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Cash Transfers and Health Outcomes: Evidence from Italian Municipalities

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Abstract

This paper aims to assess the impact of a cash transfer programme implemented in Italy since 2014, known as the '80 euro bonus', on health outcomes as gauged by mortality rates. Using municipality-level data over the period 2010-2019 and a difference-in-differences approach, we find a significant reduction in mortality rates associated with the size of cash transfers and the number of recipients in the municipality. This effect remains robust across several checks. Furthermore, at the provincial level, we observe sustained decreases in mortality rates, especially for cancer and cardiovascular diseases, in the areas with a higher concentration of cash transfer recipients. These results support the positive impact of increased financial resources on health outcomes and highlight the role of cash transfers as effective tools for public health policies.

Keywords: cash transfer, personal income, health outcomes, mortality rate, local communities, difference-in-difference.

JEL: C23, E32, H24, I10, I18

1 Introduction

Cash transfer programs have gained prominence as effective mechanisms for addressing poverty and improving overall socioeconomic well-being, allowing for an increase in consumption and/or asset building. With an increasing number of countries implementing such programs, understanding the nuanced effects of cash transfers is crucial for policymakers, researchers, and practitioners alike. The rationale behind cash transfers lies in the belief that direct financial assistance can empower individuals and households to make choices that align with their unique needs and priorities. Because of their flexible use by individuals and households, cash transfers may impact different dimensions of individual well-being, including health. The link between cash transfers and health has been explored in several studies,[1] and its foundations lies on the extended literature about the social determinants of health.[2] This link is crucial from a public policy perspective since, on one side, the generally wide scope of cash transfers (as well as social assistance programs) may provide an additional tool to complement traditional healthcare policies and, on the other, unlike conventional in-kind assistance programs, cash transfers may offer recipients the flexibility to allocate resources based on their immediate requirements, thus fostering a sense of agency and autonomy. However, the empirical evidence on the impact of cash transfers on health is mixed, because different countries usually implement different forms of transfer, generally with a different composition of beneficiaries, probably involving different channeling mediators of their effects on health. Moreover, the different studies use different measures of health outcomes, on which the impact of cash transfers is estimated.

Our paper adds to the empirical literature on the effects of cash transfers on health, providing evidence on the health impact of a large program of tax credits, not targeted at the poorest groups in society since it largely benefits middle-income groups. This latter issue is quite relevant, even if not frequently explored in this literature, since income may be important to health even after the more basic needs have been satisfied (Lundberg et al., 2010). Moreover, even if the poorest individuals are at a comparatively higher risk of poor health and, therefore, are the ones that can potentially enjoy a higher benefit from a program of cash transfers, middle classes are larger in number and, therefore, the overall impact of a program of which they benefit may be quite huge (Lundberg et al., 2008). We exploited the adoption of a tax credit program in Italy in April 2014, the so-called "80-euro" or "Renzi" bonus, from the name of the prime minister of the time, which provided a monthly tax credit of €80 to all payroll employees with a gross annual income in between €8,145 and €26,000. As pointed out above, since the individual median income in Italy, at the time, was about €16,000, the policy benefited mostly middle-income individuals, and it involved a very large number of beneficiaries, about 11 million payroll employees (Vannutelli, 2023). The policy was first adopted as a temporary measure, only for the year 2014, and in 2015 it became permanent. The policy followed a long period of recession in Italy (11 consecutive quarters of downturn) and, therefore, it aimed at stimulating consumption and economic growth. While the impact of the 80-euro bonus on consumption has been investigated (Neri et al., 2017) and, more recently, it has also been estimated its electoral effect (Vannutelli, 2023), our objective is to estimate its impact on the health of its beneficiaries.

To pursue the objective of our research, we use administrative data on the number of

[1] For recent works surveying studies on the impact of cash transfers, and more in general of social assistance programs, on health, see, among the others, Sun et al. (2021) and Shahidi et al. (2019).

[2] Sun et al. (2021) identify a conceptual model relating cash transfers, supplementing typical socioeconomic determinants of health, and mediating factors that channel the socioeconomic position of individuals into their health. On the relevance of the social determinants of health, also in terms of policy, see two reports by the World Health Organization (WHO, 2008, 2011).

bonus beneficiaries, employment, and income distribution, as well as on the mortality rate of the universe of Italian municipalities. We take advantage of the quasi-random geographical variations in program intensity at the municipal level, which result from predetermined differences in income and payroll employment distribution. Using a difference-in-differences design, we compare the evolution of mortality rates over time across municipalities characterized by varying numbers of beneficiaries. We control for the two eligibility criteria of the bonus, that is the percentage of payroll employees over the total population of municipalities and the percentage of the taxpayers with an income between €10,000 and €26,000. We also control for the population, the average disposable income, the percentage of over 65, and the percentage of the female population, in each municipality. We include municipality and region-by-year fixed effects, in such a way as to control for potential different shocks affecting municipalities with different characteristics and for potential differential trends at the regional level.

Results show that there is a statistically significant negative effect of the bonus on mortality, at the municipality level, both when the bonus is measured in terms of the amount per capita and of the share of the population benefiting from it. In particular, one additional euro of tax credit per capita generates a reduction in mortality rate in an estimated range between 0.003 to 0.005 deaths per 1,000 population. Similarly, an increase of one percentage point in the share of program beneficiaries corresponds to a substantial decrease ranging between 0.033 to 0.049 in municipal mortality rates per 1,000 inhabitants.

