market.

The utility of the outside option, U, can be expressed analogously to its counterparts for the other two options (A and B), except for the wage component which is now replaced by the monetary benefit accruing during the unemployment period, b_i, which in this context is mainly represented by parental support[26]. The non-pecuniary benefits of unemployment (for instance the utility from leisure) is instead captured by a specific taste component γ_{iU}[27].

$$V_{iU_\tau}(w) = \frac{1-\beta_g^{\tau_U}}{1-\beta_g}\left[\frac{b_i^{1-\rho_g}}{1-\rho_g} + \gamma_{iU}\right] + EV_{iU_{\tau_U}}. \tag{2.3}$$

Finally, the expected future utility accruing to individual i from choosing an unemployment spell of duration τ_U can be expressed as:

$$EV_{iU_\tau} = \int_{t=\tau_j}^{\infty} \beta_g^t \left[\frac{E_i(w_t|U_\tau)^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_t = 1|U_\tau)\right] dt, \tag{2.4}$$

where $E_i(w_t|U_\tau)$ and $Pr_i(l_t = 1|U_\tau)$ are individual beliefs concerning the expected wage and the probability of having a permanent contract at time t conditional on having undergone an unemployment spell of duration τ just after graduation.

Contract choice and identification

When choosing between two contracts, A and B, and the outside option U, characterized by a waiting time τ_U, individuals maximize the sum of instantaneous and long-term expected utility.

More specifically, the probability of choosing a contract option, for instance option A, can be expressed as the probability that the inter-temporal utility derived from accepting that contract (A) is higher than the utility of accepting any other option (in this case, contract B and the outside option U), or:

$$\pi_A = Pr\big(V_A = \max_{j\in\{A,B,U\}} V_j\big) \tag{2.5}$$

In addition to the idiosyncratic taste component for each contract type (γ_{ij}), which is unobserved by the researcher but constant and known to the respondent, the hypothetical nature of the choice scenarios proposed in the survey results in a second layer of uncertainty, an idiosyncratic component that is unknown both to the researcher and to the respondent when the choice is elicited (the *resolvable uncertainty* component as labelled by Blass et al. (2008)). More specifically, this component accounts for the chronological and cognitive gap in the respondent's information set

[26]The component b_i accounts for any source of financial support received while not working. While in a more general context b_i would mostly refer to unemployment benefit, recent graduates searching for a job are more likely to receive parental support or analogous forms of financial coverage of their expenses.

[27]This component is normalized to zero for the estimation.

between the moment when the choice is elicited (the survey) and the moment when the choice is made in real life, which is resolvable because it will cease to exist when the actual choice is made.

Adding the resolvable uncertainty component, the log odds of individual i choosing contract A over contract B (an analogous expression can be used for the outside option U) can then be expressed as:

$$ln\left(\frac{\pi_A}{\pi_B}\right) = V_{iA} - V_{iB} + \varepsilon_i \tag{2.6}$$

Assuming that the resolvable uncertainty component ε_i follows a type I extreme value distribution[28], and that each individual respondent makes the same assumption (following Manski et al. (1999)), equation 2.6 could in principle be estimated via nonlinear least squares to retrieve the structural parameters of the model.

However, as also highlighted in previous studies, in particular in Wiswall and Zafar (2015) for the choice among college majors, a direct estimation of equation 2.6 will result in biased estimates if respondents' beliefs on future returns to different contracts are correlated with the unobserved taste for different contract types (the γ_{ij}'s).

Since the existence of such correlation cannot be theoretically ruled out, as both preferences and beliefs are the product of a joint cognitive process, I follow Wiswall and Zafar (2015) and devise an information treatment to create an exogenous shock to subjective beliefs. In particular, I provide information on earnings and contract types for relevant subsets of the Italian working population[29] conditional on having started one's career with an internship versus any other contract type. I then use the change in beliefs of treated individuals to estimate the coefficients of the time-invariant components of the model (the structural parameters β, ρ and η) from the following differenced equation:

$$ln\left(\frac{\pi'_A}{\pi'_B}\right) - ln\left(\frac{\pi_A}{\pi_B}\right) = EV'_{iA} - EV'_{iB} - EV_{iA} + EV_{iB} + \psi_i \tag{2.7}$$

where $\psi_i = \varepsilon'_i - \varepsilon_i$. Equation 2.7 can then be estimated via nonlinear least squares under the assumption that the error term ψ_i, i.e. the difference in the resolvable uncertainty components after and before the treatment, is not correlated with the observed change in beliefs.[30]

Finally, the estimated values of the structural parameters can be plugged back in the cross-sectional version of the model[31] (equation 2.6) to retrieve the unobserved taste components γ_{ij} and the financial value of unemployment b_i for each individual respondent, thus allowing to estimate

[28] In making this assumption, I follow Wiswall and Zafar (2015) and Boneva et al. (2021).

[29] Selected according to gender, level of education and age group to be comparable to the respondents.

[30] This is quite reasonable in our setting, due to the fact that the information provided in the information treatment should affect individual choices only through their beliefs concerning future returns to internships.

[31] Here, I average out pre- and post-treatment beliefs to increase robustness. More details on the estimated equation are presented in Appendix section A.

the non-parametric distributions of these components.

2.4 Survey structure and data

To estimate the parameters of the model described above, I rely on a survey experiment administered to a sample of 500 university students from Bocconi University in Milan. The survey is organized in three blocks: (i) a section where individual beliefs on future labor market outcomes are elicited; (ii) a choice experiment asking respondents to allocate 100 probability points across different options of access to the labor market in the context of hypothetical but realistic scenarios;[32] and (iii) a standard set of questions on demographic characteristics, socioeconomic status of the family of origin, and university career.

As a final step, a fraction of the sample is also subject to an information treatment. The treatment provides randomly selected respondents (corresponding to approximately two thirds of the sample) with information concerning labor market outcomes for Italian workers of the same gender with a university degree, conditional on (i) starting their career with an internship and (ii) starting their career with any other contract type. Both the choice experiment and the elicitation of expectations on future outcomes are repeated twice: before and after the treatment (or at the beginning and at the end of the survey for the control group).

Elicitation of expectations on conditional outcomes

As a first step, I ask respondents to think about their life at two points in the future, one year after the end of their first contract[33] (short-term outcomes) and at age 35[34] (long-term outcomes).

For each of these points in time, I elicit respondents' beliefs concerning selected labor market outcomes conditional on finding themselves in each of eight possible situations upon their entry in the labor market. The eight situations correspond to six contract types (listed in Table 2.2), and two unemployment spells of different duration (3 and 9 months).

[32] Elicitation of individual choices in hypothetical scenarios has been increasingly employed to measure individual preferences for alternative work arrangements or levels and types of education, and subsequent real-life choices have been shown to validate survey responses(Maestas et al., 2017; Mas and Pallais, 2017; Wiswall and Zafar, 2018)

[33] The first contract refers to one of the options offered in the hypothetical scenarios, all with limited duration between 3 and 12 months

[34] This arbitrary threshold is common in the literature, see, for instance, Boneva et al. (2021). The underlying assumption is that most individuals have resolved most of the career-related uncertainty, while being still reasonably close in the future.

Table 2.2: Option types in the survey scenarios

Contract description		Firm size		Wage range		Corresponding utility component γ	
A	B	A	B	A	B	A	B
Internship, no hiring	Internship, for hiring	Big[1]	Small-medium	€450-1000	€450-1000	γ_{IBN}	γ_{ISH}
Fixed term	Internship, for hiring	Small-medium	Big	€1000-1900	€450-1000	γ_{FS}	γ_{IBH}
Internship, for hiring	Fixed term	Big	Small-medium	€450-1000	€1000-1800	γ_{IBH}	γ_{FS}
Fixed term	Internship, no hiring	Small-medium	Big	€1000-1900	€450-1000	γ_{FS}	γ_{IBN}
Internship, no hiring	Fixed term	Big	Small-medium	€450-1000	€1000-1900	γ_{IBN}	γ_{FS}
Fixed term	Fixed term	Small-medium	Big	€1000-1900	€1100-2000	γ_{FS}	γ_{FB}
Internship, no hiring	Fixed term	Small-medium	Small-medium	€450-1000	€1100-2000	γ_{INS}	γ_{FS}
Internship, no hiring	Fixed term	Big	Big	€450-1000	€1100-2000	γ_{INB}	γ_{FB}

Notes: (1) Big firm size is described in the survey as referring to a firm which is multinational or leader in its sector

More specifically, contract types include internships and fixed-term contracts in firms of different size, while the outcomes upon which expectations are elicited are: (i) expected wage and (ii) the probability of having a permanent contract.

An example of this question type is provided in Appendix figure 2A7. Respondents are asked to select their expected future wage and probability of having a permanent contract on a clickable slider without visible handle in order to reduce anchoring to a pre-selected value.[35]

The choice experiment

The choice experiment section consists of eight scenarios mimicking the structure of the model choice sets. In each scenario, individuals are asked to distribute 100 probability points among three options: a contract A, a contract B and an outside option U which consists in waiting for 3 or 9 months until the next offer. An example of choice scenario is shown in Appendix figure 2A6.

The contract options differ along three dimensions: type of contract (an internship with hiring purposes, an internship with no hiring purposes or a fixed-term job contract), firm size (described as "medium-small" and "multinational or leader in its sector") and wage (or internship compensation). Respondents are instructed to consider that every other aspect of the job is identical for the two options, and it is also specified that there is no difference in the geographic location of the two options[36].

Concerning the contract type, I propose a fixed-term contract (as opposed to a permanent contract) as an alternative to internships due to the much larger diffusion of this type of contract among workers with a university degree aged below 30 upon entry in the labor market, as shown

[35] It has been shown, for instance by Bruine de Bruin and Carman (2018), that clickable sliders minimize the use of focal responses, while the absence of a visible handle pointing to any quantity in the slider has been shown to reduce anchoring (see, e.g., Maineri et al. (2021)).

[36] In particular, all the options are in the same place where the respondent attended university.

in Figure 2A2. Secondly, since larger firms are more likely to offer internship contracts[37], the majority of the proposed scenarios features a choice between a fixed term job contract in a small firm and an internship contract in a large firm. Finally, I distinguish between two different types of internships (for hiring purposes, or without hiring purposes) as this information is likely to be known to prospective interns, either because it is directly specified by the firm posting the internship offer or via information provided during the selection process, and is particularly useful to shed light on whether students are mostly driven by the willingness to use internships as signal, or by the hope to use them as stepping stones towards more permanent employment in the same firm.

All the scenario-related questions are asked in probabilistic terms in order to account for resolvable uncertainty, representing the fraction of the overall uncertainty concerning utility components (such as conditional expectations on future outcomes and preference parameters) that would disappear in an actual choice scenario, that is if the respondent was called to make the same choice in real life. The probabilities are again selected on clickable sliders with no visible handle.

The information treatment

The information treatment[38] consists of a visual representation of stylized facts concerning actual labor market outcomes for relevant population groups. Treated respondents are shown summary statistics based on data from the Italian social security institute (INPS) on all contracts activated between 2007 and 2021. The summary statistics are gender-specific, and refer to those workers who have at least a Bachelor's degree, but less than a Doctoral degree, and are less than forty years old at the time when the last contract was registered. The selected outcomes are (i) the fraction of workers for whom the first contract was an internship; (ii) the average wage for the last contract conditional on having or not having started one's career with an internship; and (iii) the fraction of open-term contracts out of last contracts for individuals who have or have not started their career with an internship.

Sample description

The survey was administered to 500 respondents, recruited by the Bocconi Experimental Laboratory for Social Sciences. Respondents received a compensation of €7 for an estimated completion time of 30 minutes. Bocconi University is a large private university in Milan, in Northern Italy, which offers degree programs at both the Bachelor's and Master's level in economic, statistical and legal disciplines. Admission to degree programs is selective, and tuition fees are sizable compared to Italian public universities. These factors result in a positively selected sample in terms of socioeconomic background compared to the Italian population of university students. Table 2.3

[37] Figure 2A3 shows how interns represent a larger fraction of the labor force in large firms (100 employees or more) as opposed to small and medium enterprises.

[38] The screen for female respondents is shown in Figure 2A9.

compares the demographic characteristics of the Bocconi sample with the corresponding features of the average graduate in Economic disciplines in Italy as reported by Almalaurea.[39]

Table 2.3: Demographics: comparison with Almalaurea 2021 sample

	Bocconi sample	Almalaurea: Economics
Female	0.50	0.51
High school final grade (out of 100)	93.3	80.5
High school type (%)		
Scientific	0.62	0.37
Classic	0.19	0.08
Technical	0.09	0.36
Vocational	0.00	0.02
At least one parent with university degree	0.68	0.29
Both parents with university degree	0.60	0.11

Both samples are balanced in terms of gender, with approximately half of the respondents being female. As expected, respondents in the Bocconi sample are instead positively selected in terms of ability (as measured by High school grade) and family background. The average high school grade is nearly 13 points higher in the Bocconi sample, and Bocconi students are more likely to have graduated from a Scientific or Classic High school than the Almalaurea students[40]. Bocconi students are also substantially less likely to be first generation students, as 68% of them have at least one parent who completed university education, while for 60% of them this is true for both parents. In comparison, only 29% of the Almalaurea students have at least one parent with university-level education, and for 11% of them both parents are highly educated. Since Bocconi is a private selective university, where admission is conditional on both High school grades and on the results of an entry test and enrollment fees are high by Italian standards[41], the presence of a pronounced positive selection is not surprising. However, this selection certainly affects the generality of the results that will be presented in the following sections[42].

[39]Summary statistics are computed by Almalaurea on a sample of 40.876 graduates in Economic disciplines, or 93% of the universe of graduates in Economic disciplines in 65 Italian universities. The universities sample excludes private Universities such as Bocconi. The statistics are available at https://www2.almalaurea.it/cgi-php/universita/statistiche/tendine.php?LANG=itconfig=profilo.

[40]In the Italian setting, Scientific and Classic High school are usually associated with a better preparation in theoretical subjects, and with an easier transition to university studies.

[41]Approximately €13,000 per year compared with approximately €2,000 per year in a public university.

[42]In order to obtain more general results, I am currently undergoing an additional data collection effort in other Italian public universities.

Table 2.4 summarises the university experience of the average respondent in the Bocconi sample separately by socioeconomic group[43] and type of degree. Out of the original sample, 15 responses are discarded from the following analyses due to the type of degree[44]. First, it is interesting to notice that students from wealthier families are more likely to be enrolled in an undergraduate degree then in a Master's degree (although this difference is not significant). While this finding is somewhat puzzling, given that more privileged backgrounds have been shown to correlate positively with the probability to continue studying[45], it can be rationalized in light of the fact that poorer students enrolled in Master courses appear to be positively selected in terms of ability as measured by the High school final grade, arguably justifying the investment in extra years of education.

This positive selection is instead not apparent among undergraduate students, for which a wealthier background seems to result in a slightly higher High school grade (although the difference is not statistically significant in this case).

As expected, the two socioeconomic groups differ significantly in terms of university financing: for both undergraduate and Master's degrees, students from wealthier backgrounds rely relatively more on family support (and, quite surprisingly in the case of undergraduate students, on savings from own work) and less on public subsidies[46]. Consistently with the reported sources of university financing, respondents from poorer backgrounds are not more likely to have had working experiences.

When looking at the reasons for choosing a given university curriculum, respondents from different socioeconomic groups assign slightly different weights to personal interest for the subject and career prospects (the residual category being "other reasons"). In particular, respondents from poorer families weight career prospects more; however, the difference is not statistically significant. Concerning expectations for graduation outcomes, high-SES respondents from both undergraduate and Master's courses tend to hold more optimistic beliefs in terms of grades, however the difference is only significant for undergraduates. Finally, the reported probability of graduating in time is also higher for wealthier undergraduates.

[43]The preferred measure of socioeconomic group uses family income, however results are robust to using parental education.

[44]I exclude those respondents who are enrolled in a 5-years course in Law, and are thus required to complete a compulsory extra-curricular internship after the end of their studies in order to obtain a professional licence. 485 observations are employed for most of the following analyses.

[45]For instance Boneva et al. (2021) show how being a first generation students negatively affects the reported probability of enrolling in a master's degree.

[46]Income-based subsidies covering from 65% to 100% of the tuition costs are available for families reporting a low ISEE (an index of family wealth which is computed on the basis of parental income and properties).

Table 2.4: High school grade and university experience

		Family income < €4000	Family income > €4000	Difference (p value)
Undergraduate (number)		57	100	
Master's (number)		143	185	
Undergraduate (%)		28.5	34.1	0.14
High school final grade	Undergraduate	93.68 (10.38)	95.02 (7.53)	0.36
	Master's	94.12 (8.05)	91.91 (9.20)	**0.02**
Course is in English	Undergraduate	36.84 (48.67)	57.00 (49.76)	**0.01**
	Master's	62.94 (48.47)	67.57 (46.94)	0.38
Curricular internship	Undergraduate	31.58 (46.90)	34.00 (47.61)	0.76
	Master's	84.62 (36.21)	77.84 (41.65)	0.76
Ever worked	Undergraduate	52.63 (50.37)	52.00 (50.21)	0.94
	Master's	53.15 (50.08)	54.59 (49.92)	0.79
Any subsidy	Undergraduate	36.84 (48.67)	6.00 (23.87)	**0.00**
	Master's	39.86 (49.13)	13.51 (34.28)	**0.00**
Financing of university tuition				
Family support	Undergraduate	74.12 (30.60)	84.78 (24.60)	**0.02**
	Master's	68.17 (33.09)	81.43 (26.63)	**0.00**
Public subsidy	Undergraduate	15.35 (25.77)	2.72 (9.76)	**0.00**
	Master's	15.92 (25.46)	5.31 (16.55)	**0.00**
Own work savings	Undergraduate	4.98 (9.40)	9.54 (20.41)	0.11
	Master's	12.09 (20.89)	10.74 (19.33)	0.55
Financial credit	Undergraduate	5.54 (17.30)	2.96 (11.53)	0.26
	Master's	3.83 (12.27)	2.52 (10.89)	0.31
Reasons for choosing the university curriculum				
Career prospects	Undergraduate	51.39 (20.05)	49.28 (19.49)	0.52
	Master's	49.27 (19.90)	48.03 (18.66)	0.56
Interest for the subject	Undergraduate	43.53 (19.75)	45.40 (19.71)	0.57
	Master's	44.08 (19.93)	45.94 (18.47)	0.39
Expected graduation outcomes				
Expected degree grade (out of 110)	Undergraduate	100.53 (7.68)	103.40 (7.60)	**0.02**
	Master's	104.99 (4.85)	105.72 (4.55)	0.16
Graduating in time	Undergraduate	86.21 (21.23)	92.98 (13.19)	**0.01**
	Master's	94.52 (8.28)	92.95 (12.19)	0.19
Not graduating	Undergraduate	1.23 (2.73)	0.91 (2.99)	0.51
	Master's	0.70 (2.04)	0.70 (2.31)	0.99

Expectations and beliefs on future paths

An interesting aspect to analyze is whether students differ in their post-graduation plans and beliefs concerning the probabilities of future events.

Table 2.5 and Table 2.6 report the probability assigned to different post-graduation courses of

action[47] and the probability assigned to labor market-related external events. Both tables report these statistics separately by socioeconomic status and current degree type (undergraduate versus Master's degree).

Undergraduate students deem very likely that they will continue studying (approximately 80% of probability for both socioeconomic groups, with a small difference in favor of wealthier respondents), while Master's students assign a higher probability to start looking for a job. Although none of the differences between socioeconomic groups is statistically significant at the 10% level, both the probability of continuing studying and the probability of studying while working are more than 3 percentage points lower for low-SES Master's respondents, which is consistent with a lower investment capacity on post-master or PhD level education.

Table 2.5: Beliefs concerning future plans

	Family income < €4000	Family income > €4000	Difference (p value)
Currently enrolled in Bachelor's degree			
Studying while working	29.00 (26.83)	28.43 (28.53)	0.90
Starting own business	13.93 (21.75)	15.55 (23.02)	0.67
Searching for a job	31.33 (32.44)	29.31 (32.31)	0.71
Continue studying	79.70 (21.70)	82.20 (24.25)	0.52
Currently enrolled in Master's degree			
Studying while working	14.69 (21.38)	17.69 (24.54)	0.25
Starting own business	14.24 (19.14)	16.50 (20.87)	0.31
Searching for a job	73.92 (25.04)	74.43 (25.91)	0.86
Continue studying	19.52 (24.21)	23.58 (26.45)	0.15

Concerning labor market behavior and beliefs, Master's students are more likely to be searching for a job already when the survey is conducted (70% versus approximately 40% for undergraduates). The proportion of students searching is larger among high-SES students, the difference being more sizable for undergraduates (45 versus 37%) but not statistically significant. The two socioeconomic groups are also not statistically different concerning the reasons why they would start an extra-curricular internship, both deeming very important the possibility of enriching one's CV and relatively less important the opportunity to develop general abilities and to be hired in the same firm (although low-SES individuals select this last aspect as important slightly more often than their high-SES counterparts).

Focusing on the probability of choosing different courses of action concerning job search after graduation, Bachelor's students from less wealthy backgrounds seem to be willing to devote less

[47] Courses of action are not exhaustive, meaning that probabilities are not required to sum to 100.

effort (in terms of weekly hours) on searching for an opportunity in the labor market; however, they devote a much larger fraction of the total searching time to internship opportunities (48% against 40% for wealthier individuals). Finally, less wealthy students assign an overall lower value to the probability of receiving any job or internship offer within 3 months, and this is true for both undergraduate and master's students. Concerning the relative probability of receiving a job offer rather than an internship offer, while all student groups (high and low-SES from both undergraduate and Master's courses) deem internship offers more likely, students from poorer backgrounds perceive the gap to be larger by almost 10 percentage points (although the difference is not statistically significant).

Table 2.6: Labor market-related beliefs and job search experience

		Family income < €4000	Family income > €4000	Difference (p value)	
Already searching	Undergraduate	36.84 (48.67)	45.00 (50.00)	0.32
	Master's	70.63 (45.71)	71.35 (45.33)	0.89
Reasons for starting an internship (% of respondents selecting)				
Enriching CV	Undergraduate	92.98 (25.77)	94.00 (23.87)	0.80
	Master's	86.01 (34.81)	82.70 (37.93)	0.42
Developing general abilities	Undergraduate	57.89 (49.81)	61.00 (49.02)	0.70
	Master's	49.65 (50.17)	49.73 (50.14)	0.99
Developing specific abilities	Undergraduate	73.68 (44.42)	64.00 (48.24)	0.22
	Master's	67.83 (46.88)	63.24 (48.35)	0.39
Being hired in same firm	Undergraduate	43.86 (50.06)	38.00 (48.78)	0.47
	Master's	62.24 (48.65)	60.00 (49.12)	0.68
Understanding match with job type	Undergraduate	84.21 (36.79)	82.00 (38.61)	0.73
	Master's	81.81 (38.71)	83.24 (37.45)	0.74
Plans for job search after graduation				
Weekly hours spent on job search	Undergraduate	31.18 (19.27)	37.25 (20.65)	**0.07**
	Master's	38.78 (22.33)	36.61 (24.76)	0.41
Relative effort for internships	Undergraduate	48.44 (22.55)	40.91 (19.66)	**0.03**
	Master's	43.12 (22.88)	42.76 (20.78)	0.88
Beliefs on arrival rates of different opportunities				
Internship within 3 months	Undergraduate	60.44 (23.70)	71.58 (21.12)	**0.00**
	Master's	64.85 (26.11)	70.77 (22.46)	**0.03**
Job offer within 3 months	Undergraduate	47.95 (25.82)	58.84 (22.91)	**0.01**
	Master's	45.59 (28.18)	52.71 (26.93)	**0.02**
Probability ratio: job to internship	Undergraduate	79.58 (41.69)	86.20 (58.39)	0.46
	Master's	69.95 (48.75)	79.16 (71.66)	0.20
No offer for 3 months	Undergraduate	29.12 (22.96)	22.92 (17.56)	**0.06**
	Master's	19.21 (17.56)	18.44 (15.58)	0.68
No offer for 9 months	Undergraduate	13.89 (13.47)	11.86 (13.67)	0.37
	Master's	8.53 (11.90)	7.97 (10.47)	0.65

Experimental behavior

I conclude this section by summarising the respondents' behavior in the proposed choice scenarios and their beliefs concerning future outcomes.

Table 2.7 reports the average probability of choosing different types of contract in each subsample (low and high socioeconomic status, divided by course type[48]). While there is no sizable variation in behavior among undergraduate students from different socioeconomic backgrounds,

[48] Appendix tables 2A11 and 2A16 perform an analogous exercise replacing socioeconomic status with ability (as measured by high school grade) and gender.

the differences being small and not statistically significant, in the case of master's students the in-survey behavior is more dependent on socioeconomic status. In particular, students from wealthier backgrounds are slightly more likely to choose unemployment (the outside option in each scenario), while students from poorer backgrounds are substantially more likely to start an internship with hiring purposes, and particularly so when the internship is in a big firm (while they are equally likely to start any internship).

Interestingly, Appendix table 2A11 shows how there is a sizable difference in the likelihood of starting an internship by ability among Master's students. This finding differs from the one reported for the ISTAT sample, representative of the Italian graduate population at large, and might depend on the larger and qualitatively better supply of labor market opportunities offered to Bocconi graduates, and especially to the best performing ones, which might result in internships not being needed in order to access better jobs.

Table 2.7: Elicited probabilities in the experiment

	Family income below €4000	Family income above €4000	Difference (p value)
Undergraduate students			
Internship	34.09 (14.44)	33.43 (14.39)	0.67
Internship in big firm	27.52 (14.19)	27.04 (13.85)	0.76
Internship with hiring purposes	16.93 (6.98)	16.44 (6.81)	0.51
Internship with hiring purposes in big firm	12.28 (6.67)	11.84 (6.34)	0.53
Unemployment	9.08 (15.59)	8.60 (14.53)	0.77
Master's students			
Internship	34.97 (13.64)	34.54 (13.49)	0.85
Internship in big firm	28.71 (13.23)	27.75 (12.58)	0.65
Internship with hiring purposes	18.73 (7.74)	16.07 (6.51)	**0.02**
Internship with hiring purposes in big firm	14.05 (7.32)	11.44 (5.62)	**0.01**
Unemployment	8.84 (14.84)	9.51 (14.90)	0.79

Table 2.8 and table 2.9 report the average beliefs concerning labor market returns to different initial contracts for the two socioeconomic groups of respondents. Table 2.8 compares the returns associated with different types of internships[49] with the ones associated to fixed term contracts in firms of any size, while table 2.9 compares the same types of internships with fixed term contracts in small firms only[50].

Overall, internships with hiring purposes in big firms are associated with a higher likelihood to improve future labor market prospects when compared to fixed-term contracts (and more so when

[49]I focus on internship types that are more likely to provide higher returns, either because they are associated with hiring purposes, and thus offer a safer path to a permanent form of employment, or because they are offered by big firms, which are usually associated with better career prospects.

[50]Master's and undergraduate students are pooled together to improve the clarity and precision of the results, but results reported separately for each course type, results for all internship types pooled together and results by ability and gender are available in the Appendix, starting with table 2A7.

the comparison group is restricted to small firms). This is particularly true for the probability of obtaining an open-term contract one year after the end of the internship (the ratio to fixed-term contract in small firms being approximately 1.2) and for expected wage at age 35 (the ratio being slightly less than 1.1) The difference in beliefs across socioeconomic groups is instead minimal.

Table 2.8: Elicited beliefs on returns to different types of internships vs fixed term contracts in any firm

	Family income below €4000	Family income above €4000	Difference (p value)
Internship in big firm			
Permanent contract at age 35	0.94 (0.12)	0.92 (0.14)	0.26
Wage at age 35	0.97 (0.10)	0.96 (0.11)	0.23
Permanent contract, short term	0.83 (0.27)	0.86 (0.26)	0.37
Wage, short term	0.85 (0.17)	0.87 (0.17)	0.19
Internship for hiring purposes			
Permanent contract at age 35 job	0.96 (0.10)	0.94 (0.11)	0.14
Wage at age 35 job	0.95 (0.09)	0.94 (0.10)	0.42
Permanent contract, short term job	0.95 (0.25)	0.96 (0.22)	0.75
Wage, short term job	0.86 (0.16)	0.85 (0.16)	0.47
Internship for hiring purposes in big firm			
Permanent contract at age 35	0.99 (0.12)	0.98 (0.13)	0.69
Wage at age 35	1.01 (0.11)	1.00 (0.11)	0.36
Permanent contract, short term	1.02 (0.33)	1.04 (0.31)	0.68
Wage, short term	0.92 (0.18)	0.93 (0.17)	0.59

Table 2.9: Elicited beliefs on returns to different types of internships vs fixed term contracts in small firms

	Family income below €4000	Family income above €4000	Difference (p value)
Internship in big firm			
Permanent contract at age 35	0.97 (0.15)	0.96 (0.16)	0.55
Wage at age 35	1.04 (0.15)	1.03 (0.14)	0.37
Permanent contract, short term	0.95 (0.43)	1.00 (0.45)	0.25
Wage, short term	0.95 (0.23)	0.95 (0.21)	0.98
Internship for hiring purposes			
Permanent contract at age 35	1.00 (0.13)	0.99 (0.13)	0.54
Wage at age 35	1.02 (0.13)	1.01 (0.12)	0.17
Permanent contract, short term	1.10 (0.44)	1.09 (0.41)	0.87
Wage, short term	0.93 (0.19)	0.93 (0.17)	0.88
Internship for hiring purposes in big firm			
Permanent contract at age 35	1.02 (0.15)	1.02 (0.15)	0.91
Wage at age 35	1.09 (0.17)	1.07 (0.16)	0.40
Permanent contract, short term	1.17 (0.61)	1.20 (0.57)	0.64
Wage, short term	1.01 (0.24)	1.01 (0.21)	0.74

2.5 Results

2.5.1 Reduced form results

Individual expectations and choices in hypothetical scenarios

I now assess the predictive power of individual beliefs for the probability of choosing between each pair of contracts in the hypothetical scenarios.

First, I regress the ratio of the probability of choosing each pair of options on the ratio of the corresponding contract features and on the ratio of the expected future outcomes conditional on choosing the corresponding contract types:

$$\frac{Pr_{ijs}}{Pr_{izs}} = \frac{w_j s}{w_z s} + Big_{jzs} + \sum_{t=T_0,T_1} \left[\frac{EV_i(w_t|j)}{EV_i(w_t|z)} + \frac{Pr_i(l_t=1)|j}{Pr_i(l_t=1)|z} \right] + \varepsilon_{is}$$

where j and z are the two contract options (or a contract option and the outside option), s refers to each scenario, Big_{jzs} is an indicator for firm size[51] and the EV_i and Pr_i components are individual beliefs on future outcomes conditional on each contract option, for both short-term ($t = T_0$) and long-term ($t = T_1$) outcomes.

[51] Which takes value 1 if scenario j is in a big firm and z is not, -1 if the opposite is true, and 0 if neither contract or both contracts are in a big firm.

	Probability of A versus B		Probability of U versus A		Probability of U versus B	
	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)
Firm size[1]	19.42***	17.05***	-11.87***	-11.00***	-7.20***	-5.55***
	(1.81)	(1.45)	(1.91)	(1.27)	(1.42)	(1.02)
Contract wage[2]	36.42***	33.08***	-0.02***	-0.02***	-0.02***	-0.02***
	(2.01)	(1.66)	(0.00)	(0.00)	(0.00)	(0.00)
Long-term permanent contract	13.63	43.57***	1.94	23.86***	4.14	21.34***
	(12.78)	(11.75)	(8.07)	(6.52)	(8.07)	(6.52)
Long-term expected wages	-0.01***	0.03***	-0.03***	0.03***	-0.01**	0.02***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)
Short-term permanent contract	20.94***	24.49***	16.71**	26.24***	20.66**	16.64**
	(7.82)	(6.69)	(7.41)	(5.63)	(8.18)	(6.46)
Short-term expected wages	0.07***	0.01	0.02***	0.00	0.01***	2.23
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1,600	2,280	1,600	2,280	1,600	2,280
R^2	0.25	0.29	0.07	0.12	0.12	0.15

*p<0.1; **p<0.05; ***p<0.01

Note: Probability ratios are multiplied by 100. Standard errors in parentheses are clustered at the individual level; the number of observations is given by the number of respondents in each sub-samples (200 for the low-status subsample and 285 for the high-status subsample) multiplied by the number of pre-treatment scenarios.
(1) The firm size variable ratio in the comparison between A and B is equal to 1 if contract A is in a big firm and B is in a small firm, -1 if the opposite is true and 0 if the two contracts are in firms of the same size. In the comparison with the outside option U, it is equal to 1 if the contract is in a big firm - (2) The wage ratio is equal to the wage of the contract A or B in the comparison with the outside option U.

Table 2.10: Beliefs and individual choices: pre-treatment answers only

Table 2.10 reports the results for respondents with different socioeconomic status, proxied by the reported level of income of the family of origin[52], for answers given before the information treatment (or the control screen for non-treated individuals). Table 2A21 in the Appendix shows that qualitatively similar results are obtained if the same exercise is performed on after-treatment answers.

The first two columns in table 2.10 focus on the ratio between the two main contract options (A and B), while the last four columns report the results for the ratio between the outside option U and each of the other two contracts. Finally, odd numbers refer to low-socioeconomic status individuals.

As expected, the ratio of the wages associated with the two available contracts is a strong predictor for the ratio of the corresponding choice probabilities, while it is less predictive of the

[52]In particular, I ask the net income available each month.

choice between each contract and unemployment[53]. The coefficient for the firm size is also positive and significant (and negative and significant in the comparison with the outside option), meaning that individuals strongly prefer contracts offered by larger firms. As for prospective outcomes, only the probability of having a permanent contract represents a sizable component in predicting probability ratios, while expected wages are associated with small and noisy coefficients, which turn slightly negative for low socioeconomic status individuals in the long-term.

It is also interesting to look in more detail at the heterogeneity in coefficients across socioeconomic backgrounds: wealthier individuals weight long-term outcomes more compared both to the corresponding short-term outcomes, and to the less wealthy sub-sample. In particular, the long-term probability of obtaining an open-term contract is only significant for the wealthier sub-sample, while the weight assigned to the immediate contract wage and to firm size is slightly higher for less wealthy respondents.

Beliefs updating after the information treatment

Since respondents' beliefs concerning future outcomes conditional on the initial contract type might be correlated with personal preferences for different contract types, which are unobserved, I rely on an information treatment to provide a source of exogenous variation to individual beliefs. More specifically, I present descriptive statistics on the two labor market outcomes considered in the analysis (wage and probability of having an open-term contract) and on the fraction of the population entering the labor market with an internship. Table 2.11 summarises the provided information: according to these statistics, internships are associated with a lower probability of obtaining a permanent contract for both genders, and a lower wage for men. Wages conditional on having participated in an internship are instead slightly higher for women.

Table 2.11: Information treatment

	Wage (€)		Permanent contract (%)		Fraction doing internship
	With internship	No internship	With internship	No internship	
Women	1481	1454	22	32	23
Men	1596	1768	27	35	24

In order to examine how individuals react to the exposure to the treatment, table 2.12 reports the average value of individual beliefs elicited before (*pre*) and after (*post*) the treatment (or at the beginning and at the end of the survey for the control sub-sample), by treatment status. Differences between groups after the treatment tend to be larger, although they are only significant for long-term outcomes and for short-term wages conditional on entering the labor market with a fixed-term

[53]In this case, the wage ratio refers to the wage of the contract, which is, as expected, negatively related with the probability of choosing the outside option U.

contract. The more limited reaction of short-term outcomes (expected wages conditional on entering the labor market with an internship and the probability of obtaining an open-term contract one year after the end of the first contract) could depend on the fact that, due to data limitations, the provided information refers to only one point in time and pools together workers below the age of 40 at different points in their careers, and could thus be perceived as less relevant for short-term outcomes. For long-term beliefs, the difference between post- and pre-treatment expected outcomes for treated individuals is consistently larger than its counterpart for control individuals, and has negative sign, consistently with the provided information being lower than respondents' beliefs, both in terms of wages and probabilities of having a permanent contract.

Table 2.12: Signs and magnitudes of pre- and post-treatment beliefs by treatment status

	Control	Treated	Difference (p value)	Relevant information[1]
	Short term outcomes			
Pre permanent contract after job	0.617 (0.22)	0.618 (0.22)	0.90	0.33
Pre permanent contract after internship	0.470 (0.21)	0.481 (0.21)	0.10	0.25
Pre wage after job	1833 (707)	1798 (732)	0.15	1615
Pre wage after internship	1472 (698)	1426 (748)	0.05	1540
Post permanent contract after job	0.676 (0.20)	0.667 (0.23)	0.22	0.33
Post permanent contract after internship	0.537 (0.22)	0.541 (0.22)	0.50	0.25
Post wage after job	2001 (827)	1910 (794)	**0.00**	1615
Post wage after internship	1670 (854)	1631(806)	0.16	1540
	Long term outcomes			
Pre permanent contract after job	0.787 (0.20)	0.773 (0.21)	**0.05**	0.33
Pre permanent contract after internship	0.716 (0.23)	0.684 (0.24)	**0.00**	0.25
Pre wage after job	3346 (1288)	3185 (1170)	**0.00**	1615
Pre wage after internship	2999 (1294)	2897 (1147)	**0.01**	1540
Post permanent contract after job	0.785 (0.19)	0.750 (0.21)	**0.00**	0.33
Post permanent contract after internship	0.718 (0.21)	0.670 (0.24)	**0.00**	0.25
Post wage after job	3316 (1328)	3061 (1170)	**0.00**	1615
Post wage after internship	2997 (1290)	2785 (1152)	**0.00**	1540

Notes: (1) Average between genders, weighted by the number of individuals.

As a final measure of update consistency, I also consider a relative improvement indicator, namely the normalized difference between the pre- and post-treatment similarity to the relevant piece of information provided:

$$RI = \frac{|(y^{PRE} - y^{INFO})| - |(y^{POST} - y^{INFO})|}{y^{INFO}}.$$

Here, y^{PRE} and y^{POST} refer to the individual belief (or probability of choosing an internship),

before and after the information treatment (or at the beginning and at the end of the survey for control subjects), and y^{INFO} refers to the relevant piece of information provided. Since the information treatment is not as granular as the situations proposed in the belief elicitation section due to data limitations, I pool together different contract types when measuring y_{PRE} and y_{POST}. In particular, I pool together the different types of internships (for hiring purposes and with no hiring purposes; in big and medium-small firms) and the two different types of fixed-term contracts (in big and small firms). For an analogous reason, I also keep the beliefs conditional on being unemployed at the beginning of one's career out of the analysis.