These results may be regarded as relevant, relative to the ones found in other studies, because of the wide scope of the 80-euro bonus. Even if it cannot be strictly considered a universal transfer, the 80-euro bonus is less targeted than many other transfers considered in the literature, generally aiming at addressing poverty conditions, and it is practically unconditional. As noted by Shahidi et al. (2019), "social assistance is increasingly conditional on a range of punitive, work-related obligations that compel entry into precarious employment conditions".[3] This conditionality may affect the health outcome of the monetary transfer, since its potential positive effects may be overcome by the negative impact that a precarious employment condition may have on the health of the beneficiaries (on this issue, see Pega et al., 2013). Moreover, as noted above, the eligibility condition for the 80-euro bonus is such that the beneficiaries of the transfer are numerous and mostly targeted in the middle-income groups. The implication is that the numerosity of beneficiaries improves the chance to capture the effect of the bonus on health, when using, as we do, an aggregate measure, such as the population mortality rate, at the municipal level. The exclusion of the lowest income groups from the set of beneficiaries may also prevent the aggregate measure of the health impact being affected by risky behaviors, more common within these groups, which can be aggravated by the additional money received through the transfer (Pega et al., 2013).

The use of the mortality rate of the general population, at the municipality level, as a measure of the health outcome of the 80-euro bonus, may raise some doubts on whether it is the appropriate measure to catch the effects of a relatively small amount of additional income (a bit less than €1,000 per year), whose impact on health may be more specific and delimited than the general mortality rate can capture. However, if the link between the cash transfer and health is rooted in a change in the socio-economic position of the beneficiaries, as observed by Link and Phelan (1995), it may impact the population's health through its

[3]Even if the US EITC program provides a tax credit at different income levels, its most significant impact is in extending the supply of labor, with a tax incentive for those people who are voluntarily outside the labor market. In a sense, then, for these people, the tax credit is conditional on entering employment. The EITC is probably one of the most studied tax credit programs, for the exam of its impact on the health of its beneficiaries, as far as the US is concerned (among the recent works, see Lenhart, 2019; Wagenaar et al., 2019; Komro et al., 2019).

influence on multiple risk factors and multiple disease outcomes. The mortality rate of the general population, therefore, may be better able than more specific measures, to capture these influences. Moreover, the individuals may spend the additional income from transfers on consumption, which impacts the health of other individuals. Again, the mortality rate of the general population can capture all these other effects better than outcome measures based on individual data exclusively related to the beneficiaries of transfers. As a robustness check, however, we considered additional measures of health, related to more delimited health conditions and, therefore, more effective in capturing potential specific effects of cash transfers on health. In particular, we considered a measure of avoidable mortality for a wide set of different diseases. Because of the availability of data, we had to carry out our analysis at a more aggregate level, the provincial one. The result of this additional analysis confirms the previous ones, in terms of the statistical significance, size, and direction of the estimates of the coefficient measuring the marginal impact of cash transfers on health, at least as far as the most relevant conditions are concerned (cancer, cardiovascular and respiratory diseases).

As a further robustness check, we also considered the role of public spending for healthcare, since it is crucial for population health in a country characterized by universal public coverage. However, the provision of public care in Italy has been regionalized since the early nineties; therefore, there are regional and local variations that can, in principle, bias our results if there are correlations between these variations and the drivers of the 80-euro bonus, that is, the geographical distribution of payroll employees and the income groups. We usually observe higher per capita public spending for healthcare in the northern regions of the country, where we also notice a relative concentration of the beneficiaries of the bonus. We could only control for the annual public spending per capita at the regional level, and the results were again confirmed. Since the estimate of the coefficient for the regional per capita public spending for healthcare is significant, the results allow us to make a comparison between cash and in-kind transfer, which is a relevant policy issue, widely discussed in the literature (for a general view on this comparison, see Currie and Gahvari, 2008). What emerges from our analysis is that an additional euro spent on cash transfers appears to be more productive, in terms of health gain, than the same euro spent on in-kind transfers. However, our results also suggest that public spending on healthcare plays a significant mediating role in the effectiveness of the cash transfer program, facilitating improved access to healthcare services and enhancing the quality of services and healthcare infrastructure.

The paper is organized as follows: in Section 2, we provide an overview of the institutional setting and details regarding the 80-euro bonus. Section 3 describes the data utilized for our empirical analysis. The empirical strategy adopted is outlined in Section 4, whereas Section 5 presents the results. Lastly, we draw conclusions in Section 6.

2 Institutional setting

The 80-euro bonus is among the largest monetary transfers to households ever implemented in Italy. The program was adopted by the Italian Government in response to the double-dip recession, exacerbated by internal demand stagnation, which led to a 6% drop in total consumption between 2010 and 2013 (Andini et al., 2018). The policy, first announced in March 2014 but formally adopted in April 2014 with Decree Law 66/2014, later ratified by the Parliament, was aimed at stimulating private consumption and economic growth. According to the Government's estimates, roughly 11 million subjects should have received the bonus, entailing a transfer of 6.1 billion euros (Ministry of Economics and Finance, 2015). While initially planned for 2014 only, the measure has been made permanent starting from 2015 and is still in force despite some adjustments.[4] Introduced by Prime Minister Matteo Renzi, the benefit was designed as a tax credit and consisted of a monthly transfer of €80 starting from May 2014 to payroll employees and assimilated[5] with gross annual income between €8,145 and €26,000. Specifically, the transfer amounts to €80 per month for gross income between €8,145 and €24,000. For earnings between €24,000 and €26,000, the amount of the benefit linearly decreases and is calculated as follows: $80 \times \frac{26{,}000 - income}{2{,}000}$. According to Vannutelli (2023), the bonus involves a 6% increase in the average monthly wage.