Table 2.13 reports the average value of the relative improvement by treatment status. As expected, relative improvement for treated individuals is always larger than its counterpart for the control group. As also observed above for the presence of any update, the impact of the treatment is larger for long-term outcomes, as the provided information pools together workers below the age of 40, and is thus more likely to be perceived as relevant for medium- and long-term labor market outcomes. It is also important to highlight that the information on the fraction of individuals doing an internship in the general population does not directly affect the respondent's probability of choosing an internship herself[54], as the relative improvement in the treated group is, if anything, lower than the one in the control group.

Table 2.13: Relative improvement by treatment status

	Control group	Treated group	Difference (p value)
Probability of doing an internship	0.038 (0.70)	0.010 (0.68)	0.20
Permanent contract, short term, job	-0.128 (0.51)	-0.122 (0.59)	0.75
Permanent contract, short term, internship	-0.228 (0.71)	-0.196 (0.68)	0.15
Wage, short term, job	-0.050 (0.35)	-0.024 (0.35)	**0.02**
Wage, short term, internship	-0.039 (0.35)	0.001 (0.30)	**0.00**
Permanent contract at age 35, job	0.010 (0.34)	0.066 (0.44)	**0.00**
Permanent contract at age 35, internship	0.010 (0.59)	0.068 (0.72)	**0.01**
Wage at age 35, job	0.008 (0.36)	0.077 (0.48)	**0.00**
Wage at age 35, internship	0.014 (0.41)	0.065 (0.44)	**0.00**

Finally, I perform a regression of the measure for relative improvement on treatment status and a vector of individual characteristics including gender, socioeconomic status, ability as measured by High School grade, type of course and being in the final year of the degree:

$$RI = \alpha_0 + \alpha_1 Treated + \gamma X + \varepsilon$$

[54]Here the relative improvement is measured using individual probability to choose an internship and the fraction of individuals doing an internship in the population.

The results for this specification are reported in table 2.14 and 2.15. The effect of being treated is positive for all belief-related outcomes, and statistically significant for all outcomes except the probability of obtaining a permanent contract and the expected wage in the short term conditional on starting one's career with an internship (column 1 and 2 in table 2.14). Again, the effect of the information treatment is confirmed to be larger for long-term outcomes. Finally, the effect of providing information on the fraction of workers starting their career with an internship does not affect the probability of choosing to start an internship. The coefficient for the binary treatment variable, reported in table 2.15, is negative and not statistically significant.

Table 2.14: Regression of the measure for relative improvement on treatment

	Permanent contract, internship	Wage, internship	Permanent contract, job	Wage, job
	(1)	(2)	(3)	(4)
Short term outcomes				
Intercept	-0.119	0.116	-0.009	-0.159***
	(0.100)	(0.125)	(0.062)	(0.057)
High socieoconomic status	-0.027	-0.013	-0.007	-0.019*
	(0.018)	(0.023)	(0.011)	(0.010)
High school grade	0.000	-0.003**	-0.001*	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.146***	-0.029	-0.003	0.020**
	(0.018)	(0.022)	(0.011)	(0.010)
Final year	-0.002	-0.084***	0.099***	0.104***
	(0.020)	(0.024)	(0.012)	(0.011)
Undergraduate	0.116***	0.085***	-0.011	-0.024**
	(0.020)	(0.024)	(0.012)	(0.011)
Treated	0.016	0.033	0.026**	0.040***
	(0.018)	(0.023)	(0.011)	(0.010)
Long term outcomes				
Intercept	0.224***	0.176	-0.067	-0.071
	(0.073)	(0.122)	(0.079)	(0.077)
High socieoconomic status	-0.014	-0.020	-0.076***	-0.073***
	(0.013)	(0.022)	(0.014)	(0.014)
High school grade	-0.002***	-0.002*	0.002*	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.005	0.023	-0.006	0.023*
	(0.013)	(0.022)	(0.014)	(0.014)
Final year	-0.003	0.029	-0.022	-0.035**
	(0.014)	(0.024)	(0.015)	(0.015)
Undergraduate	0.040***	0.032	-0.020	-0.007
	(0.014)	(0.024)	(0.015)	(0.015)
Treated	0.055***	0.060***	0.067***	0.053***
	(0.013)	(0.022)	(0.014)	(0.014)
Observations	3,840	3,840	3,840	3,840

*p<0.1; **p<0.05; ***p<0.01

Note: Standard errors in parentheses.

Table 2.15: Regression of RI for probability of choosing an internship contract on treatment

	Internship contract
Intercept	0.059
	(0.125)
High socioeconomic status	-0.006
	(0.023)
High school grade	-0.000
	(0.001)
Female	0.006
	(0.022)
Final year	-0.031
	(0.024)
Undergraduate	0.000
	(0.024)
Treated	-0.027
	(0.023)
Observations	3,840

*p<0.1; **p<0.05; ***p<0.01

Note: Standard errors in parentheses.

2.5.2 Model estimation

I finally proceed with the structural estimation of the model presented in Section 3. Table 2.16 reports the estimates for the structural parameters β, ρ, and η, estimated separately by group (based on socioeconomic background). The parameter estimates are obtained applying a nonlinear least squares estimator on the differenced version of equation 2.6 (post versus pre-treatment). For this estimation, I only include the respondents who received an exogenous shock to their expectations through the information treatment.

Consistently with the reduced-form results presented earlier in this section, both types of respondents (low and high socioeconomic status) give present outcomes a considerably higher weight, with the time discount factor β being slightly below 0.1 and statistically indistinguishable across subsamples (although wealthier respondents have a slightly higher discount factor, consistently with the reduced form results presented above). Wealthier individuals also have a slightly higher coefficient of risk aversion ρ of 5.9[55], which is statistically different from the value of 5.3 retrieved for the less wealthy sample at the 5% confidence level. Finally, the two types differ substantially in the

[55]For comparison, Wiswall and Zafar (2015) find a similar value of 5 for their student sample.

weight assigned to the probability of having an open-term contract in the future. This probability is indeed highly valued by individual of the high socioeconomic status type, while it is assigned nearly 0 weight by the low socioeconomic status type[56].

Table 2.16: Structural utility parameters by socioeconomic status

	Family income below €4000	Family income above €4000	Difference (p value)
β	0.08 (0.20)	0.09 (0.18)	0.44
η	0.01 (0.05)	0.42 (0.60)	**0.00**
ρ	5.30 (4.28)	5.90 (4.07)	**0.04**

Parameter estimates for the time discount factor β, the risk aversion parameter ρ and the weight for the non-pecuniary component η. The estimation is performed using through a non-linear least squares procedure. Bounds are set for the variables, with the lower bound at 10^{-9} and the upper bound at 10. Standard error in parentheses are based on 400 sample bootstraps.

Plugging the estimates for the utility parameters back in equation 2.6 we can finally obtain the individual-level estimates for the residual taste parameters (the individual and contract-specific γ's) and the monetary benefit of unemployment b[57]. This last component is particularly interesting as it is a proxy for financial constraints, which are expected to differ across socioeconomic backgrounds[58]. Figure 2.3 displays the distributions of the six taste parameters and the monetary benefit of unemployment. All contract types are preferred to the baseline of unemployment (normalized to 0), with the exception of internships with no hiring purposes in small firms for the high socioeconomic background sample (for which the average preference for this type of contract is slightly below 0). While the average preference for contract types tends to be similar across socioeconomic groups for most types of contracts, despite some differences in the shape of the distribution[59] , wealthier individuals show a higher preference for fixed-term contracts, both in small and big firms, and a lower preference for internships with no hiring purposes in small firms compared to their less wealthy peers. This finding, while apparently at odd with the observational data from the ISTAT survey presented above, can be explained by the peculiar nature of the Bocconi sample: due to the high tuition costs required to access the degree programs offered by the Bocconi university, students from relatively poorer backgrounds are facing a heavier investment than their wealthier peers, and are thus more likely to be different both in terms of ability[60] and unobserved characteristics such

[56]In the estimation, the probability is expressed in numbers between 0 and 100 in order to make magnitudes comparable in the utility function.

[57]For these estimates, I use the whole sample, including both treated and control individuals., I estimate the taste parameters applying a nonlinear least squares estimator on the level version of equation 1, using the average of pre- and post-treatment responses to increase robustness.

[58]In this context, the monetary benefit of unemployment is mostly equivalent to parental support, as university students are unlikely to have access to publicly provided unemployment benefits.

[59]Statistical equality between distributions is tested via a Kolmogorov-Smirnov test.

[60]The descriptive statistics shown in table 2.4 provide support for the Master's sample, for which low socioeconomic

as risk aversion[61] and ambition. This is in line with the fact that these contracts involve a higher investment in skill formation, with no certain returns in terms of employment in the same firm.

Finally, and as expected, the monetary benefit associated with unemployment b is higher for respondents from a wealthier background, who are indeed more likely to receive parental support in case of unemployment (on average 38.9 versus 12.3, more than 3 times larger).

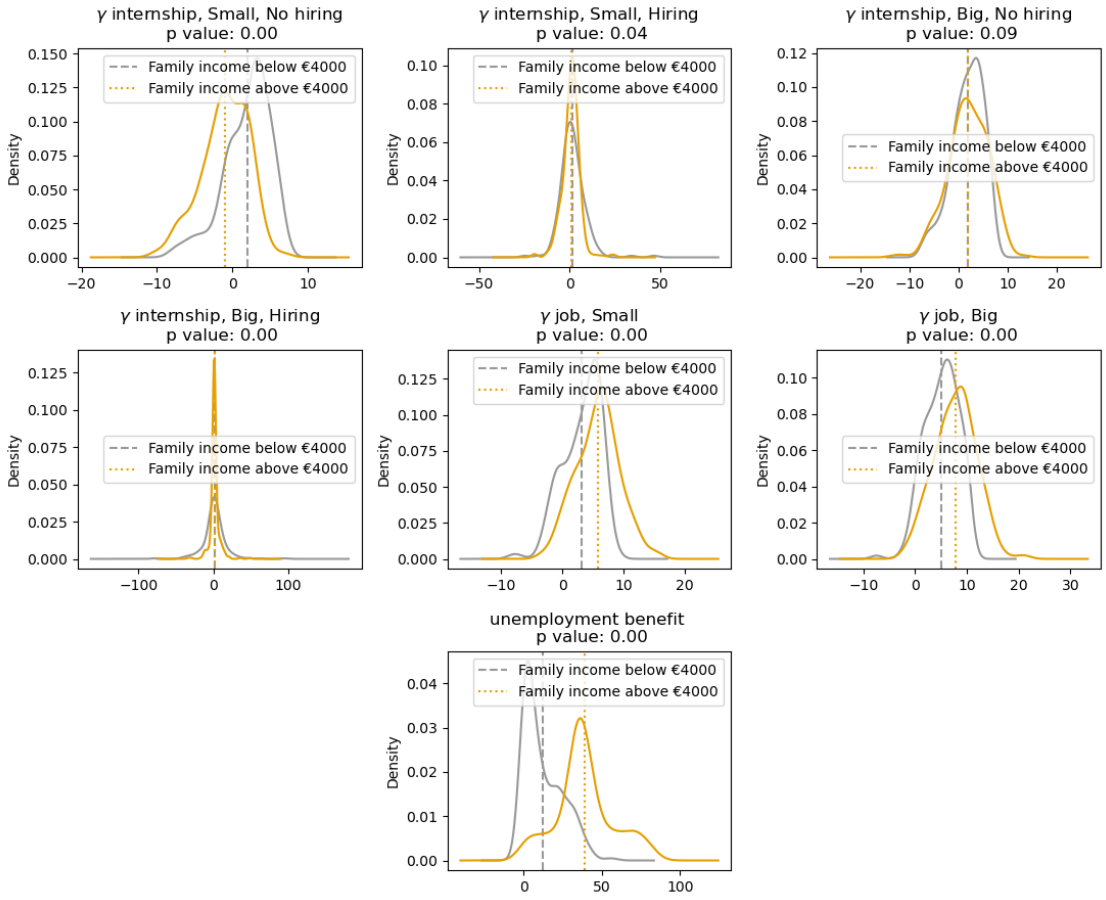


Figure 2.3: Distribution of taste parameters for different contracts and monetary benefit from unemployment; for each individual, I bootstrap across the 16 available observations 100 times and average out the estimation results, obtained through non-linear least squares; p values are shown for the Kolmogorov-Smirnov test for equality of distributions.

These results suggest that respondents from different socioeconomic backgrounds differ in their preferences, although this finding seems to be more related to a difference in risk aversion and ambition, which in the selected sample of the Bocconi students are higher among less wealthy individuals, and weight future job-related outcomes differently. In particular, individuals from wealthier backgrounds place a higher weight on future job stability compared to earnings, suggesting that they

status respondents report a higher High School final grade.

[61] The parameter estimate for the utility parameter ρ, which represents risk aversion, is indeed lower for poorer students, in line with their propensity to engage in more relevant investments.

might value non-strictly monetary benefits more compared to individuals from lower socioeconomic backgrounds, and have a higher evaluation of long-term outcomes. Finally, it is apparent that the two socioeconomic groups face different financial constraints, as wealthier individuals enjoy higher monetary benefits from unemployment on average.

2.6 Conclusion

In this paper, I set to explain the observed socioeconomic gap in the take-up of extracurricular internships among Italian university students. After collecting evidence from the 2015 ISTAT survey on the professional placement of Italian university graduates that students from wealthier families are more likely to start and complete an extra-curricular internship after graduation, I estimate a choice model to retrieve group-level structural preferences parameter and individual-level taste parameters for different contract types, in order to investigate whether supply-side factors, namely individual preferences, constraints and beliefs, can explain this gap.

In order to collect estimable data, I conduct a survey experiment on a sample of Italian university students from the Bocconi University. In the survey, I present respondents with hypothetical but realistic scenarios of contract choice after graduation. I then elicit their expectations for relevant labor market outcomes in their future at two points in time, one year after the end of the chosen contract and at age 35, conditional on choosing different types of contract (and in particular internships versus fixed-term contracts) upon entry in the labor market. In order to control for the endogeneity of beliefs concerning future outcomes conditional on contract types, I offer to a fraction of the sample an information treatment in which I provide descriptive statistics on the labor market outcomes of a sample of Italian workers with comparable characteristics in terms of education and gender.

Among the Bocconi survey sample, differences in experimental behavior across groups (low versus high socioeconomic background and low versus high ability as measured by High School grades) are lower than the ones found in the ISTAT sample, possibly reflecting the positive selection of Bocconi students concerning both family wealth and measured ability, and the larger supply of high quality labor market opportunities offered to Bocconi graduates compared to graduates from other Italian universities. For instance, higher ability individuals in the Bocconi sample are less likely to choose internship contracts, while socioeconomic status only affects the choice for different types of internships (with low socioeconomic status students choosing internships with hiring purposes comparatively more).

While it is pivotal to consider these aspects, and interpret the results in light of the positive selection of Bocconi students (in terms of both ability and socioeconomic background), this implies that the differences in structural parameters and in the estimated taste for different contract types that result from the structural estimation might actually represent a lower bound of the differences characterizing the population of university graduates at large.

Indeed, while I find that individuals from different socioeconomic backgrounds hold qualitatively similar beliefs concerning the impact of different initial contracts on future labor market outcomes, I also find that they assign different utility weights to different types of outcomes, with students from wealthier backgrounds assigning a higher value to stability (probability of having a permanent

contract) than to strictly monetary aspects (in particular the wage offered by the initial contract). Finally, the residual preferences for contract types (once the monetary features of the contract and the beliefs on conditional future outcomes are accounted for) show some differences across socioeconomic backgrounds, with less wealthy individuals having a higher preference for internships with no hiring purposes (despite choosing them less, possibly because of more binding constraints) and lower preferences for fixed-term contracts. As expected, they also have a much lower evaluation of the monetary benefits of unemployment on average. Overall, these results suggest that the differential presence of liquidity constraints and different evaluation of monetary versus stability-related future outcomes play a large role in shaping individual choices, and might play an even larger role in a more heterogeneous sample, which I am currently targeting in an additional effort of data collection.