The allocation of the bonus is entirely automatic, without any specific request from the employee. First, the employer assesses eligibility, based on the worker's annual payroll income,[6] as long as the gross expected tax is larger than the income tax deduction. Second, the employer reduces the withholding on pension contributions, thus increasing the employee's salary by €80 per month. Therefore, the tax credit determines a reduction in the 'tax wedge' which is the difference between the total labor cost to the employer and the corresponding net take-home earnings of the employee. However, since the enrollment is checked based on predicted 2014 gross income rather than actual income which becomes available in 2015 only, some people that were misclassified as eligible[7] had to reimburse all or part of the bonus received, in the tax statement.[8] The allocation mechanism and the eligibility criteria were dictated by the need to make the policy measure much easier to implement. First of all, since the employee is directly recognized for the bonus by the employer, and the tax credit is indicated as a separate voice in his paycheck, the transfer is fast and also very salient. In fact, any alternative mechanism such as a direct transfer of money from the Government would have taken months to be enacted. Second, establishing a lower threshold to be eligible to receive the bonus was required to prevent the employer from paying the bonus out of pocket. On the one hand, excluding tax-exempt subjects, the so-called '*incapienti*', was justified by financial and administrative reasons. On the other hand, such choice questioned the policy impact on consumption growth, since individuals excluded from the benefit are potentially the ones with the highest propensity to consume (Baldini et al., 2015).

Evidence on the impact of the 80-euro bonus is still very limited, focusing primarily on the redistributive effects resulting from the policy adoption. For example, Baldini et al. (2015) demonstrate that the middle class benefits the most from the tax rebate program and therefore redistributive effects of the policy are negligible.[9] Further evidence on the limited impact of Renzi's program on income distribution is provided in the microsimulation model carried out by Bazzoli et al. (2017).[10] Moreover, little empirical research investigates labor supply, electoral effects, and consumption responses following the 80-euro bonus program. In this regard, Villamaina and Acciari (2023) use a Regression Discontinuity Design method to demonstrate that the tax credit did not negatively influence the level of effort provided by workers qualifying for the bonus. Vannutelli (2023) use a difference-in-differences approach

[4] Decree Law 3/2020 converted into Law on April 2, 2020, has replaced the 80-euro cash transfer with a 100-euro bonus to payroll employees having a taxable income between €8,174 and €28,000.

[5] For example, recipients of unemployment benefits or of wage subsidies (i.e., *Cassa integrazione*), priests, cooperative workers, recipients of scholarships.

[6] Since the bonus is computed on an individual basis, a family can benefit from more than one tax credit, depending on each family member's eligibility.

[7] E.g., workers gaining taxable income from additional sources and thus exceeding the eligible range, individuals losing their jobs throughout the year and thus entitled to zero or only part of the bonus.

[8] Almost 1.7 million beneficiaries had to reimburse all or part of the bonus in 2016 (Ministry of Economics and Finance, 2017)

[9] See Andini et al. (2018) on the possibility of introducing a matching learning algorithm to select the beneficiaries of the bonus in order also to improve the effectiveness of the tax credit program, strengthening its redistributive effect.

[10] See also Di Caro (2018) on the same topic.

to study the change in electoral results among municipalities varying in the share of bonus recipients. The bonus introduction results in both short-run and long-run electoral rewards in favor of the Democratic Party, whose leader, Matteo Renzi, adopted the policy in April 2014. Finally, adopting a methodology close to Vannutelli (2023) but distinguishing between eligible and non-eligible families, Neri et al. (2017) study the variation in the households' spending decisions determined by the introduction of the 80-euro bonus. Results show that families spend 50-60% of the bonus on the consumption of food (see also Gagliarducci and Guiso, 2015; Lucchetti et al., 2021) and means of transportation.

Cash transfers, however, may impact other relevant social outcomes not immediately related to their main policy goals. As mentioned in the previous Section, one relevant outcome that can be affected by cash transfers is the health of their beneficiaries and, more generally, of the entire population. Up to now, however, the studies investigating the effects of the 80-euro bonus have not examined this effect, and our paper represents an attempt to fill this gap since we believe that, considering the number of beneficiaries of the transfer, the effect on health can be relevant.

3 Data

The dataset employed in the empirical analysis combines detailed data from various sources. The following analyses employ both municipal and provincial-level observations. For the sake of saving space, the Tables with the descriptive statistics of the two samples of observations are given in Appendix A. Specifically, Table A.1, in the Appendix A reports the descriptive statistics of our sample of observations at the municipal level, while Table A.2 shows the descriptive statistics of our sample of observations at the provincial level.

The primary source is the open dataset on taxable income distribution provided by the Department of Economics of the Italian Ministry of Economy and Finance. This dataset offers extensive and detailed information at the municipal level on income distribution and taxation for the universe of Italian municipalities. For each municipality and year, data are grouped by income brackets and income sources (such as retirement income, payroll employment, self-employment, etc.). Starting from 2015, the dataset includes records of both the number of beneficiaries of the cash transfer program known as the 80-euro bonus, and the total amount disbursed in each municipality and year.

As for the outcome variable, data on the number of deaths are retrieved from open data published by the National Institute of Statistics (ISTAT). The municipal mortality rate is calculated as the ratio between the total number of deaths in each municipality and the resident population at the beginning of each year, expressed per thousand inhabitants. Finally, the dataset is enriched with additional socio-demographic data, encompassing the resident population, the percentage of the population aged over 65, the percentage of females relative to the total population. We complete the dataset, collecting information on the per capita regional public healthcare expenditure. Data are sourced from the public database Health For All and are available for all the years considered in our analysis.

Throughout the analysis, we will refer to the period spanning from 2010 to 2019. The choice of this reference time frame is based on considerations regarding the macroeconomic dynamics that occurred in the previous years, which may introduce distortions in the mortality trend. In fact, several studies have shown that mortality is procyclical, which means that death rates tend to decrease during economic bursts and to increase during economic upturns, suggesting several mechanisms to explain this relationship[11](Ruhm, 2000; Edwards,

[11]Many studies stress the role of individual behavior, which becomes healthier following income drop and

2008; Haaland and Telle, 2015; Van den Berg et al., 2017; Cervini-Plá and Vall-Castelló, 2021). Following the U.S. subprime crisis in 2007, all countries entered in recession, although the exact timing differed from one nation to another. Italy was among the first European countries to be affected by the financial crisis (mid-2007), measured in terms of relative decline in GDP. As reported in Figure A.1 in Appendix A, the recessionary shock was particularly severe, with a significant slowdown of the Italian economy, here documented by a marked drop in GDP (-5.2% in 2009). Other economic indicators showed similar trends between 2007 and 2010: industrial production, employment rate, and investments all fell dramatically. Additionally, healthcare expenditures were sharply reduced (Salinari et al., 2023). To prevent our estimates from being biased by this unique economic downturn, we chose to limit our analysis to the period spanning from 2010 to 2019.

4 Empirical strategy

To estimate the impact of the cash transfer program on mortality rates, we construct two variables representing alternative measures of treatment intensity: the first (*bonus1*) being the per capita amount (total amount divided by the resident population in the municipality), and the second (*bonus2*) being the percentage of beneficiaries relative to the resident population:

$$Bonus1_{it} = \frac{TotalAmount_{it}€}{Population_{it}} \tag{1}$$

$$Bonus2_{it} = \frac{N.Recipients_{it}}{Population_{it}} \cdot 1000 \tag{2}$$

In both cases, the treatment variable is continuous and takes on positive values for all municipalities from 2015 onwards. Given the design of this variable, our empirical strategy relies on a generalized difference-in-differences approach that leverages cross-sectional variability in treatment intensity among more or less treated municipalities. As illustrated by the maps in Figure 1, the spatial allocation of the bonus exhibits cross-sectional variability, serving as the source of variation for identification.

The main specification is as follows:

$$y_{it} = \beta_1 Bonus_{it} + \beta_2 x_{it} + \tau_t + \nu_i + \epsilon_{it} \tag{3}$$

In this context, the dependent variable represents the mortality rate in municipality i and year t. $Bonus_{it}$ serves as the treatment variable, measured in the two alternative specifications (1) and (2). x_{it} is a vector of control variables at the municipal level that allows to capture the bonus allocation criteria (share of payroll employees and share of individuals earning between €10,000 and €26,000, over municipal population) and also encompasses additional socio-demographic factors (population, percentage of population above 65 years, percentage of females, per capita disposable income). We incorporate year-fixed effects τ_t to control for time-specific factors that may affect the dependent variable across all municipalities, and municipality fixed effects ν_i to account for unobserved characteristics specific to each municipality that remain constant over time.

increased disposable leisure time during recessions (e.g., improved diet, reduction in smoking and drinking, increased physical exercise) (Ruhm and Black, 2002; Ruhm, 2005b). Further literature emphasizes alternative factors contributing to procyclical mortality, such as the reduction in the number of traffic and workplace accidents or in air pollution, during economic downs (Ionides et al., 2013; Ruhm, 2005a; Heutel and Ruhm, 2016)

In this context, a potential concern arises from the possibility that municipalities treated more or less intensively may differ in certain characteristics that also affect mortality, potentially confounding the relationship between treatment and outcome. Indeed, the maps shown in Figure 1 reveal a clear clustering between the North (where municipalities belonging to the third and fourth quartiles are concentrated) and the Central-Southern part of the country (where most of the "less treated" municipalities, belonging to the first and second quartiles of the distribution, are located). This diverse distribution is mainly driven by differences in the number of payroll employees who earn an annual gross income ranging between €8,145 and €26,000, towards which the bonus measure is targeted.

Such clustering patterns should be accounted for in the empirical analysis, as more treated municipalities may significantly differ from less treated ones in aspects that also influence mortality trends, introducing bias into the estimates and hindering comparability between municipalities.

We address this concern in two ways. First, we take into account the two main determinants of bonus allocation: 1) being a payroll employee; and 2) having an annual total income between €8,145 and €26,000. Specifically, we construct two measures representing 1) the proportion of payroll employees relative to the total municipal population, and 2) the proportion of residents earning between €10,000 and €26,000.[12] These metrics play a significant role in our empirical approach, as they are critical determinants influencing selection into different treatment intensities.

Secondly, we check whether municipalities with different treatment intensities exhibited different mortality trends before the implementation of the policy. Indeed, the empirical strategy is grounded in the main identification assumption that, in the absence of the policy, the trend in mortality rates for more or less treated municipalities would be parallel before 2015 – in other words, a parallel counterfactual trends condition would hold. While we cannot directly test the counterfactual parallel trends assumption, we can examine whether pre-event trends were indeed parallel.