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Appendix

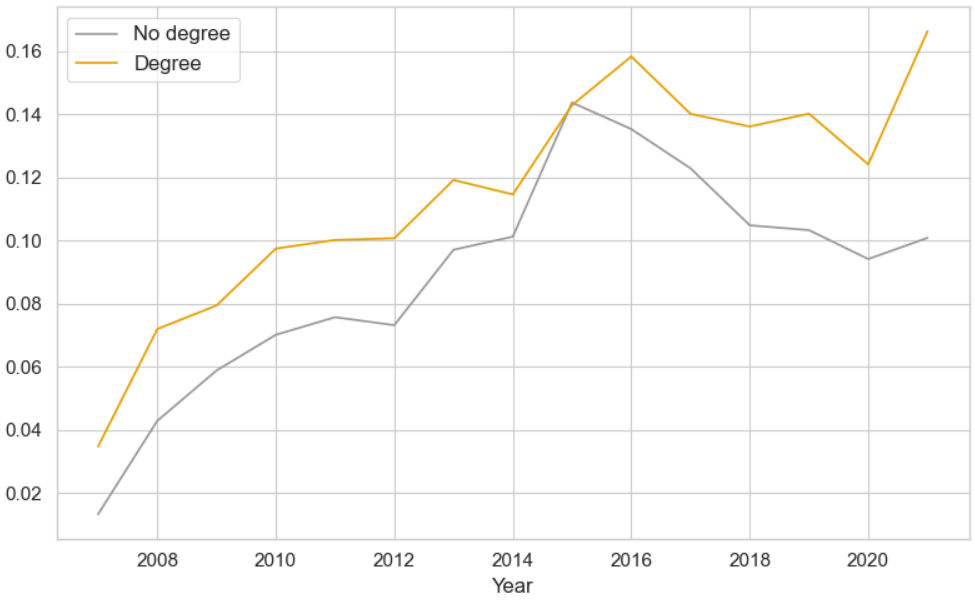
Model estimation

In more detail, equation 2.7 can be estimated as the difference between the logarithm of the log odds after and before the treatment, or:

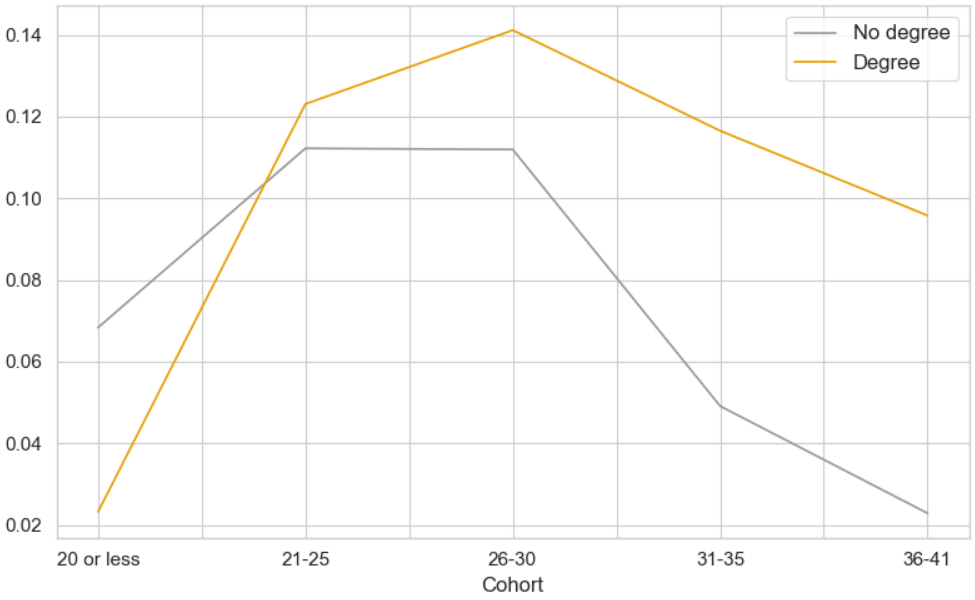
$$
\begin{aligned}
ln\left(\frac{\pi'_A}{\pi'_B}\right) - ln\left(\frac{\pi_A}{\pi_B}\right) &= EV'_{iA} - EV'_{iB} - EV_{iA} + EV_{iB} + \psi_i \\
EV_{iA} &= \frac{1-\beta_g^{\tau_A}}{1-\beta_g}\left(\frac{w_A^{1-\rho_g}}{1-\rho_g} + \gamma_A\right) \\
&\quad + \frac{\beta_g^{\tau_A} - \beta_g^T}{1-\beta_g}\left(\frac{E[w_{\tau_A}|A]^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_{\tau_A} = 1|A)\right) \\
&\quad + \frac{\beta_g^T}{1-\beta_g}\left(\frac{E[w_T|A]^{1-\rho_g}}{1-\rho_g} + \eta_g Pr_i(l_T = 1|A)\right) \\
\Rightarrow EV'_{iA} - EV_{iA} &= \frac{\beta_g^{\tau_A} - \beta_g^T}{1-\beta_g}\left(\frac{(E'[w_{\tau_A}|A] - E[w_{\tau_A}|A])^{1-\rho_g}}{1-\rho_g}\right. \\
&\quad \left. + \eta_g\big(Pr'_i(l_{\tau_A} = 1|A) - Pr_i(l_{\tau_A} = 1|A)\big)\right) \\
&\quad + \frac{\beta_g^T}{1-\beta_g}\left(\frac{(E'[w_T|A] - E[w_T|A])^{1-\rho_g}}{1-\rho_g}\right. \\
&\quad \left. + \eta_g\big(Pr'_i(l_T = 1|A) - Pr_i(l_T = 1|A)\big)\right) \\
ln\left(\frac{\pi'_A}{\pi'_B}\right) - ln\left(\frac{\pi_A}{\pi_B}\right) &\sim \frac{\beta_g^{\tau_A} - \beta_g^T}{1-\beta_g}\left(\frac{(E'[w_{\tau_A}|A] - E[w_{\tau_A}|A])^{1-\rho_g}}{1-\rho_g}\right. \\
&\quad \left. + \eta_g\big(Pr'_i(l_{\tau_A} = 1|A) - Pr_i(l_{\tau_A} = 1|A)\big)\right) \\
&\quad - \frac{\beta_g^{\tau_B} - \beta_g^T}{1-\beta_g}\left(\frac{(E'[w_{\tau_B}|B] - E[w_{\tau_B}|B])^{1-\rho_g}}{1-\rho_g}\right. \\
&\quad \left. + \eta_g\big(Pr'_i(l_{\tau_B} = 1|B) - Pr_i(l_{\tau_B} = 1|B)\big)\right) \\
&\quad + \frac{\beta_g^T}{1-\beta_g}\left(\frac{(E'[w_T|A] - E[w_T|A])^{1-\rho_g}}{1-\rho_g}\right. \\
&\quad - \frac{(E'[w_T|B] - E[w_T|B])^{1-\rho_g}}{1-\rho_g} \\
&\quad + \eta_g\big(Pr'_i(l_T = 1|A) - Pr_i(l_T = 1|A) \\
&\quad \left. - Pr'_i(l_T = 1|B) + Pr_i(l_T = 1|B)\big)\right)
\end{aligned}
$$

The same applies for the choice between each of the contracts (A and B) and the outside option U. For each individual there are 8 equations, resulting in a total of $8 * N_g^T$ equations per socioeconomic group (where N_g^T is the number of individuals subject to treatment and belonging to socioeconomic group g. The parameters β_g, η_g and ρ_g are estimated via nonlinear least squares separately for the two socioeconomic groups, and excluding untreated respondents.

Figures and tables

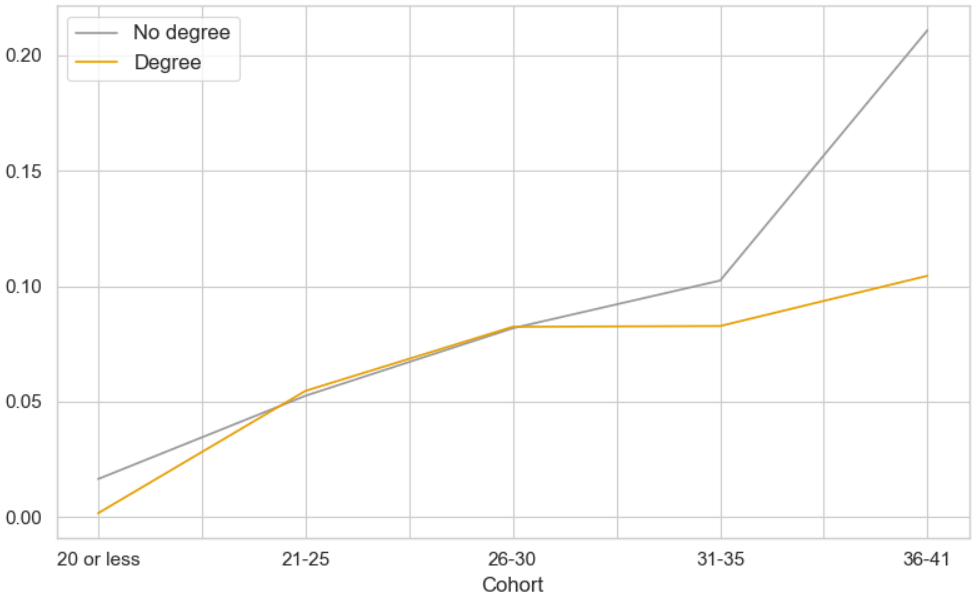


(a) Fraction of internships out of first contracts by year

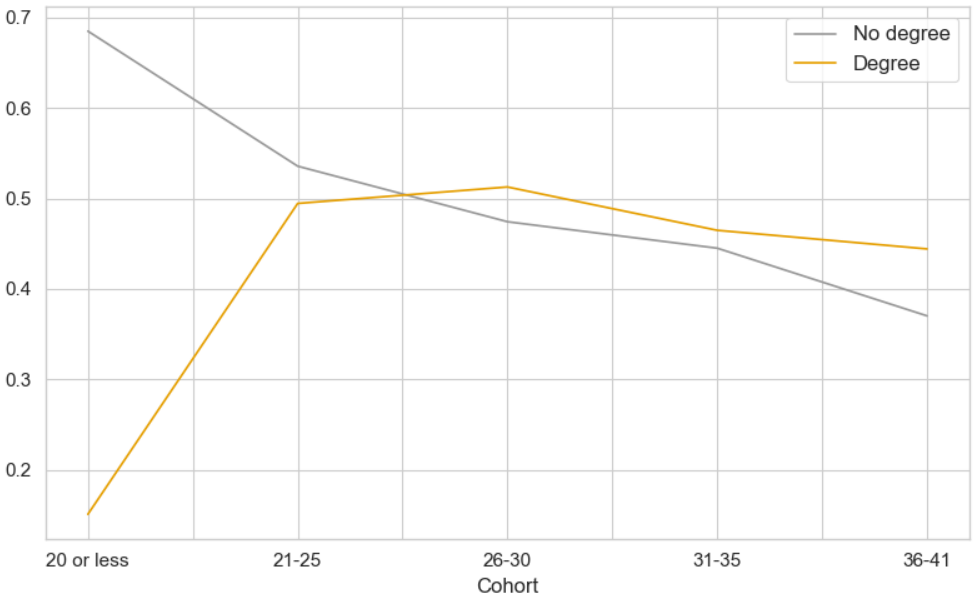


(b) Fraction of internships out of first contracts by cohort

Figure 2A1: Author's elaboration from the INPS dataset *Comunicazioni Obbligatorie* (Contracts subject to compulsory communication to the authorities), 2007 to 2021.



(a) Fraction of open-term contracts out of first contracts by cohort



(b) Fraction of fixed-term contracts out of first contracts by cohort

Figure 2A2: Author's elaboration from the INPS dataset *Comunicazioni Obbligatorie*, 2007 to 2021.

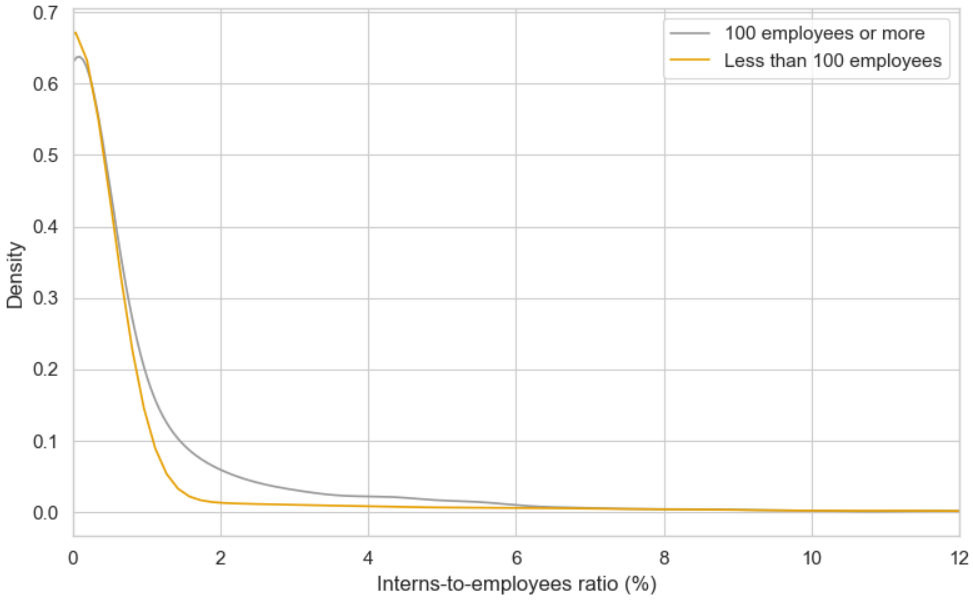


Figure 2A3: Interns-to-employees ratio by firm size.
Author's elaboration from INAPP's RIL (Longitudinal Survey on Firms and Labor) data for year 2018.

Figure 2A4: Internship take up by ability proxy: low ability (as proxied by a High school grade of 90 or less) on the left, high ability (High school grade higher than 90) on the right.

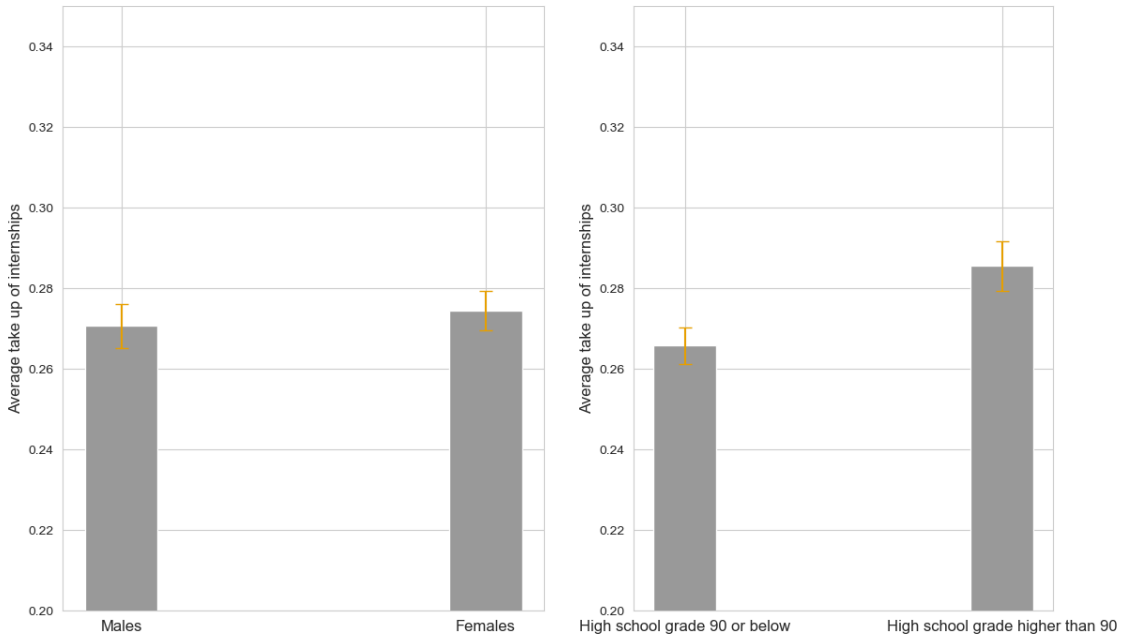


Table 2A1: Logit regression of the binary variable for having done an internship on observable characteristics.

	Starting an internship	Starting an internship
Average family education	0.069***	0.092***
	(0.012)	(0.013)
Average family job status	0.061***	0.074***
	(0.016)	(0.017)
Female	0.193***	0.221***
	(0.022)	(0.022)
High school grade	-0.004***	-0.001
	(0.001)	(0.001)
Younger than 22 at graduation	0.092**	0.032
	(0.040)	(0.040)
Between 25 and 29 at graduation	0.073***	0.084***
	(0.024)	(0.025)
Older than 30 at graduation	-0.889***	-0.839***
	(0.039)	(0.039)
Economics degree	1.046***	1.027***
	(0.047)	(0.047)
Engineering degree	0.329***	0.292***
	(0.048)	(0.048)
Humanities degree	0.290***	0.264***
	(0.044)	(0.044)
Scientific degree	0.062	0.033
	(0.048)	(0.048)
Center	0.007	0.047
	(0.128)	(0.129)
North East	-0.019	0.008
	(0.128)	(0.129)
North West	-0.005	0.065
	(0.127)	(0.128)
South	0.055	0.113
	(0.127)	(0.128)
Observations	56,516	43,520
Excluded degree fields	No	Yes
Note:	*p<0.1; **p<0.05; ***p<0.01	

Figure 2A5: Effect of doing an internship on current job spell duration.

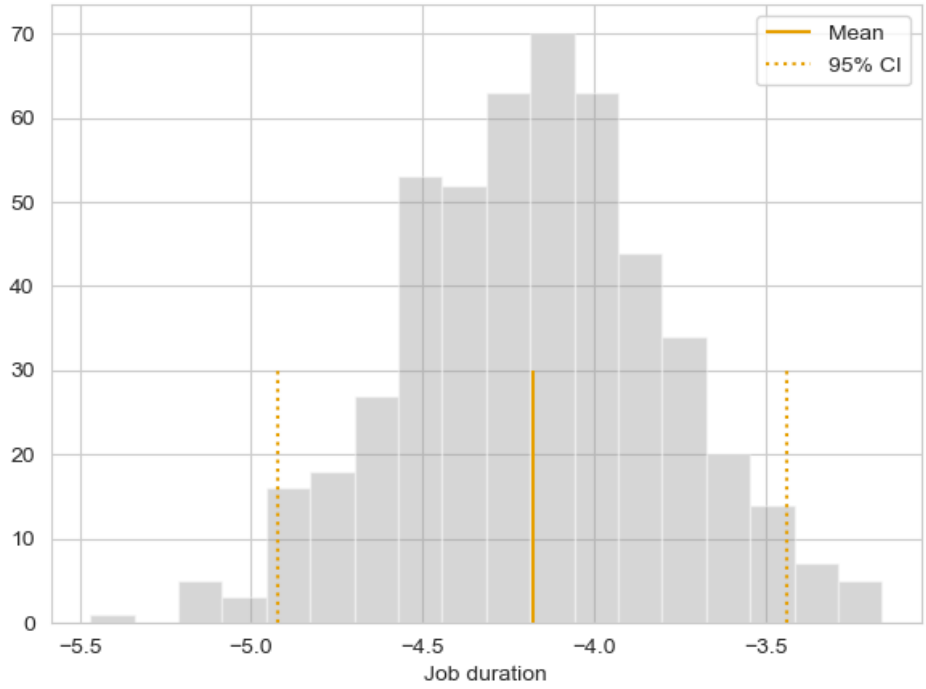


Table 2A2: Current year in the program

Course year (%)	Family income < €4000	Family income > €4000
Final year (undergraduate or master)	72.00	65.26
Undergraduate	28.5	35.1
of which:		
First year	0.00	1.99
Second year	36.84	48.97
Third year	56.14	46.98
After third year	7.02	1.99
Master's degree	71.5	64.9
of which:		
First year	26.57	27.03
Second year	55.24	53.53
After final expected year	18.18	19.46

Table 2A3: University and labor market

University experience	
Course type	
Undergraduate course	31%
Course is in English	58%
University major:	
Economics and management	40.5%
Economics and finance	21.8%
Economics and social sciences	8.8%
Arts, culture and communication management	5%
Political sciences	4.4%
Additional experiences:	
Period of study abroad	33.3%
Curricular internship	65%
Working while studying	38.5%
Reasons for university choice (importance in % terms):	
Career prospects	49.3 (19.32)
Personal interest for the subject	44.87 (19.23)
University financing (importance in % terms):	
Family contribution	77.23 (29.46)
Own work savings	10.19 (19.07)
External subsidies	9.25 (20.74)
Credit from financial institutions	3.33 (12.25)
Labor market	
Already searching for a job (%)	61
Self-assessment of own knowledge about labor market (%)	56.23 (21.61)
Helpfulness of extracurricular internships for later career (%)	75.45 (18.26)
Main advantages of extracurricular internships (% of sample mentioning):	
Enriching own CV	87
Assessing own match with the job type	83
Developing job-specific skills	66
Being hired by the same firm	54
Developing general skills	52

Table 2A4: High school grade and university experience by socioeconomic status for Master's students only

	Family income < €4000	Family income > €4000	Difference (p value)
High school final grade	94.17 (8.00)	91.73 (9.23)	**0.01**
Course is in English	0.60 (0.49)	0.64 (0.48)	0.48
Curricular internship	0.83 (0.37)	0.76 (0.43)	0.12
Erasmus	0.45 (0.50)	0.39 (0.49)	0.27
Ever worked	0.53 (0.50)	0.55 (0.50)	0.66
Any subsidy	0.42 (0.49)	0.13 (0.34)	**0.00**
Financing of university tuition			
Family support	67.57 (33.09)	81.65 (26.44)	0.00
Financial subsidy	16.34 (25.53)	5.41 (16.88)	0.00
Own work savings	12.14 (20.69)	10.55 (19.02)	0.46
Financial credit	3.95 (12.40)	2.39 (10.62)	0.21
Reasons for university choice			
Career prospects	49.54 (19.80)	48.38 (18.73)	0.58
Interest for the subject	43.83 (19.77)	45.79 (18.49)	0.34
Other	6.63 (10.51)	5.83 (9.54)	0.46
Expected graduation outcomes			
Expected graduation grade (out of 110)	105.01 (4.84)	105.45 (4.81)	0.41
Graduating in time	94.50 (8.25)	93.03 (12.07)	0.20
Graduating with more than 12 months of delay	4.82 (7.40)	6.27 (11.42)	0.18
Not graduating	0.68 (2.00)	0.70 (2.27)	0.96