In Figure 2, we depict the trend of mortality rates during the years 2010-2019, grouping municipalities by treatment intensity (deciles of the per capita bonus distribution disbursed in each municipality over the period 2015-2019). Specifically, in Figure 2 we report the first and the last decile. Upon visual inspection of the trends, an approximately parallel trend seems to emerge among the two deciles of the distribution. This suggests that mortality in municipalities with lower or higher treatment intensity follows a similar pattern. Notably, starting from 2015 – the year of bonus introduction, indicated by the vertical red line – it appears that the trend takes different paths. For instance, the line representing the more treated decile (i.e. the last decile) exhibits a flatter trend compared to the less treated decile. Although limited, this initial visual inspection suggests that, before the treatment, the groups followed parallel trends, providing support for the chosen identification strategy.[13]

Moreover, to further investigate the plausibility of the parallel trend assumption, we employ an event-study difference-in-differences approach where we allow the treatment effect to differ across years:

$$y_{it} = \beta_t[Bonus_i \times 1(Year_t)] + \beta_2 x_{it} + \tau_t + \nu_i + \epsilon_{it} \tag{4}$$

Where $Bonus_i$ measures the treatment (alternatively, the per capita cash transfer or the share of recipients in the municipality) received in municipality i in 2015, interacted with

[12] Unfortunately, information on individuals earning between €8,145 and €10,000 is unavailable due to their inclusion in the lowest income bracket of the income distribution dataset, ranging from €0 to €10,000.

[13] Figure A.2 in Appendix A depicts the trend of mortality rates before and after intervention for all the deciles of the treatment distribution.

time dummies $1(Year_t)$ from 2010 to 2019. In the estimates, the interaction with treatment in 2014 is omitted, so that all β_t values are interpretable relative to 2014. x_{it} is the usual set of controls, τ_t and ν_i are year and municipality fixed effects, respectively.

5 Results

5.1 Main results

Our results indicate a positive impact on municipal mortality rates following the implementation of the cash transfer program, as detailed in Table 1. The findings, related to the estimation of Equation 3, indicate that an annual transfer of €100 per capita is associated with a significant reduction in municipal mortality rates, amounting to approximately 0.5 deaths per 1,000 inhabitants. Additionally, the increase of one percentage point in the share of program beneficiaries corresponds to a substantial decrease of approximately 0.049 in municipal mortality rates per 1,000 inhabitants. After controlling for socio-demographic factors and economic determinants influencing the distribution of the treatment, our results remain statistically significant, albeit with a slight reduction in the magnitude of estimated coefficients.

Figure 3 depicts the predicted values of death rates across various levels of treatment intensity. The graph shows a consistent decline in mortality rates corresponding to different degrees of treatment intensity, providing a visual representation of the program's effect on municipal mortality.

Figure 4 plots the yearly coefficients β_t from the event study analysis presented in Equation 4. Results suggest that the parallel trends assumption is satisfied, as neither of the two alternative measures for treatment intensity received in 2015 exhibits coefficients that are statistically different from zero, before 2014. This result is reassuring for the validity of the presented estimates, suggesting that observed differences in outcomes can be attributed to the treatment rather than pre-existing differences between groups.

Overall, the negative coefficients associated to the 80-euro bonus, regardless of how the bonus is computed, confirm that cash transfers are powerful in improving health outcomes (Barham, 2011; Cooper et al., 2020; Pega et al., 2022). The mechanism behind such a relationship likely may lie not only in the possibility of buying better food and moving on to a healthier lifestyle thanks to the monthly amount received, but also in improved access to care services (Lagarde et al., 1996). Finally, it must be noted that, in the years following the introduction of the 80-euro bonus, from 2015 to 2019, the out-of-pocket payments for healthcare, as a share of the total healthcare expenditure, increased by about 1%, that corresponds, more or less, to a decline of the same size in the share of public spending.

5.2 Regional time trends

Our primary estimates incorporate municipal fixed effects, thereby allowing control for all unobserved confounding factors that are both specific to each municipality and constant over time. However, a limitation of this approach is its inability to account for unobserved time-varying confounding factors that could be associated both with treatment intensity and mortality. We address this concern by re-estimating 3 introducing region-by-year fixed effects. This inclusion enables us to control for any unobserved regional characteristics that vary over time. This is particularly relevant in the context of our analysis, given that regions serve as the competent administrative bodies for the provision of healthcare services in Italy. By controlling for regional time trends, we can mitigate confounding effects associated with variations in healthcare policies implemented at the regional level. The results of these estimations are presented in Table 2. While the estimated coefficients exhibit a lower magnitude, they remain both negative and statistically significant.

5.3 The role of regional health care expenditure

In this section, we consider the role of regional healthcare expenditure in the relationship between cash transfers and mortality. Firstly, we re-estimate the main regression, also controlling for per capita regional healthcare expenditure, to compare the coefficients of cash transfers and per capita public spending. Secondly, we explore the potential synergies between public healthcare spending and the 80-euro bonus on mortality rates, by introducing an interaction term between the two variables. Finally, we leverage the austerity measure adopted in 2007 for some Italian regions, known as the Recovery Plans, to investigate heterogeneous effects of the cash transfer between regions that underwent significant cuts to healthcare expenditure and those that did not.

To delve into the relationship between monetary transfers, public healthcare spending, and mortality, we begin by re-estimating Equation 3, also controlling for per capita regional healthcare expenditure. Since public spending is a crucial determinant of population health, especially in a country characterized by universal public coverage, we anticipate the coefficient of this variable to be negative and statistically significant. Moreover, this check allows us to compare the estimated impact of cash and in-kind transfers, a pertinent and widely discussed policy issue. Generally, in-kind transfers are seen as a redistribution mechanism designed to ensure equitable access to healthcare. However, some literature emphasizes how forms of cash transfers may be more effective, as they allow individuals to use the transfer to meet specific individual needs (Currie and Gahvari, 2008; Cunha, 2014; Liscow and Pershing, 2022).

The estimated equation is as follows:

$$y_{it} = \beta_1 Bonus_{it} + \beta_2 RegionalExp_{rt} + \beta_3 x_{it} + \tau_t + \nu_i + \epsilon_{it} \tag{5}$$

Secondly, we control for the presence of potential mediating effects of public spending on the effectiveness of the cash transfer program. The rationale behind this additional control is that, if the bonus affects mortality, this effect is likely to be more pronounced in areas with better healthcare facilities and services. The estimated equation is as follows:

$$y_{it} = \beta_1 Bonus_{it} + \beta_3 RegionalExp_{rt} + \beta_3 [Bonus_{it} * RegionalExp_{rt}] + \beta_4 x_{it} + \tau_t + \nu_i + \epsilon_{it} \tag{6}$$

The results of the estimates for Equations 5 and 6 are presented in Table 3. What emerges from our analysis is that an additional euro spent on cash transfers appears to be more productive, in terms of health gain, than the same euro spent on in-kind transfers (Column 1). Therefore, our data seem to support cash transfers over in-kind transfers in order to improve health outcomes. This finding can be explained by the combination of factors that lead to better health outcomes, which, instead, would be restricted under in-kind transfers. Specifically, positive health indicators are not only driven by healthy eating, physical exercise, or access to care, but by a mixture of them. Therefore, while in-kind transfers would allow to address only one of these aspects at once, cash transfers allow the recipients to independently decide how to use these resources. As a result, individuals can decide to spend the amount received for different purposes such as combining a balanced diet with physical activity and undergoing specialist visits which together contribute to better health outcomes.

However, when examining the results in Column 2, the interaction term between public healthcare spending and private transfers shows a negative and significant effect. This result suggests that public healthcare spending has a significant mediating role in the effectiveness of individual transfers. For ease of interpretation, we plot the estimated marginal effect of the bonus on mortality for different levels of per capita expenditure. As shown in Figure 5, the absolute marginal effect increases in magnitude as the level of per capita regional expenditure increases.

A tentative explanation for this result is that public and private expenditures work in synergy to improve healthcare outcomes. In other words, while private transfers may enhance individuals' ability to pay for medical care and essential healthcare services, higher levels of public healthcare spending can amplify the positive effects of monetary transfers on healthcare reduction, improving access conditions, service quality, and healthcare infrastructures.

To further explore this issue, we leverage the adoption of specific austerity policies implemented in Italy since 2007 (the so-called Recovery Plans, hereafter RPs). These plans targeted reductions in healthcare spending in Italian regions facing high financial deficits for the provision of healthcare services. This set of policies resulted in reduced healthcare spending, increased co-payments, and raised regional taxation, leading to higher mortality rates (Depalo, 2019), primarily due to avoidable deaths (Arcà et al., 2020), and premature deaths (Cirulli and Marini, 2023). We re-estimate Equations 5 and 6 in two separate subsamples, composed of regions that were subjected to such austerity policies (a total of 7 regions, considering the time frame of our analysis)[14] and those that did not undergo austerity policies. The results for these two different subsamples are presented in Table 4 and Figure 6. Consistent with the estimates seen in Table 3, it seems that the per capita bonus is associated with reduced mortality only in regions that were not subjected to austerity policies and cuts in healthcare spending during the considered time frame. In contrast, the bonus does not seem to have had any impact on the mortality of municipalities subjected to cuts in healthcare spending. This result suggests that the reduction in mortality due to the bonus appears to be somehow contingent on public spending in the healthcare sector, and that monetary transfers alone may not be sufficient during periods of reduced public spending.

5.4 Mortality by cause

In this section, we shift our empirical analysis to the provincial level, where more detailed data on health outcomes, including specific information on causes of mortality, are accessible.

Data at the provincial level are sourced from the Italian *Health for All* database. We collect information for 32 major causes of death and calculate cause-specific mortality rates at the provincial level, expressed per thousand inhabitants. As mentioned above, Table A.2, Appendix A, reports the descriptive statistics of our sample of observations at the provincial level.

We regress each cause-specific mortality rate against our two treatment variables — namely, per capita bonus and the proportion of recipients (this time relative to the province's population). The full set of controls, provincial fixed effects, and time-fixed effects are consistently included in the estimations. Standard errors are clustered at the provincial level.

Figures 7 and 8 depict the estimated coefficients for the variables $bonus1$ and $bonus2$, respectively, for each of the 32 causes of death considered. Results suggest that the effect

[14] The subsample of RPs regions includes Abruzzo, Calabria, Campania, Lazio, Molise, Puglia, and Sicilia.

on overall mortality is primarily driven by a reduction in mortality related to cancer, circulatory system diseases, and ischemic heart diseases. These findings provide a suggestion of the underlying mechanism behind the observed mortality reduction. Indeed, cash transfers have been shown as an effective tool to incentivize the uptake of preventive services (Lagarde et al., 1996; Ranganathan and Lagarde, 2012), and it is undisputed that participation in screening programs together with clinical preventive interventions can reduce avoidable mortality (Greer et al., 2016; Van den Heuvel et al., 2017). This would explain why cancers, circulatory system diseases, and ischemic heart diseases, which all fall within preventable death conditions, significantly respond to the Renzi tax credit, differently from other conditions which cannot be generally prevented through access to medical check-ups.