Table 2A5: Beliefs concerning future plans, final year students only

	Family income < €4000	Family income > €4000	Difference (p value)
Studying while working	16.99 (23.12)	20.30 (27.93)	0.25
Starting own business	12.28 (19.18)	15.47 (21.68)	0.16
Searching for a job	63.16 (33.55)	64.10 (34.20)	0.80
Continue studying	34.98 (36.24)	37.04 (37.82)	0.62

Table 2A6: Labor market-related beliefs and job search experience by socioeconomic status, final year students only

	Family income < €4000	Family income > €4000	Difference (p value)
Already searching	0.70 (0.46)	0.71 (0.46)	0.85
Informed on the labor market	59.21 (20.95)	61.13 (18.87)	0.38
Reasons for starting an intership			
Enriching CV	0.86 (0.35)	0.83 (0.38)	0.48
Unterstanding match with job type	0.83 (0.38)	0.84 (0.37)	0.80
Developing specific abilities	0.67 (0.47)	0.64 (0.48)	0.50
Being hired in the same firm	0.61 (0.49)	0.59 (0.49)	0.69
Developing general abilities	0.48 (0.50)	0.49 (0.50)	0.87
Plans for job search after graduation			
Weekly hours to be spent on job search	38.42 (22.35)	37.42 (24.94)	0.70
Relative effort for internships	0.43 (0.23)	0.42 (0.21)	0.81
Beliefs on arrival rates of different opportunities			
Internship within 3 months	65.50 (25.99)	69.90 (23.27)	0.10
Job offer within 3 months	46.48 (28.58)	51.92 (27.35)	0.07
Probability ratio: job to internship	0.98 (3.39)	0.78 (0.70)	0.43
No offer for 3 months	19.21 (17.44)	19.78 (17.12)	0.76
No offer for 9 months	8.42 (11.74)	8.47 (10.68)	0.97

Table 2A7: Elicited beliefs on returns to internships vs fixed term contracts

	Family income below €4000	Family income above €4000	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.87 (0.20)	0.88 (0.20)	0.81
Permanent contract at age 35, vs job in small firm	0.92 (0.24)	0.93 (0.20)	0.67
Wage at age 35	0.89 (0.17)	0.89 (0.14)	0.60
Wage at age 35, vs job in small firm	0.96 (0.20)	0.96 (0.15)	0.89
Permanent contract, short term	0.76 (0.34)	0.79 (0.27)	0.42
Permanent contract, short term, vs job in small firm	0.88 (0.53)	1.57 (4.09)	0.05
Wage, short term	0.79 (0.19)	0.77 (0.19)	0.42
Wage, short term, vs job in small firm	0.87 (0.23)	0.85 (0.21)	0.45
Master's students			
Permanent contract at age 35	0.89 (0.15)	0.90 (0.15)	0.60
Permanent contract at age 35, vs job in small firm	0.95 (0.16)	0.92 (0.18)	0.37
Wage at age 35	0.91 (0.15)	0.92 (0.11)	0.62
Wage at age 35, vs job in small firm	0.98 (0.15)	0.98 (0.13)	0.98
Permanent contract, short term	0.76 (0.28)	0.82 (0.30)	0.19
Permanent contract, short term, vs job in small firm	0.92 (0.39)	0.90 (0.47)	0.69
Wage, short term	0.76 (0.20)	0.79 (0.21)	0.47
Wage, short term, vs job in small firm	0.86 (0.24)	0.85 (0.23)	0.79

Table 2A8: Elicited beliefs on returns to internships in a big firm vs fixed term contracts

	Family income below €4000	Family income above €4000	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.90 (0.23)	0.91 (0.20)	0.55
Permanent contract at age 35, vs job in small firm	0.93 (0.28)	0.97 (0.25)	0.20
Wage at age 35	0.95 (0.19)	0.94 (0.15)	0.92
Wage at age 35, vs job in small firm	1.02 (0.24)	1.03 (0.18)	0.81
Permanent contract, short term	0.79 (0.36)	0.87 (0.34)	0.05
Permanent contract, short term, vs job in small firm	0.96 (0.75)	1.80 (5.24)	0.06
Wage, short term	0.86 (0.22)	0.85 (0.21)	0.50
Wage, short term, vs job in small firm	0.94 (0.28)	0.94 (0.26)	0.89
Master's students			
Permanent contract at age 35	0.95 (0.14)	0.91 (0.17)	0.23
Permanent contract at age 35, vs job in small firm	1.00 (0.17)	0.93 (0.20)	0.03
Wage at age 35	0.95 (0.16)	0.96 (0.12)	0.53
Wage at age 35, vs job in small firm	1.03 (0.19)	1.03 (0.18)	0.91
Permanent contract, short term	0.86 (0.34)	0.86 (0.34)	0.98
Permanent contract, short term, vs job in small firm	1.06 (0.61)	0.97 (0.73)	0.40
Wage, short term	0.83 (0.22)	0.85 (0.23)	0.61
Wage, short term, vs job in small firm	0.93 (0.28)	0.92 (0.28)	0.85

Table 2A9: Elicited beliefs on returns to internships for hiring vs fixed term contracts

	Family income below €4000	Family income above €4000	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.93 (0.19)	0.94 (0.18)	0.81
Permanent contract at age 35, vs job in small firm	0.98 (0.25)	0.99 (0.20)	0.92
Wage at age 35	0.93 (0.17)	0.92 (0.14)	0.81
Wage at age 35, vs job in small firm	0.99 (0.21)	1.00 (0.17)	0.65
Permanent contract, short term	0.93 (0.35)	0.97 (0.33)	0.24
Permanent contract, short term, vs job in small firm	1.12 (0.79)	1.93 (4.95)	0.06
Wage, short term	0.85 (0.19)	0.82 (0.20)	0.21
Wage, short term, vs job in small firm	0.93 (0.24)	0.91 (0.23)	0.44
Master's students			
Permanent contract at age 35	0.94 (0.14)	0.95 (0.13)	0.85
Permanent contract at age 35, vs job in small firm	1.01 (0.18)	0.97 (0.16)	0.20
Wage at age 35	0.94 (0.16)	0.95 (0.11)	0.63
Wage at age 35, vs job in small firm	1.01 (0.17)	1.02 (0.15)	0.71
Permanent contract, short term	0.92 (0.35)	0.98 (0.38)	0.33
Permanent contract, short term, vs job in small firm	1.11 (0.56)	1.04 (0.54)	0.50
Wage, short term	0.81 (0.21)	0.84 (0.21)	0.40
Wage, short term, vs job in small firm	0.92 (0.25)	0.92 (0.24)	0.94

Table 2A10: Elicited beliefs on returns to internships for hiring in big firm vs fixed term contracts

	Family income below €4000	Family income above €4000	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.96 (0.23)	0.97 (0.20)	0.81
Permanent contract at age 35, vs job in small firm	1.00 (0.31)	1.03 (0.25)	0.50
Wage at age 35	0.99 (0.20)	0.99 (0.15)	0.85
Wage at age 35, vs job in small firm	1.07 (0.27)	1.08 (0.21)	0.75
Permanent contract, short term	0.99 (0.43)	1.07 (0.45)	0.11
Permanent contract, short term, vs job in small firm	1.23 (1.08)	2.20 (6.49)	0.08
Wage, short term	0.92 (0.22)	0.91 (0.21)	0.72
Wage, short term, vs job in small firm	1.02 (0.31)	1.00 (0.26)	0.55
Master's students			
Permanent contract at age 35	1.00 (0.16)	0.96 (0.17)	0.08
Permanent contract at age 35, vs job in small firm	1.07 (0.22)	0.98 (0.20)	0.02
Wage at age 35	0.99 (0.18)	1.01 (0.13)	0.55
Wage at age 35, vs job in small firm	1.08 (0.23)	1.08 (0.19)	0.99
Permanent contract, short term	1.02 (0.37)	0.99 (0.36)	0.61
Permanent contract, short term, vs job in small firm	1.31 (1.06)	1.12 (0.84)	0.21
Wage, short term	0.89 (0.24)	0.90 (0.23)	0.76
Wage, short term, vs job in small firm	1.00 (0.30)	0.99 (0.28)	0.80

Table 2A11: Elicited probabilities in the experiment by ability

	High school grade of 95 or lower	High school grade above 95	Difference (p value)
Undergraduate students			
Internship	34.36 (13.23)	33.20 (15.28)	0.46
Internship in big firm	27.33 (13.15)	27.18 (14.65)	0.92
Internship with hiring purposes	16.81 (5.89)	16.52 (7.59)	0.70
Internship with hiring purposes in big firm	11.83 (5.84)	12.19 (6.97)	0.61
Unemployment	8.16 (13.55)	9.33 (16.04)	0.48
Master's students			
Internship	37.57 (13.41)	33.31 (13.39)	0.06
Internship in big firm	31.17 (12.10)	26.62 (12.90)	0.04
Internship with hiring purposes	17.47 (7.17)	16.82 (7.05)	0.59
Internship with hiring purposes in big firm	13.18 (6.13)	12.01 (6.51)	0.28
Unemployment	8.76 (16.04)	9.51 (14.29)	0.77

Table 2A12: Elicited beliefs on returns to internships vs fixed term contracts by ability

	High school grade of 95 or lower	High school grade above 95	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.86 (0.20)	0.89 (0.19)	0.28
Permanent contract at age 35, vs job in small firm	0.92 (0.23)	0.93 (0.21)	0.77
Wage at age 35	0.88 (0.16)	0.89 (0.15)	0.55
Wage at age 35, vs job in small firm	0.95 (0.17)	0.97 (0.18)	0.33
Permanent contract, short term	0.79 (0.31)	0.77 (0.30)	0.60
Permanent contract, short term, vs job in small firm	1.50 (4.12)	1.09 (2.00)	0.24
Wage, short term	0.79 (0.19)	0.78 (0.19)	0.59
Wage, short term, vs job in small firm	0.86 (0.23)	0.86 (0.21)	0.89
Master's students			
Permanent contract at age 35	0.88 (0.15)	0.90 (0.14)	0.47
Permanent contract at age 35, vs job in small firm	0.91 (0.16)	0.94 (0.18)	0.37
Wage at age 35	0.91 (0.11)	0.91 (0.13)	0.99
Wage at age 35, vs job in small firm	0.99 (0.13)	0.97 (0.14)	0.26
Permanent contract, short term	0.80 (0.25)	0.80 (0.32)	0.96
Permanent contract, short term, vs job in small firm	0.98 (0.58)	0.87 (0.35)	0.16
Wage, short term	0.76 (0.20)	0.79 (0.21)	0.38
Wage, short term, vs job in small firm	0.86 (0.24)	0.86 (0.23)	0.94

Table 2A13: Elicited beliefs on returns to internships in a big firm vs fixed term contracts by ability, Undergraduate

	High school grade of 95 or lower	High school grade above 95	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.88 (0.22)	0.92 (0.20)	0.08
Permanent contract at age 35, vs job in small firm	0.94 (0.27)	0.97 (0.26)	0.26
Wage at age 35	0.94 (0.17)	0.95 (0.16)	0.31
Wage at age 35, vs job in small firm	1.01 (0.20)	1.04 (0.22)	0.21
Permanent contract, short term	0.85 (0.37)	0.83 (0.34)	0.46
Permanent contract, short term, vs job in small firm	1.53 (4.35)	1.37 (3.72)	0.74
Wage, short term	0.86 (0.22)	0.85 (0.21)	0.83
Wage, short term, vs job in small firm	0.93 (0.27)	0.95 (0.27)	0.52
Master's students			
Permanent contract at age 35	0.91 (0.14)	0.93 (0.18)	0.35
Permanent contract at age 35, vs job in small firm	0.95 (0.17)	0.96 (0.20)	0.75
Wage at age 35	0.97 (0.12)	0.95 (0.14)	0.41
Wage at age 35, vs job in small firm	1.06 (0.18)	1.02 (0.18)	0.14
Permanent contract, short term	0.91 (0.37)	0.84 (0.33)	0.21
Permanent contract, short term, vs job in small firm	1.15 (1.02)	0.93 (0.44)	0.05
Wage, short term	0.83 (0.22)	0.85 (0.23)	0.73
Wage, short term, vs job in small firm	0.93 (0.29)	0.92 (0.27)	0.86

Table 2A14: Elicited beliefs on returns to internships for hiring vs fixed term contracts by ability

Undergraduate students			
	High school grade of 95 or lower	High school grade above 95	Difference (p value)
Permanent contract at age 35	0.92 (0.19)	0.94 (0.18)	0.45
Permanent contract at age 35, vs job in small firm	0.98 (0.23)	0.99 (0.22)	0.94
Wage at age 35	0.92 (0.16)	0.93 (0.15)	0.85
Wage at age 35, vs job in small firm	0.99 (0.18)	1.00 (0.19)	0.46
Permanent contract, short term	0.95 (0.33)	0.96 (0.35)	0.71
Permanent contract, short term, vs job in small firm	1.82 (4.76)	1.40 (2.80)	0.33
Wage, short term	0.84 (0.21)	0.84 (0.18)	0.95
Wage, short term, vs job in small firm	0.91 (0.24)	0.93 (0.23)	0.41
Master's students			
Permanent contract at age 35	0.92 (0.14)	0.96 (0.13)	0.16
Permanent contract at age 35, vs job in small firm	0.96 (0.13)	1.00 (0.18)	0.22
Wage at age 35	0.94 (0.12)	0.95 (0.14)	0.76
Wage at age 35, vs job in small firm	1.04 (0.16)	1.01 (0.16)	0.31
Permanent contract, short term	0.95 (0.27)	0.96 (0.41)	0.78
Permanent contract, short term, vs job in small firm	1.14 (0.70)	1.03 (0.46)	0.27
Wage, short term	0.81 (0.20)	0.84 (0.21)	0.45
Wage, short term, vs job in small firm	0.93 (0.26)	0.91 (0.23)	0.59

Table 2A15: Elicited beliefs on returns to internships for hiring in big firm vs fixed term contracts by ability

	High school grade of 95 or lower	High school grade above 95	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.95 (0.23)	0.98 (0.20)	0.17
Permanent contract at age 35, vs job in small firm	1.01 (0.29)	1.02 (0.26)	0.82
Wage at age 35	0.98 (0.17)	1.00 (0.17)	0.30
Wage at age 35, vs job in small firm	1.06 (0.22)	1.08 (0.25)	0.35
Permanent contract, short term	1.03 (0.43)	1.04 (0.46)	0.95
Permanent contract, short term, vs job in small firm	1.79 (4.46)	1.77 (5.35)	0.98
Wage, short term	0.90 (0.23)	0.92 (0.21)	0.57
Wage, short term, vs job in small firm	0.99 (0.29)	1.02 (0.28)	0.30
Master's students			
Permanent contract at age 35	0.95 (0.14)	0.99 (0.18)	0.21
Permanent contract at age 35, vs job in small firm	0.99 (0.15)	1.02 (0.24)	0.33
Wage at age 35	1.01 (0.13)	1.00 (0.16)	0.66
Wage at age 35, vs job in small firm	1.11 (0.22)	1.06 (0.20)	0.19
Permanent contract, short term	1.04 (0.35)	0.98 (0.37)	0.33
Permanent contract, short term, vs job in small firm	1.37 (1.39)	1.10 (0.57)	0.08
Wage, short term	0.88 (0.23)	0.90 (0.23)	0.61
Wage, short term, vs job in small firm	0.99 (0.30)	0.99 (0.28)	0.94

Table 2A16: Elicited probabilities in the experiment by gender

	Female	Male	Difference (p value)
Undergraduate students			
Internship	34.77 (15.54)	32.67 (13.14)	0.18
Internship in big firm	28.58 (14.68)	25.93 (13.17)	0.08
Internship with hiring purposes	16.03 (6.79)	17.26 (6.92)	0.10
Internship with hiring purposes in big firm	12.05 (6.59)	12.01 (6.39)	0.95
Unemployment	11.58 (17.71)	6.07 (11.06)	0.00
Master's students			
Internship	34.69 (14.55)	34.70 (12.39)	1.00
Internship in big firm	29.04 (13.59)	27.08 (11.88)	0.34
Internship with hiring purposes	16.38 (7.42)	17.73 (6.67)	0.24
Internship with hiring purposes in big firm	12.77 (6.58)	11.98 (6.21)	0.44
Unemployment	11.77 (16.92)	6.61 (11.78)	0.03

Table 2A17: Elicited beliefs on returns to internships vs fixed term contracts by gender

	Female	Male	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.90 (0.18)	0.85 (0.21)	0.04
Permanent contract at age 35, vs job in small firm	0.95 (0.21)	0.89 (0.23)	0.03
Wage at age 35	0.91 (0.13)	0.87 (0.18)	0.05
Wage at age 35, vs job in small firm	0.97 (0.14)	0.95 (0.20)	0.21
Permanent contract, short term	0.78 (0.29)	0.77 (0.31)	0.61
Permanent contract, short term, vs job in small firm	1.42 (3.76)	1.12 (2.26)	0.39
Wage, short term	0.79 (0.17)	0.77 (0.20)	0.32
Wage, short term, vs job in small firm	0.87 (0.20)	0.84 (0.24)	0.24
Master's students			
Permanent contract at age 35	0.90 (0.14)	0.89 (0.16)	0.48
Permanent contract at age 35, vs job in small firm	0.94 (0.16)	0.92 (0.18)	0.45
Wage at age 35	0.92 (0.11)	0.90 (0.14)	0.24
Wage at age 35, vs job in small firm	0.99 (0.13)	0.96 (0.15)	0.16
Permanent contract, short term	0.77 (0.28)	0.83 (0.31)	0.21
Permanent contract, short term, vs job in small firm	0.84 (0.30)	0.98 (0.54)	0.04
Wage, short term	0.80 (0.18)	0.75 (0.23)	0.12
Wage, short term, vs job in small firm	0.89 (0.22)	0.83 (0.25)	0.11

Table 2A18: Elicited beliefs on returns to internships in big firm vs fixed term contracts by gender