6 Concluding remarks

A large part of the empirical literature previously reviewed finds a positive association between cash transfers and the health outcomes of the population. Although it has to be emphasized that, in our opinion, the fundamentals of health policy are clearly linked to public health and public health care, this literature highlights that the importance of large-scale cash transfers cannot be ignored. Indeed, the broad scope of cash transfer policies and programs, together with the substantial resources mobilized and the documented positive health impacts, invite the consideration of cash transfers in the evaluation of public policies and their effects on health outcomes, recognizing the substantial role that cash transfers can play as an auxiliary tool within the broader set of public health initiatives.

In this paper, we attempt to contribute to the above-mentioned literature by testing the effects of a large program of cash transfers to employees with middle-low incomes in Italy. The program structurally entered into force in 2015 and affected a target group of about 11 million individuals who raised their disposable income permanently by about one thousand euros per year. To assess the impact of the cash transfer program on health outcomes we exploited the large spatial heterogeneity of beneficiaries within the country. Indeed, since the beneficiaries were only employees with middle-low incomes, their distribution across Italy is extremely heterogeneous.

As a health outcome, we employed municipality-level mortality data which, to the best of our knowledge, are the only available outcome at this level of granularity in Italy. Although mortality rates measure a limited portion of a population's health outcomes, they represent an outcome widely used in the literature and have also been shown to be particularly responsive to business cycles and changes in income (e.g. Ruhm, 2000, 2015; Finkelstein et al., 2024).

Our empirical findings have shown a robust and significant association between the level of concentration of the population receiving cash transfers and mortality rates at the municipality level. In particular, in municipal areas with a higher concentration in the population of recipients of cash transfers, there was a significant reduction in overall mortality rates at the municipality level. This result remained robust to various empirical strategies and specifications.

However, to further assess the robustness of our findings we repeated the empirical analysis at the provincial level where more detailed data on health outcomes and, in particular, data on causes of mortality are available. Again, we found that a higher concentration in the population of beneficiaries of cash transfers corresponded to a significant reduction in mortality rates in particular for cancer and cardiovascular diseases at the provincial level.

Summing up, the results of our study, although preliminary, seem to offer support to the previous literature that finds a positive relationship between monetary transfers and population health. Although our empirical findings are robust to several checks, the conclusions made in this study are still tentative, and several issues remain open to scrutiny. Above all, we remark that our study evaluates health outcomes by using imperfect proxies like mortality rate at the municipality and the provincial level. Indeed, a more appropriate evaluation of the impact of the cash transfer program on population health would involve a more comprehensive measure of health outcomes, which, however, to the best of our knowledge, are not currently available at the municipal level.

References

Andini, M., Ciani, E., de Blasio, G., D'Ignazio, A., and Salvestrini, V. (2018). Targeting with machine learning: An application to a tax rebate program in italy. *Journal of Economic Behavior & Organization*, 156:86–102.

Arcà, E., Principe, F., and Van Doorslaer, E. (2020). Death by austerity? the impact of cost containment on avoidable mortality in italy. *Health economics*, 29(12):1500–1516.

Baldini, M., Giarda, E., Olivieri, A., Pellegrino, S., Zanardi, A., et al. (2015). Il" bonus" degli 80 euro: caratteristiche ed effetti redistributivi. *Rivista di diritto finanziario e scienza delle finanze*, 74(I):3–22.

Barham, T. (2011). A healthier start: the effect of conditional cash transfers on neonatal and infant mortality in rural mexico. *Journal of Development Economics*, 94(1):74–85.

Bazzoli, M., De Poli, S., and Fiorio, C. V. (2017). The impacts of the renzi government's economic policies on income distribution. *Italian Fiscal Policy Review. 2015.*

Cervini-Plá, M. and Vall-Castelló, J. (2021). Business cycle and mortality in spain. *The European Journal of Health Economics*, 22(8):1289–1299.

Cirulli, V. and Marini, G. (2023). Are austerity measures really distressing? evidence from italy. *Economics & Human Biology*, 49:101217.

Cooper, J. E., Benmarhnia, T., Koski, A., and King, N. B. (2020). Cash transfer programs have differential effects on health: a review of the literature from low and middle-income countries. *Social science & medicine*, 247:112806.

Cunha, J. M. (2014). Testing paternalism: Cash versus in-kind transfers. *American Economic Journal: Applied Economics*, 6(2):195–230.

Currie, J. and Gahvari, F. (2008). Transfers in cash and in-kind: Theory meets the data. *Journal of economic literature*, 46(2):333–383.

Depalo, D. (2019). The side effects on health of a recovery plan in italy: A nonparametric bounding approach. *Regional Science and Urban Economics*, 78:103466.

Di Caro, P. (2018). Redistribution in real-world pit: Evidence from italian tax records. Technical report.

Edwards, R. (2008). Who is hurt by procyclical mortality? *Social science & medicine*, 67(12):2051–2058.

Finkelstein, A., Schilbach, M. J. N. F., and Zhang, J. (2024). Lives vs. livelihoods: The impact of the great recession on mortality and welfare. Technical report, National Bureau of Economic Research.