	Female	Male	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.93 (0.18)	0.88 (0.24)	0.07
Permanent contract at age 35, vs job in small firm	0.98 (0.24)	0.93 (0.29)	0.12
Wage at age 35	0.96 (0.13)	0.93 (0.19)	0.10
Wage at age 35, vs job in small firm	1.03 (0.17)	1.02 (0.25)	0.79
Permanent contract, short term	0.84 (0.31)	0.84 (0.39)	0.89
Permanent contract, short term, vs job in small firm	1.48 (3.98)	1.40 (4.04)	0.85
Wage, short term	0.86 (0.20)	0.84 (0.23)	0.38
Wage, short term, vs job in small firm	0.95 (0.25)	0.93 (0.29)	0.65
Master's students			
Permanent contract at age 35	0.92 (0.14)	0.93 (0.19)	0.91
Permanent contract at age 35, vs job in small firm	0.96 (0.18)	0.95 (0.20)	0.57
Wage at age 35	0.98 (0.12)	0.94 (0.15)	0.06
Wage at age 35, vs job in small firm	1.06 (0.18)	1.00 (0.18)	0.05
Permanent contract, short term	0.80 (0.27)	0.92 (0.40)	0.04
Permanent contract, short term, vs job in small firm	0.91 (0.41)	1.10 (0.89)	0.08
Wage, short term	0.87 (0.20)	0.81 (0.25)	0.10
Wage, short term, vs job in small firm	0.95 (0.26)	0.90 (0.30)	0.22

Table 2A19: Elicited beliefs on returns to internships for hiring vs fixed term contracts by gender

	Female	Male	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.94 (0.17)	0.92 (0.20)	0.30
Permanent contract at age 35, vs job in small firm	0.99 (0.20)	0.98 (0.24)	0.52
Wage at age 35	0.94 (0.12)	0.90 (0.18)	0.02
Wage at age 35, vs job in small firm	1.01 (0.14)	0.98 (0.22)	0.27
Permanent contract, short term	0.95 (0.31)	0.96 (0.38)	0.71
Permanent contract, short term, vs job in small firm	1.78 (4.74)	1.39 (2.42)	0.36
Wage, short term	0.85 (0.18)	0.82 (0.21)	0.18
Wage, short term, vs job in small firm	0.94 (0.22)	0.90 (0.25)	0.12
Master's students			
Permanent contract at age 35	0.94 (0.14)	0.95 (0.13)	0.93
Permanent contract at age 35, vs job in small firm	0.98 (0.17)	0.98 (0.17)	1.00
Wage at age 35	0.95 (0.12)	0.94 (0.15)	0.46
Wage at age 35, vs job in small firm	1.03 (0.16)	1.00 (0.16)	0.18
Permanent contract, short term	0.92 (0.30)	1.00 (0.43)	0.17
Permanent contract, short term, vs job in small firm	1.00 (0.37)	1.13 (0.68)	0.13
Wage, short term	0.86 (0.18)	0.81 (0.23)	0.13
Wage, short term, vs job in small firm	0.95 (0.22)	0.88 (0.26)	0.09

Table 2A20: Elicited beliefs on returns to internships for hiring in a big firm vs fixed term contracts by gender

	Female	Male	Difference (p value)
Undergraduate students			
Permanent contract at age 35	0.98 (0.19)	0.95 (0.24)	0.14
Permanent contract at age 35, vs job in small firm	1.03 (0.25)	1.00 (0.29)	0.34
Wage at age 35	1.00 (0.13)	0.97 (0.20)	0.08
Wage at age 35, vs job in small firm	1.08 (0.19)	1.07 (0.28)	0.78
Permanent contract, short term	1.03 (0.41)	1.04 (0.48)	0.80
Permanent contract, short term, vs job in small firm	1.89 (5.69)	1.66 (4.09)	0.67
Wage, short term	0.93 (0.19)	0.90 (0.24)	0.19
Wage, short term, vs job in small firm	1.02 (0.27)	0.99 (0.30)	0.31
Master's students			
Permanent contract at age 35	0.96 (0.16)	0.99 (0.18)	0.38
Permanent contract at age 35, vs job in small firm	1.00 (0.21)	1.02 (0.22)	0.63
Wage at age 35	1.02 (0.14)	0.98 (0.16)	0.11
Wage at age 35, vs job in small firm	1.10 (0.21)	1.05 (0.20)	0.11
Permanent contract, short term	0.98 (0.36)	1.02 (0.37)	0.50
Permanent contract, short term, vs job in small firm	1.09 (0.52)	1.29 (1.21)	0.16
Wage, short term	0.92 (0.20)	0.87 (0.26)	0.14
Wage, short term, vs job in small firm	1.03 (0.28)	0.95 (0.29)	0.07

Table 2A21: Beliefs and individual choices: post-treatment answers only

	Probability of A versus B		Probability of U versus A		Probability of U versus B	
	Low	High	Low	High	Low	High
Firm size	17.57***	17.10***	-9.96***	-10.69***	-7.39***	-5.02***
	(1.98)	(1.48)	(1.69)	(1.06)	(1.30)	(1.00)
Long-term permanent contract	-1.36	34.54**	6.44	23.08***	-1.16	19.06**
	(21.25)	(16.89)	(8.86)	(7.79)	(9.40)	(8.31)
Long-term expected wages	1.17**	-0.01	-3.37	1.93	0.27	2.61
	(0.47)	(0.02)	(5.89)	(3.00)	(5.69)	(4.16)
Short-term permanent contract	32.54**	40.47***	28.89***	13.09*	31.37***	19.10***
	(14.91)	(12.49)	(9.08)	(6.93)	(10.18)	(7.32)
Short-term expected wages	-0.05***	-0.00	0.04	-0.01***	-0.08	-0.01***
	(0.01)	(0.01)	(0.06)	(0.00)	(0.11)	(0.00)
Contract wage	36.01***	33.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(2.24)	(1.83)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1,600	2,280	1,600	2,280	1,600	2,280
R^2	0.24	0.28	0.07	0.09	0.15	0.16

*p<0.1; **p<0.05; ***p<0.01

Note: Probabilities expressed in points out of 100. Standard errors in parentheses clustered at the individual level; the number of observations is given by the number of respondents in each sub-samples (200 for the low-status subsample and 285 for the high-status subsample) multiplied by the number of pre-treatment scenarios.

(1) The wage ratio is equal to the wage of the contract A or B in the comparison with the outside option U.

	A	B
Tipo di contratto	Stage a fini di assunzione	Contratto di lavoro di 12 mesi
Tipo di azienda	Multinazionale o leader nel settore	Medio-piccola
Compenso mensile netto	540	1550

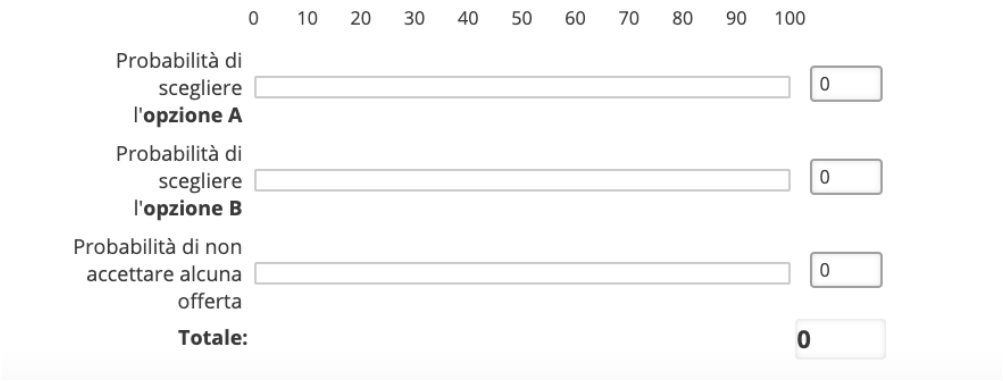


Figure 2A6: Example of choice scenario in the survey

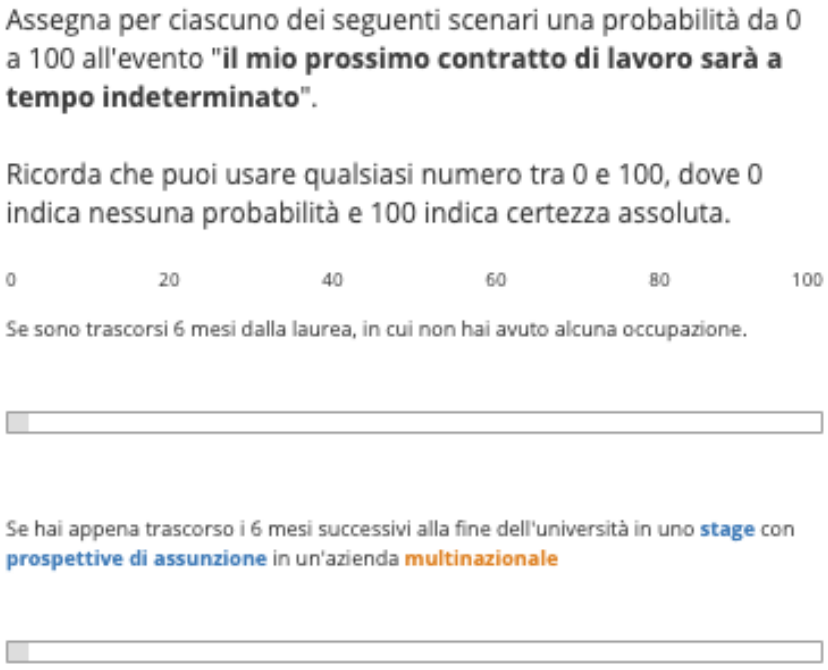


Figure 2A7: Elicitation of expected probability of having an open-term contract in the short term

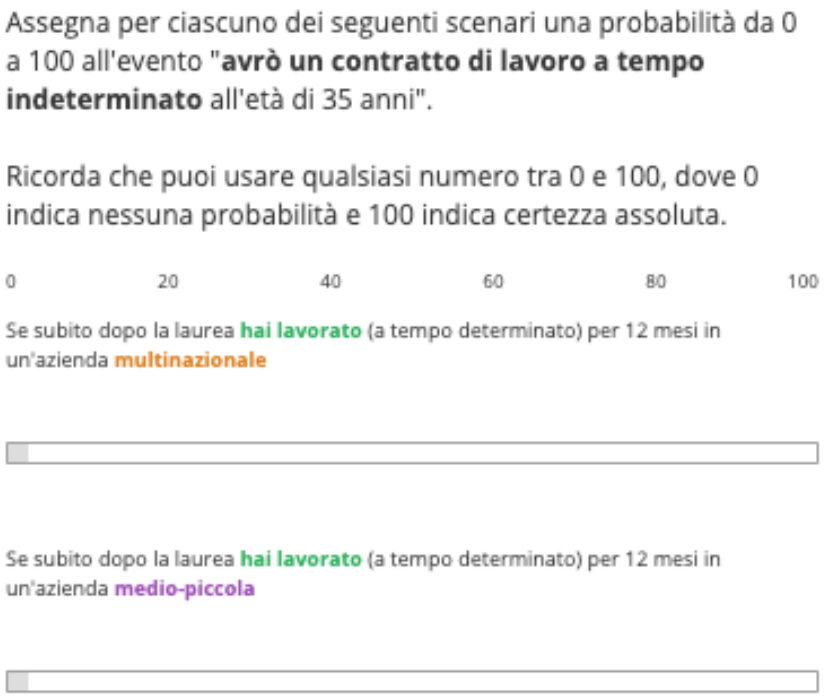


Figure 2A8: Elicitation of expected probability of having an open-term contract at age 35

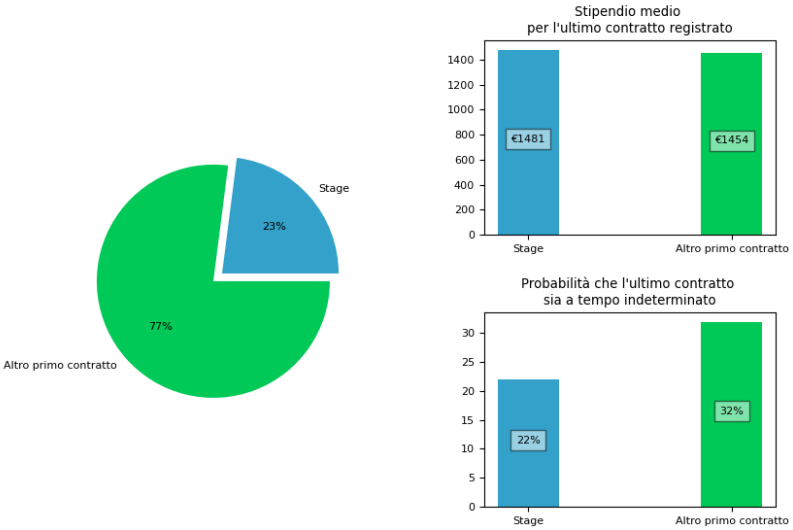


Figure 2A9: Information treatment for female respondents

Chapter 3

Can migration affect public good provision? Evidence from Mexico

Abstract

This paper investigates the relationship between emigration and public good provision in the migrants' communities of origin. I combine Mexican migration data from the *Matricula Consular de Alta Seguridad* (MCAS) dataset and data on public good provision from the Mexican Census, and instrument the number of migrants with a variant of the shift-share instrument to circumvent the endogeneity of migration decisions. I find that emigration has a positive impact on publicly provided access to basic services, and that this effect is mainly driven by rural municipalities. Overall, these findings support the idea that the impact of emigration on migrants' communities of origin also proceeds through social and political channels.

Keywords: Brain Drain, Emigration, Local Public Service, Public Provision
JEL Classification: F22, H41, H42, H54

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3.1 Introduction

Similarly to the process of technological catching up, developing countries can widely benefit from adopting institutional best practices, which are conducive to economic growth and substantial improvements in individuals' well-being. In this perspective emigration, favoring the transfer of people, financial assets, and information between countries, is a pivotal driver of institutional change and best practice transmission and, as such, it can substantially affect the development of migrants' communities of origin.

Emigration can relax financial constraints on individual participation in the public sphere, both in terms of money and time, through remittances and repatriated savings. It can change personal attitudes towards the public sector, both for migrants themselves and for those left behind, through the existence of social networks and return migration. It can also negatively influence migrants' communities of origin to the extent that it deprives them of the migrants' contribution to the public sphere. This is especially true when migrants are positively selected according to relevant dimensions such as civic sense and participation in the public discourse.

In this context, it is particularly interesting to ask whether the effect of emigration on institutional change is confirmed empirically and which channels are likely to prevail. This paper answers this question while focusing on a specific aspect of institutional change: the local provision of essential public goods in Mexican municipalities.

Essential public goods such as the widespread availability of drinkable water are directly related to individuals' well-being and the formation of human capital. According to the World Health Organization[1], diseases resulting from the lack of uncontaminated water kill more than 800,000 people each year. At the same time, easily preventable sanitation-related disorders are likely to negatively affect the cognitive ability and education of children in developing countries, as shown by Miguel and Kremer (2004) for Kenya.

Despite being at an intermediate level of development, Mexico offers an ideal context due to the size of its diaspora towards the neighboring United States and its recent political decentralization process, resulting in the delegation of the responsibility for public services to municipal governments (Smith, 2017).

One fundamental obstacle to the empirical investigation of the effects of emigration on the migrants' communities of origin is that the decision to emigrate is affected by the living conditions faced by potential migrants in their hometown, with a lower provision of public goods representing a positive push factor in the migration decision.

To address this issue, I account for the endogenous component of the migration decision by employing a modification of the *shift share* instrument popularized by Card (2001). More specifically, the variation over time of the number of migrants leaving each Mexican municipality for the

[1] See https://www.who.int/news-room/fact-sheets/detail/drinking-water

neighboring United States[2] is predicted by the interaction between the geographical distance with each US destination state and the change in the minimum wage in the corresponding US state.

Information on the size of emigration flows from each Mexican municipality is retrieved from the *Matricula Consular de Alta Seguridad* (MCAS) dataset, a relatively recent and geographically detailed data source on migratory flows between Mexico and the United States which has been shown to provide a uniquely rich and representative set of information on Mexican emigration (as documented by Massey et al. (2010)). I combine the data on migration flows with two waves of the Mexican census (the 2015 Intercensal survey and the 2020 Census), providing detailed information on water source quality and sanitation in each household that can be aggregated at the municipality level.

I find a positive effect of emigration on the fraction of households having access to publicly provided potable water and sewer systems, and a negative effect on the prevalence of private or semi-private methods of access to the same services. Running the analysis separately for rural municipalities, I also find that the results are driven by the latter, which represent the main compliers to the instrumental treatment.

This work contributes to the literature on the relationship between emigration and more broadly defined institutional change in developing countries by focusing on the relationship between remittances and the provision of essential public goods and services in migrants' home communities. Indeed, previous studies have either focused on different institutional dimensions (Spilimbergo, 2009; Li, 2013; Docquier et al., 2016 on the quality of democratic institutions, Batista and Vicente, 2011; Chauvet et al., 2016 on political participation, Ivlevs and King (2017) on corruption, Beine et al., 2013; Beine and Sekkat, 2013 on institutional norms and fertility preferences) or adopted a descriptive, case study-based approach as in Orozco (2003).

One exception is Adida and Girod (2011), whose work investigates the effects of remittances on citizens' access to essential public services in Mexican municipalities between 1995 and 2000. I build on their contribution by extending the analysis to the effects of emigration in general and by resorting to an instrumental variable strategy to address endogeneity.

The rest of the paper is organized as follows: section 2 provides some background information on the Mexican context in terms of the migratory phenomenon and political decentralization, section 3 presents the empirical strategy and the data sources, section 4 shows the results, and section 5 concludes.

[2]The United States are by far the first destination country, receiving more than 90% of the Mexican diaspora (Chort and de la Rupelle, 2016).

3.2 The context

Mexico represents a particularly interesting case for the study of migratory phenomena. The disparity in GDP per capita between Mexico and the neighboring United States has consistently widened over the past four decades. By 2020, the GDP per capita in the United States exceeded that of Mexico by a factor of seven, as shown in Appendix figure 3.1[3]. The significant and increasing asymmetry in living standards, paired with the presence of a shared land border of more than 3,000 kilometers, has resulted in a sizable Mexican diaspora towards the United States, reaching a peak of nearly 12 million Mexican-born individuals residing in the US as of 2010, and only slightly declining in recent years (to more than 10 million in 2017, or slightly less than 10% of the Mexican population).

Aside from the sheer size, Mexican migration to the United States is particularly relevant to the topic of this study due to the high proportion of undocumented migrants[4]. Differently from regular migrants, undocumented migrants do not undergo the highly selective screening which is imposed on foreigners willing to work in the United States, meaning that the *brain drain* effect might play a less pivotal role in the migrants' communities of origin in the Mexican case. Fernández-Huertas Moraga (2013) documents how migrants are negatively selected (compared with non-migrants) regarding both labor market outcomes before migration and level of schooling, although the adverse selection seems to be weaker for rural migrants.

The Mexican diaspora to the United States is also characterized by a particularly high rate of return migration[5], adding the return channel to the possible mechanisms through which the migratory phenomenon affects the quality of local public goods in this setting. Finally, Mexico provides an ideal case study due to the process of political decentralization, which started in the 1980s and resulted in the responsibility for the provision of basic public services such as water and sewage being transferred from the central to the local governments (Herrera, 2014). Decentralization results in a larger role being played by local communities that, in turn, can be significantly affected by emigration through remittances, return migrants, or migrant networks acting on their source communities from abroad.[6]

[3]The gap in more broadly defined living conditions is also substantial, with the United States being ranked 65 positions above Mexico in the Human Development Index in 2021 (access at https://hdr.undp.org/data-center/human-development-index/indicies/HDI)

[4]Undocumented migrants represent more than half of the total emigration flows to the US according to Hazán (2014).

[5]More than 30% of the total number of migrants between 2005 and 2010 returned to Mexico within five years according to Campos-Vazquez and Lara (2012).

[6]In particular, the Hometown Associations (HTA), networks of immigrants in the US who promote development in their communities of origin through the realization of public projects, often in cooperation with Mexican local governments (Orozco, 2003).

3.3 Empirical strategy

3.3.1 Data sources

The first main source of data, covering the availability of basic services in Mexican municipalities, combines the 2015 Intercensal survey with the 2020 Census data[7], both made available by the Mexican Statistical Institute INEGI. The extended survey, which is administered to a representative sample of the population, contains detailed information on the presence and type of access to basic services such as drinkable water and sewage systems at the household level, as well as on several other aspects related to living conditions and household wealth.

The second main source of data is the *Matrícula Consular de Alta Seguridad* (MCAS) data set, which measures migratory flows from every Mexican municipality to each US state. The MCAS dataset, which is made available by the governmental agency IME (Institute of Mexicans abroad), contains the number of *Matricula Consulares* issued by Mexican consulates in the United States starting in 2008.

Matricula Consulares are registration documents which are widely recognized for official purposes and, unlike most other identification documents, do not require proof of legal migration status, implying that the MCAS dataset entries refer almost entirely to undocumented migrants (Massey et al., 2010).

Of course, the number of Matricula Consulares (MC) issued in a given year does not correspond to the total number of migrants from Mexico, nor to the total number of undocumented migrants, which might be problematic if those migrants who register for the Matricula Consular are selected according to some relevant dimensions. For instance, positive selection might occur if the procedure for obtaining the Matricula Consular was particularly cumbersome. However, on the requirements side the *Matricula Consular* is non-discriminatory (Massey et al., 2010): the process only requires proof of a local address in the US which can be as simple as a utility bill, and a payment of 27$ every 5 years.

Another source of selection might be the duration of the migration spell, as short-term migrants could be less in need of an identification document in the US. However, very short-term migrants are also less likely to be exposed to the US norms and institutions, making their case relatively less interesting for the type of analysis I am conducting.

Finally, as *Matricula Consulares* need to be renewed every 5 years, it might be the case that some requests actually refer to old, rather than newly-arrived immigrants, generating some measurement error.

In order to address these concerns, Caballero et al. (2017) provide a comparison of the MCAS

[7]The data collection for the 2020 Census took place between March 2nd and March 27th (see https://en.www.inegi.org.mx/programas/ccpv/2020/). Since the Covid-19 pandemic started being perceived as a significant threat in Mexico between the end of March and the beginning of April, it is unlikely that it might have affected investments in public or durable private goods when Census-related interviews were conducted.

dataset with the main alternative sources of nationally representative information on Mexican emigration to the US: the ENADID (national survey of demographic dynamics) and the Mexican Census for the municipality of origin, and with the American Community Survey (ACS) for the US state of destination. First, they find that the MCAS dataset covers nearly 80 % of the undocumented Mexican migrant population living in the United States, with recently arrived migrants being over-represented. Secondly, and more importantly, the study shows that the geographical distribution of Mexican migrants provided by the MCAS dataset matches very closely the geographic distribution of migrants, both in terms of the US state of destination and of the Mexican state of origin. Altogether, these results confirm the suitability of the MCAS dataset for analyses requiring a high level of geographic detail, as long as the limitations of this data source, namely the exclusion of documented migrants and the lack of individual level information except for the municipality of origin, are taken into account.

3.3.2 Descriptive statistics

Table 3.1 presents some descriptive statistics for the Mexican municipalities. On average, the number of emigrants decreased between 2015 and 2020 (400 to 333), which, paired with an increase in the average municipality population (50 to 52 thousands) lead to a decrease in the average emigration rate (from 1.7 to 1.5%). Despite the fall in the size of migratory outflows, the nominal value of remittances (in $) increased substantially, from $5,300 to $7,600 on average. On the other hand, most indicators of household wealth saw an increase over the 5-years time period, with the average fraction of households owning a private vehicle raising from 30.8 to 35%, and 4% more households owning a personal computer in 2020 than the 2015 level of 14.4%. Only television ownership declined slightly (from 82 to 80.4%). The quality of water sources and sewer systems, measured through an index ranging between 0 and 1[8], slightly improved over the years: from 0.82 to 0.85 for water, where the index ranges between 0 (no access) and 1 (access to a high quality source within the house), and from 0.64 to 0.69 for the sewage system. I also report the fraction of households having access to a publicly provided access to water and sewer system: 74% of the household had access to publicly provided potable water in both years, while both the percentage of households being served by the public sewage system and the percentage of households using a privately installed septic tank increased between 2015 and 2020, from 48 to 51% and from 31 to 33% respectively.

[8]The index is built based on Díaz et al. (2018). For the quality of the water source, 1 point is assigned if the household has access to potable water inside the dwelling; 0.75 if the households has access to potable water within the lot, but outside the dwelling; 0.5 if potable water is accessed via a public hydrant; 0.25 if it is accessed from a pipe or another dwelling and 0 if is accessed from lakes, wells or streams. For the quality of the sewer system, the index takes value 1 if the house is connected to the public system; 0.5 if a septic tank or a pipeline ending up in a ravine or in a river, lake or the sea is used; 0 if there is no access to the sewer system.

	N	Mean	St. Dev.	Min	Max
Fraction of emigrants	2,376	1.7	2.1	0.003	22.6
Total number of emigrants	2,376	400.1	916.3	1	19,979
Total remittances (in thousands $)	2,375	9,781.5	27,375.7	0.0	444,638.0
Quality of water source	2,372	0.8	0.1	0.0	1.0
Public water source	2,372	0.7	0.2	0.0	1.0
Pipe	2,372	0.005	0.02	0.0	0.2
Quality of drainage system	2,372	0.6	0.3	0.0	1.0
Public drainage system	2,372	0.5	0.3	0.0	1.0
Septic tank	2,372	0.3	0.3	0.0	1.0
Car ownership	2,372	0.3	0.2	0.0	0.9
Television ownership	2,372	0.8	0.2	0.0	1.0
PC ownership	2,372	0.2	0.1	0.0	0.8
Total population in the municipality	2,376	50,319.3	142,956.1	146	1,848,954
Average family size	2,372	2.9	0.3	2.1	6.2
Average years of education	2,372	6.1	1.3	0.0	12.6
Year 2020					
Fraction of emigrants	2,406	1.5	1.8	0.002	16.1
Total number of emigrants	2,406	332.7	741.2	1	15,149
Total remittances (in thousands $)	2,403	14,889.7	38,893.9	0.0	476,241.5
Quality of water source	2,402	0.8	0.1	0.0	1.0
Public water source	2,402	0.7	0.2	0.0	1.0
Pipe	2,402	0.01	0.03	0.0	0.4
Quality of drainage system	2,402	0.7	0.2	0.0	1.0
Public drainage system	2,402	0.5	0.3	0.0	1.0
Septic tank	2,402	0.3	0.3	0.0	1.0
Car ownership	2,402	0.3	0.2	0.0	0.9
Television ownership	2,402	0.8	0.2	0.0	1.0
PC ownership	2,402	0.2	0.1	0.0	0.8
Total population in the municipality	2,406	52,049.7	148,732.7	229	1,922,523
Average family size	2,402	2.8	0.3	2.0	6.0
Average years of education	2,402	6.7	1.3	0.0	12.8

Table 3.1: Descriptive statistics. Wealth and public good quality indicators are based on the 2015 Intercensal Survey and the 2020 Census. The number of emigrants is based on the Matricula Consular data, while remittances are measured on the BBVA-CONAPO dataset.

3.3.3 Model

The first specification I explore is the baseline OLS approach enriched with municipality and time fixed effects and a set of municipality-level, time varying controls:

$$y_{m,t} = \beta_1 Mig_{m,t-1} + \gamma X_{m,t} + \mu_m + \tau_t + \varepsilon_{mt} \tag{3.1}$$

where y_{mt} is the indicator of interest for municipality m in year t y_{mt} (either water source or sewer system quality), $Mig_{m,t-1}$ is the emigration rate measured as the ratio of the number of migrants from the same municipality in the United States at $t-1$ and the municipality population, $X_{m,t}$ is a vector of municipality-specific, time varying controls[9] and μ_m and τ_t are municipality and year fixed effects.

Since the prevalence of emigration from specific municipalities might be driven by additional push factors which are not included in the set of controls, and vary over time[10], in the main model specification I instrument emigration from municipality m in year $t-1$ with a composite variable based on the interaction of two components[11]: a "share" component based on the geographic distance of Mexican municipalities from different US states, interacted with a "shift" component based on the evolution of the labor market conditions in the destination states. The instrumental variable is constructed as follows:

$$instrument_{mt-1} = \sum_{s=1}^{S} \frac{1}{log(distance_{ms})} * pull_{st-1}, \tag{3.2}$$

where $s = 1, ..., S$ is the US state of destination, and $pull_{st-1}$ is the minimum wage in state s at year $t-1$.

The logic behind this instrument is that distance can act as an exogenous source for the baseline distribution of migrants[12], while evolving conditions at destination can generate different effects in different municipalities, according to the distance component.

As an example, consider the border municipality of Tijuana, in Baja California. A positive shock to the minimum wage of the US state of California is likely to play a larger role in shaping the

[9] Including municipality population, average family size, years of schooling and fraction of households owning a car to proxy for family wealth

[10] For instance, lower agricultural output in municipality m in $t-1$ could simultaneously push migration upward and public good quality downward, due to a lower availability of resources in the municipality.

[11] This instrument exploits a shift-share mechanism, however, differently from the well-known shift-share instrument first employed by Card in his contribution (Card, 2001), which instruments immigration by exploiting the presence of pre-existing enclaves from different source countries, the version of shift-share employed here is used to instrument emigration, and exploits as "share" component the geographic distance of Mexican municipalities from different US states

[12] As emphasized by Mayda (2010), distance is among the most influential pull factors shaping migration decisions.

migration and remittance decision of individuals in Tijuana than in Matamoros, the easternmost municipality of the Mexican state of Tamaulipas, which are more likely to migrate to the bordering Texas.

As to the selection of the *shift* variable, the minimum wage in each destination state at $t-1$ was chosen as it represents an important push factor in the emigration decision, and especially so as Mexican migrants are more likely to work in low-paying occupations[13].

One possible concern with this instrument is that political decisions concerning the minimum wage might in turn be affected by previous immigration to the US states, which is in turn correlated with current migration (as observed by Jaeger et al. (2018)). However, Mexican municipalities are small enough to rule out simultaneity concerns.

Another, more relevant concern, is that labor market shocks in individual states in the US, in particular the larger ones, might affect not only emigration, but also the economy of Mexican municipalities, both via an impact on the local production (through exports or imports of intermediate goods) or through remittances from older vintages of Mexican emigrants.

Since minimum wages are the result of political decisions at the state level rather than the result of global macroeconomic shocks, they are less likely, compared to other features of the labor market at destination such as the average wage or the unemployment rate[14], to directly affect the economy of individual Mexican municipalities. At the same time, minimum wage raises are more likely to affect the migration decisions of potential migrants than the consumption and remittances decisions of older vintages of Mexican immigrants, as the incomes of the latter are more likely to be higher than the minimum wage threshold.

[13] See for instance **?** for a comparison of wage trajectories between undocumented and documented migrants, and between Mexican migrants and US natives.

[14] I still present the results obtained by employing the unemployment wage as shift factor in the appendix, as a robustness exercise.

3.4 Results

In this section I report the results for the empirical specifications outlined in Section 3, for different measures of basic public good quality as dependent variables.

First, table 3.2 shows the first stage estimates for the preferred 2SLS specification. I report the coefficients for both the minimum wage-based and the unemployment-based instruments, since I employ the latter as a robustness check for the subsequent estimates. A unit increase in the unemployment-based instrument results in an increase in the migration rate of around 0.5 percentage points while a unit increase in the alternative instrument raises the migration rate by 0.05 percentage points, both estimates being significant at the 1% level and robust to the inclusion of municipality-level controls[15].

The second-stage effect of emigration on quality and type of access to potable water is summarised in table 3.3[16]. Emigration has a positive effect on the average water source quality at the municipality level, which however turns not significant when adding municipality-level time-varying controls[17]. Looking at the fraction of the population having access to the public water provision and the fraction using privately installed pipes[18], there seems to be a positive effect on public provision (which is significant at the 10% level when including municipality-level time varying controls), which is partially compensated by a negative but small not statistically significant effect on the use of private pipes. In terms of magnitudes, a one percent increase in the migration rate raises the access to the public water network by 2.8 percentage points, while the negative effect on the diffusion of private pipes is very close to zero. Compared to the fixed-effect estimates reported in Appendix tables 3.11 and 3.12, the 2SLS coefficients are larger in magnitude, suggesting that time-varying confounding factors at the municipality level might be biasing the simple Fixed Effects estimates downward.

Table 3.4 reports analogous results for the percentage of households having access to the sewage system, and the type of access (public or private[19]). While the overall effect on the quality and diffusion of the access to this service is approximately null, the decomposition into public and private channels of access uncovers interesting results: the fraction of households having access to the public system is positively affected by emigration (with a one percentage point increase in the emigration rate resulting in a 2.8 percent increase in the access to the public service) while private

[15] I include population in logarithms, average family size, average years of education and percentage of households owning a car as a proxy for average wealth.

[16] The estimates obtained via the baseline Fixed effect specification and with the unemployment-based instrument are very similar, and are reported in Appendix tables 3.11 and 3.12.

[17] I control for municipality population in logarithms, average family size, years of education and percentage of households owning a car as a proxy for average wealth.

[18] Private access is mainly obtained through pipes. Despite being an imperfect proxy of private access to potable water since they have to be connected to the public waterworks, they still represent a form of private investment.

[19] Differently from water pipes, septic tanks, which represent the main private channel of access to sewage, do not require any intervention from the local government.

Table 3.2: First stage regression with the two versions of the instrument

	Dependent variable:			
	Migration rate (%)			
	(1)	(2)	(3)	(4)
Instrument	0.526***	0.515***		
	(0.056)	(0.055)		
Instrument - minimum wage			0.051***	0.050***
			(0.007)	(0.007)
Municipality population (log)		−0.893***		−0.872***
		(0.152)		(0.153)
Average family size		−0.019		−0.004
		(0.029)		(0.030)
Average years of education		−0.345**		−0.365**
		(0.156)		(0.160)
Average car ownership		0.130		0.027
		(0.341)		(0.349)
Controls included	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	4,782	4,774	4,782	4,774
F Statistic	125.454***	50.323***	82.339***	33.289***

*p<0.1; **p<0.05; ***p<0.01

Notes: robust standard errors in parentheses. The first instrument is computed as the sum over municipalities and US states of (1-unemployment rate) divided by the logarithm of the distance, while the second instrument is computed as minimum wage divided by the logarithm of the distance.

access via septic tanks is reduced by 7 percentage points for each additional percentage point in the emigration rate.

Table 3.3: Regression of water source quality and access via public or private channels on the migration rate

	Dependent variable:					
	Water source quality		Public access		Private pipe	
	(1)	(2)	(3)	(4)	(5)	(6)
Migration rate	0.016*	0.012	0.030	0.028*	−0.002	−0.002
	(0.010)	(0.007)	(0.018)	(0.017)	(0.002)	(0.002)
Municipality population (log)		−0.061***		−0.057*		0.027***
		(0.013)		(0.030)		(0.006)
Average family size		0.014		−0.011		−0.001
		(0.012)		(0.030)		(0.004)
Average years of education		0.096***		0.096***		−0.001*
		(0.007)		(0.010)		(0.001)
Average car ownership		0.175***		0.004		0.022**
		(0.047)		(0.072)		(0.009)
Controls included	No	Yes	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774	4,774	4,774

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Heterogeneity analysis

While the currently available data do not allow for a thorough investigation of the contribution of different channels to the results at hand, I perform some supplementary analyses which might shed some light on the mechanisms in place.

To do this, I focus on one particular dimension of heterogeneity across municipality: the rural-urban divide. Indeed, Fernández-Huertas Moraga (2013) documents the existence of differences between rural and urban communities in terms of migrant selection: urban migrants seem to be more negatively selected than rural migrants in terms of schooling and job position at baseline. At the same time, rural communities have smaller populations and local governments, and might thus be more susceptible to the influence of US-based migrant networks.

Table 3.4: Regression of sewage system quality, access to public sewage system and private pipes on the migration rate.

	Dependent variable:					
	Sewage system quality		Public access		Private septic tank	
	(1)	(2)	(3)	(4)	(5)	(6)
Migration rate	−0.003	−0.006	0.030**	0.028**	−0.066***	−0.069***
	(0.013)	(0.011)	(0.013)	(0.012)	(0.019)	(0.020)
Municipality population (log)		−0.092***		−0.047**		−0.095***
		(0.017)		(0.019)		(0.032)
Average family size		−0.019		0.006		−0.036
		(0.020)		(0.020)		(0.032)
Average years of education		0.081***		0.070***		0.025**
		(0.011)		(0.014)		(0.012)
Average car ownership		0.126**		0.039		0.156*
		(0.051)		(0.055)		(0.082)
Controls included	No	Yes	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774	4,774	4,774
Adjusted R^2	−1.023	−0.502	−1.027	−0.751	−1.025	−1.030
F Statistic	0.053	846.766***	6.276**	484.565***	12.811***	59.127***

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Descriptive statistics for the two samples are reported for year 2020 in Appendix table 3.10. Rural communities are characterized by a higher fraction of emigrants (1.9% on average versus 1.0% for urban municipalities) out of an average population of less than 6,000 (more than 100,000 for urban municipalities). Access to potable water is slightly worse in rural communities compared to their urban counterparts (0.82 versus 0.87, where quality is measured in a scale of 0 to 1), while the proportion of individuals having access to a public and private source is identical. The quality of the provision of sewage services is also lower in rural municipalities, and the fraction of the population having access to the public system is considerably lower (0.4 versus 0.63) and only partially compensated by a higher fraction of individuals owning a septic tank (0.4 versus 0.3). Average wealth, proxied by ownership of cars and personal computers, is higher in urban municipalities, while the average family size is comparable. Finally, urban citizens tend to be more educated, with an average of 7.1 years of schooling compared to 6.3 for their counterparts in rural municipalities.

Table 3.5 reports the first stage results for the two municipality types[20]. First, there is a large heterogeneity in the compliance of different municipalities with the instrumental "treatment": the effect is more than nine times larger for rural municipalities, and loses statistical significance for urban municipalities when employing the minimum wage-based instrument, suggesting that the effects of emigration on the access to local public goods are mainly relevant for rural municipalities. Secondly, emigration is negatively related with the average level of education at the municipality level, with the correlation being statistically significant (at the 5% confidence level) only for urban municipalities, which is in line with the finding from Fernández-Huertas Moraga (2013) that Mexican emigrants from urban municipalities tend to be negatively selected in terms of schooling.

Moving to the second stage results, 3.6 to 3.9 report the regression coefficients for average quality and type of access to water and sewage separately for rural and urban communities.[21]

The positive (although not statistically significant) impact of emigration on the quality of the water service provision is largely driven by rural communities when including the municipality level time-varying controls. Looking at the decomposition of public and private access, urban communities seem to benefit more from increased public access, and to suffer more from decreased private access compared with rural communities. Nevertheless, the estimates for urban communities are likely to suffer from the weak first stage for this sub-sample, and are thus less informative.

Rural communities do instead benefit from the increase in access to public sewer system, which is raised by 2 percentage points in response to a 1% increase in the emigration rate, while the diffusion of private septic tanks decreases by nearly 4 percentage points (table 3.9). The estimates are both significant at the 5% confidence level.

[20] Analogous results for the alternative 2SLS specification are presented in Appendix table 3.15.

[21] I follow Fernández-Huertas Moraga (2013) in defining rural municipalities as those municipalities having less than 15,000 residents.

Table 3.5: First stage by municipality type, minimum wage instrument

	Dependent variable:			
	Migration rate			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Instrument	0.098***	0.007	0.095***	0.007
	(0.013)	(0.005)	(0.012)	(0.005)
Municipality population (log)	−1.932***	−0.274*	−1.748***	−0.248*
	(0.297)	(0.150)	(0.268)	(0.148)
Average family size			0.011	0.009
			(0.050)	(0.020)
Average years of education			−0.340	−0.262**
			(0.244)	(0.103)
Average car ownership			0.187	−0.327
			(0.571)	(0.278)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,478	2,304	2,472	2,302
F Statistic	87.113***	5.389***	33.746***	3.532***

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Overall, the finding that rural communities are the main compliers to the instrumental treatment suggests that the corresponding second stage estimates are more informative for this sub-sample, which is also the one which is more likely to strongly respond to the impact of emigration through channels that are different from private remittances. Indeed, local communities are more active and influential in small rural municipalities, while the lower availability of both public services and private wealth leaves a larger scope to benefit from emigration, especially in the case of sewage systems, which are less available at baseline in rural communities.

Table 3.6: Regression of water source quality on the migration rate by municipality type, minimum wage instrument

	Dependent variable:			
	Water source quality			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Migration rate	0.009	0.079	0.010	−0.024
	(0.008)	(0.102)	(0.007)	(0.058)
Municipality population (log)			−0.079***	−0.064***
			(0.024)	(0.020)
Average family size			−0.001	0.034
			(0.016)	(0.024)
Average years of education			0.096***	0.098***
			(0.010)	(0.010)
Average car ownership			0.235***	0.027
			(0.057)	(0.096)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.7: Regression of public and private access to potable water by municipality type, minimum wage instrument

	Dependent variable:							
	Access to public water source				Private pipe			
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.019	0.258	0.020	0.183	−0.0002	−0.044	−0.0004	−0.043
	(0.016)	(0.235)	(0.015)	(0.184)	(0.001)	(0.042)	(0.001)	(0.041)
Municipality population (log)			−0.084	0.007			0.033***	0.011
			(0.054)	(0.060)			(0.011)	(0.012)
Average family size			−0.059	0.109*			−0.006*	−0.004
			(0.040)	(0.063)			(0.003)	(0.013)
Average years of education			0.092***	0.095***			−0.002**	0.0001
			(0.015)	(0.012)			(0.001)	(0.002)
Average car ownership			0.083	−0.070			0.020*	0.014
			(0.107)	(0.114)			(0.012)	(0.022)
Controls included	No	No	Yes	Yes	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.8: Regression of sewage system quality on the migration rate by municipality type, minimum wage instrument

	Dependent variable:			
	Sewer system quality			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Migration rate	0.001	0.102	0.001	0.005
	(0.011)	(0.121)	(0.009)	(0.074)
Municipality population (log)			-0.097^{***}	-0.048^{**}
			(0.032)	(0.024)
Average family size			-0.034	0.021
			(0.027)	(0.029)
Average years of education			0.067^{***}	0.093^{***}
			(0.017)	(0.010)
Average car ownership			0.186^{***}	0.056
			(0.072)	(0.056)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.9: Regression of public and private access to the sewage system water on the migration rate by municipality type, minimum wage instrument

	Dependent variable:							
	Access to public sewer system				Septic tank			
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.020**	0.197	0.021**	0.114	−0.036**	−0.232	−0.036**	−0.264
	(0.010)	(0.176)	(0.010)	(0.117)	(0.018)	(0.195)	(0.018)	(0.217)
Municipality population (log)			−0.060**	−0.016			−0.076	−0.079
			(0.030)	(0.040)			(0.059)	(0.069)
Average family size			−0.018	0.075*			−0.014	−0.107*
			(0.024)	(0.041)			(0.045)	(0.062)
Average years of education			0.052**	0.087***			0.033*	0.015
			(0.021)	(0.013)			(0.018)	(0.020)
Average car ownership			0.064	0.018			0.211*	0.060
			(0.073)	(0.076)			(0.111)	(0.158)
Controls included	No	No	Yes	Yes	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

3.5 Conclusion

In this paper I have shown that emigration affects households' access to basic services mainly by increasing the fraction of households having access to public channels of provision, while at the same time it seems to negatively affect households' private investments in the same services.

To address the endogenous nature of the emigration decision, which is affected by living conditions in the municipalities of origin of potential migrants, I have employed an instrumental variable strategy based on a variation of the shift-share instrument, exploiting geographical distance between each Mexican municipality - US state pair, and pull factors at destination, in particular the minimum wage in each US state. Since minimum wages are the result of political decisions at the state level rather than the result of global macroeconomic shocks, they are less likely, compared to other features of the labor market at destination such as the unemployment rate (which I use as an alternative instrument for robustness), to directly affect the economy of individual Mexican municipalities.

Running the analysis separately for rural and urban communities, I also find that compliance to the instrumental treatment is driven by rural communities.

The differential effect of emigration on public versus private channels of access to locally provided basic services, together with the finding that results are driven by rural communities, provide support for the hypothesis that social remittances and migrant networks influencing local governments from abroad (and in particular Hometown Associations) play a pivotal role, comparable to that of monetary remittances. Smaller municipality size, and smaller local governments, are indeed likely to amplify the impact of social and political channels, resulting in improved public services. These results are to some extent complementary to the ones of Adida and Girod (2011), who found a positive impact of private monetary remittances on the quality of access to basic services, entirely driven by private or semi-private access channels, and open the way for further research aimed at isolating the effect of each of these channels.

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Appendix

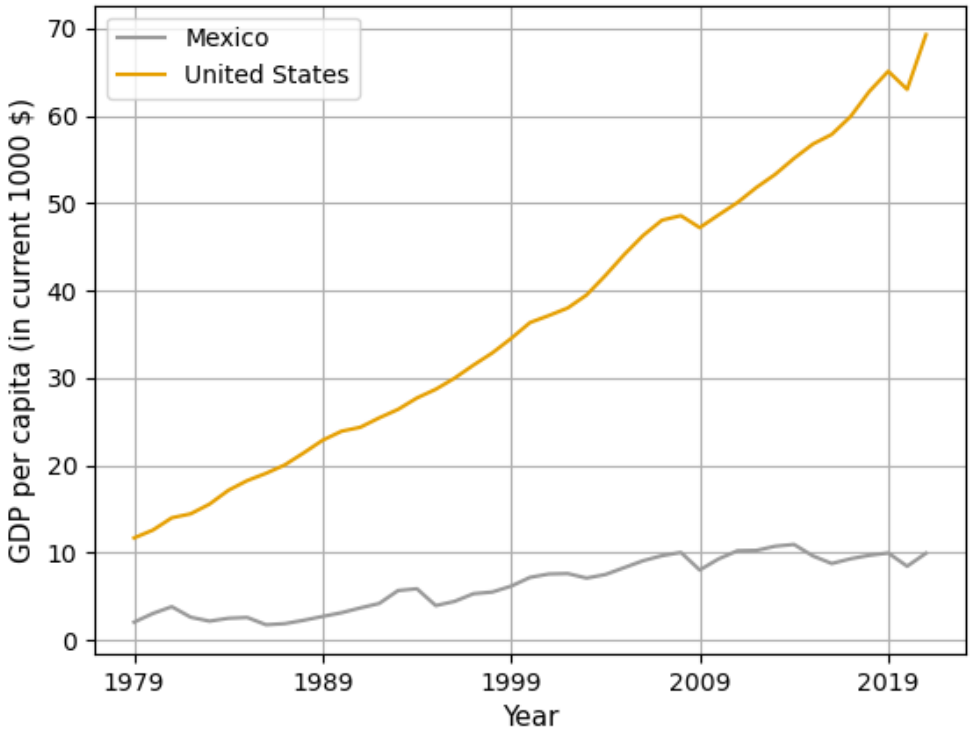

Figure 3.1: GDP per capita for the United States and Mexico. Based on World Bank yearly data.

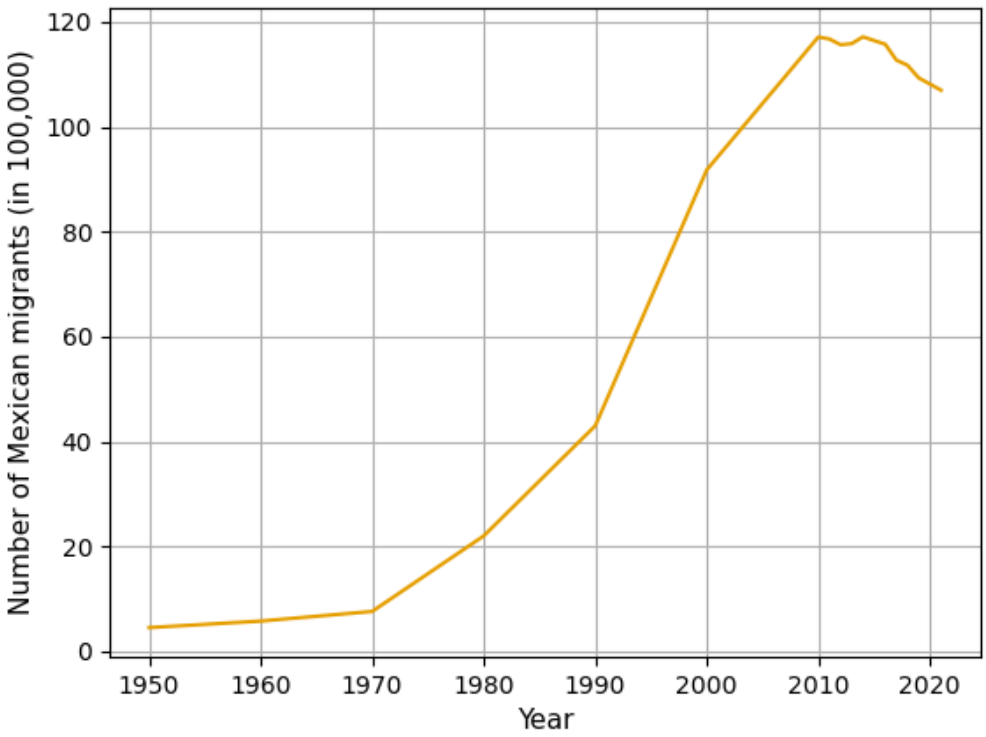

Figure 3.2: Number of Mexican born residents in the United States, 1950 to today. Based on data from migrationpolicy.org

Table 3.10: Descriptive statistics by municipality type for year 2020

	Rural			Urban		
Fraction of emigrants (%)	1,252	1.9	2.1	1,154	1.0	1.1
Total number of emigrants	1,252	95	140	1,154	590	998
Quality of water source	1,249	0.82	0.11	1,153	0.87	0.11
Public water source	1,249	0.74	0.22	1,153	0.74	0.21
Pipe	1,249	0.01	0.02	1,153	0.01	0.04
Quality of drainage system	1,249	0.61	0.26	1,153	0.77	0.19
Public drainage system	1,249	0.40	0.35	1,153	0.63	0.29
Septic tank	1,249	0.4	0.3	1,153	0.3	0.2
Waste management	1,249	0.59	0.33	1,153	0.72	0.26
Car ownership (%)	1,249	0.31	0.21	1,153	0.39	0.18
PC ownership (%)	1,249	0.13	0.10	1,153	0.24	0.14
Total population in the municipality	1,252	5,793	4,163	1,154	102,234	203,173
Average family size	1,249	2.8	0.3	1,153	2.9	0.3
Average years of education	1,249	6.3	1.0	1,153	7.1	1.3

Table 3.11: Regression of water source quality on the migration rate

	Dependent variable:			
	Water source quality			
	FE	FE	2SLS	2SLS
	(1)	(2)	(3)	(4)
Migration rate	0.003*	0.002	0.012	0.006
	(0.002)	(0.002)	(0.008)	(0.005)
Municipality population (log)		−0.069***		−0.066***
		(0.012)		(0.012)
Average family size		0.011		0.012
		(0.012)		(0.012)
Average years of education		0.096***		0.096***
		(0.007)		(0.007)
Average car ownership		0.176***		0.176***
		(0.047)		(0.047)
Controls included	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.12: Regression of public and private access to potable water on the migration rate

	Dependent variable:							
	Access to public water source				Access via private pipe			
	FE	FE	2SLS	2SLS	FE	FE	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.012***	0.011***	0.023	0.017	−0.001**	−0.001	−0.003	−0.003*
	(0.004)	(0.004)	(0.015)	(0.013)	(0.0005)	(0.0005)	(0.002)	(0.002)
Municipality population (log)		−0.072***		−0.067**		0.028***		0.026***
		(0.026)		(0.028)		(0.006)		(0.006)
Average family size		−0.017		−0.015		−0.001		−0.002
		(0.029)		(0.029)		(0.003)		(0.003)
Average years of education		0.096***		0.096***		−0.001*		−0.001*
		(0.010)		(0.010)		(0.001)		(0.001)
Average car ownership		0.008		0.006		0.022**		0.022**
		(0.072)		(0.072)		(0.009)		(0.009)
Controls included	No	Yes	No	Yes	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774	4,774	4,774	4,774	4,774

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Figure 3.3: Relationship between emigration rate and its instrument for 2015 and 2020

Table 3.13: Regression of sewage system quality on the migration rate.

	Dependent variable:			
	sewage system quality			
	FE	FE	2SLS	2SLS
	(1)	(2)	(3)	(4)
Migration rate	0.006**	0.004	0.005	−0.0001
	(0.003)	(0.003)	(0.010)	(0.009)
Municipality population (log)		−0.083***		−0.087***
		(0.014)		(0.017)
Average family size		−0.015		−0.017
		(0.019)		(0.020)
Average years of education		0.081***		0.081***
		(0.011)		(0.011)
Average car ownership		0.123**		0.124**
		(0.050)		(0.050)
Controls included	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.14: Regression of access to public sewage system and private septic tanks on the migration rate.

	Dependent variable:							
	Public sewage system				Private septic tanks			
	FE	FE	2SLS	2SLS	FE	FE	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.002	0.0004	0.015	0.011	0.007*	0.006	−0.022	−0.024*
	(0.003)	(0.003)	(0.010)	(0.009)	(0.004)	(0.004)	(0.013)	(0.013)
Municipality population (log)		−0.071***		−0.062***		−0.030		−0.056**
		(0.016)		(0.017)		(0.025)		(0.028)
Average family size		−0.004		−0.0003		−0.008		−0.019
		(0.019)		(0.020)		(0.023)		(0.024)
Average years of education		0.069***		0.069***		0.026***		0.026***
		(0.013)		(0.013)		(0.007)		(0.007)
Average car ownership		0.045		0.042		0.141**		0.147**
		(0.054)		(0.054)		(0.060)		(0.061)
Controls included	No	Yes	No	Yes	No	Yes	No	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,774	4,774	4,774	4,774	4,774	4,774	4,774	4,774

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.15: First stage regression by municipality type

	Dependent variable:			
	Migration rate			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Instrument	0.009***	0.001***	0.009***	0.001***
	(0.001)	(0.0004)	(0.001)	(0.0004)
Municipality population (log)	−1.916***	−0.294*	−1.738***	−0.268*
	(0.292)	(0.152)	(0.263)	(0.150)
Average family size			−0.012	0.008
			(0.049)	(0.020)
Average years of education			−0.321	−0.257**
			(0.237)	(0.100)
Average car ownership			0.341	−0.348
			(0.561)	(0.279)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,478	2,304	2,472	2,302
F Statistic	120.787***	13.001***	47.285***	6.602***

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.16: Regression of water source quality on the migration rate by municipality type, minimum wage instrument

	Dependent variable:			
	Water source quality			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Migration rate	0.009	0.079	0.010	−0.024
	(0.008)	(0.102)	(0.007)	(0.058)
Municipality population (log)			−0.079***	−0.064***
			(0.024)	(0.020)
Average family size			−0.001	0.034
			(0.016)	(0.024)
Average years of education			0.096***	0.098***
			(0.010)	(0.010)
Average car ownership			0.235***	0.027
			(0.057)	(0.096)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.17: Regression of public and private access to potable water by municipality type, minimum wage instrument

	Dependent variable:							
	Access to public water source				Private pipe			
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.019	0.258	0.020	0.183	−0.0002	−0.044	−0.0004	−0.043
	(0.016)	(0.235)	(0.015)	(0.184)	(0.001)	(0.042)	(0.001)	(0.041)
Municipality population (log)			−0.084	0.007			0.033***	0.011
			(0.054)	(0.060)			(0.011)	(0.012)
Average family size			−0.059	0.109*			−0.006*	−0.004
			(0.040)	(0.063)			(0.003)	(0.013)
Average years of education			0.092***	0.095***			−0.002**	0.0001
			(0.015)	(0.012)			(0.001)	(0.002)
Average car ownership			0.083	−0.070			0.020*	0.014
			(0.107)	(0.114)			(0.012)	(0.022)
Controls included	No	No	Yes	Yes	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.18: Regression of sewage system quality on the migration rate by municipality type, minimum wage instrument

	Dependent variable:			
	Sewer system quality			
	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)
Migration rate	0.001	0.102	0.001	0.005
	(0.011)	(0.121)	(0.009)	(0.074)
Municipality population (log)			-0.097^{***}	-0.048^{**}
			(0.032)	(0.024)
Average family size			-0.034	0.021
			(0.027)	(0.029)
Average years of education			0.067^{***}	0.093^{***}
			(0.017)	(0.010)
Average car ownership			0.186^{***}	0.056
			(0.072)	(0.056)
Controls included	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Table 3.19: egression of public and private access to the sewage system water on the migration rate by municipality type, minimum wage instrument

	Dependent variable:							
	Access to public sewer system				Septic tank			
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Migration rate	0.020**	0.197	0.021**	0.114	−0.036**	−0.232	−0.036**	−0.264
	(0.010)	(0.176)	(0.010)	(0.117)	(0.018)	(0.195)	(0.018)	(0.217)
Municipality population (log)			−0.060**	−0.016			−0.076	−0.079
			(0.030)	(0.040)			(0.059)	(0.069)
Average family size			−0.018	0.075*			−0.014	−0.107*
			(0.024)	(0.041)			(0.045)	(0.062)
Average years of education			0.052**	0.087***			0.033*	0.015
			(0.021)	(0.013)			(0.018)	(0.020)
Average car ownership			0.064	0.018			0.211*	0.060
			(0.073)	(0.076)			(0.111)	(0.158)
Controls included	No	No	Yes	Yes	No	No	Yes	Yes
Municipality Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,472	2,302	2,472	2,302	2,472	2,302	2,472	2,302

Note: *p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses.

Figure 3.4: Relationship between emigration rate and the minimum-wage instrument