Gagliarducci, S. and Guiso, L. (2015). Gli 80 euro? spesi al supermercato. *Lavoce. info.*

Greer, S., Schieb, L. J., Ritchey, M., George, M., and Casper, M. (2016). County health factors associated with avoidable deaths from cardiovascular disease in the united states, 2006–2010. *Public Health Reports*, 131(3):438–448.

Haaland, V. F. and Telle, K. (2015). Pro-cyclical mortality across socioeconomic groups and health status. *Journal of health economics*, 39:248–258.

Heutel, G. and Ruhm, C. J. (2016). Air pollution and procyclical mortality. *Journal of the Association of Environmental and Resource Economists*, 3(3):667–706.

Ionides, E. L., Wang, Z., and Granados, J. A. T. (2013). Macroeconomic effects on mortality revealed by panel analysis with nonlinear trends. *The annals of applied statistics*, 7(3):1362.

Komro, K. A., Markowitz, S., Livingston, M. D., and Wagenaar, A. C. (2019). Effects of state-level earned income tax credit laws on birth outcomes by race and ethnicity. *Health equity*, 3(1):61–67.

Lagarde, M., Haines, A., Palmer, N., Practice, C. E., and of Care Group, O. (1996). The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. *Cochrane database of systematic reviews*, 2010(1).

Lenhart, O. (2019). The effects of income on health: new evidence from the earned income tax credit. *Review of Economics of the Household*, 17(2):377–410.

Link, B. G. and Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of health and social behavior*, pages 80–94.

Liscow, Z. and Pershing, A. (2022). Why is so much redistribution in-kind and not in cash? evidence from a survey experiment. *National Tax Journal*, 75(2):313–354.

Lucchetti, R., Pedini, L., and Pigini, C. (2021). Bayesian model averaging for propensity score matching in tax rebate. Technical report.

Lundberg, O., Fritzell, J., Åberg Yngwe, M., and Kölegård, M. L. (2010). The potential power of social policy programmes: income redistribution, economic resources and health. *International Journal of Social Welfare*, 19:S2–S13.

Lundberg, O., Yngwe, M. Å., Stjärne, M. K., Elstad, J. I., Ferrarini, T., Kangas, O., Norström, T., Palme, J., and Fritzell, J. (2008). The role of welfare state principles and generosity in social policy programmes for public health: an international comparative study. *The Lancet*, 372(9650):1633–1640.

Ministry of Economics and Finance (2015). Statistiche sulle dichiarazioni fiscali. Analisi dei dati Irpef - Anno d'imposta 2014. Available at: https://www1.finanze.gov.it/finanze/analisi_stat/public/v_4_0_0/contenuti/analisi_dati_2014_irpef.pdf?d.

Ministry of Economics and Finance (2017). Dichiarazione dei redditi persone fisiche (Irpef) per l'anno d'imposta 2015. Available at: https://www1.finanze.gov.it/finanze/analisi_stat/public/v_4_0_0/contenuti/Comunicato_stampa28feb2017.pdf.

Neri, A., Rondinelli, C., and Scoccianti, F. (2017). Household spending out of a tax rebate: Italian'€ 80 tax bonus'. *Bank of Italy Occasional Paper*, (379).

Pega, F., Carter, K., Blakely, T., and Lucas, P. J. (2013). In-work tax credits for families and their impact on health status in adults. *Cochrane Database of Systematic Reviews*, (8).

Pega, F., Pabayo, R., Benny, C., Lee, E.-Y., Lhachimi, S. K., and Liu, S. Y. (2022). Unconditional cash transfers for reducing poverty and vulnerabilities: effect on use of health services and health outcomes in low-and middle-income countries. *Cochrane Database of Systematic Reviews*, (3).

Ranganathan, M. and Lagarde, M. (2012). Promoting healthy behaviours and improving health outcomes in low and middle income countries: a review of the impact of conditional cash transfer programmes. *Preventive medicine*, 55:S95–S105.

Ruhm, C. J. (2000). Are recessions good for your health? *The Quarterly journal of economics*, 115(2):617–650.

Ruhm, C. J. (2005a). Commentary: mortality increases during economic upturns. *International journal of epidemiology*, 34(6):1206–1211.

Ruhm, C. J. (2005b). Healthy living in hard times. *Journal of health economics*, 24(2):341–363.

Ruhm, C. J. (2015). Recessions, healthy no more? *Journal of health economics*, 42:17–28.

Ruhm, C. J. and Black, W. E. (2002). Does drinking really decrease in bad times? *Journal of health economics*, 21(4):659–678.

Salinari, G., Benassi, F., and Carboni, G. (2023). The effect of the great recession on italian life expectancy. *Population Research and Policy Review*, 42(1):3.

Shahidi, F. V., Ramraj, C., Sod-Erdene, O., Hildebrand, V., and Siddiqi, A. (2019). The impact of social assistance programs on population health: a systematic review of research in high-income countries. *BMC Public Health*, 19:1–11.

Sun, S., Huang, J., Hudson, D. L., and Sherraden, M. (2021). Cash transfers and health. *Annual Review of Public Health*, 42:363–380.

Van den Berg, G. J., Gerdtham, U.-G., von Hinke, S., Lindeboom, M., Lissdaniels, J., Sundquist, J., and Sundquist, K. (2017). Mortality and the business cycle: Evidence from individual and aggregated data. *Journal of health economics*, 56:61–70.

Van den Heuvel, W., Ghinescu, M., and Olaroiu, M. (2017). How to prevent preventable death. *SM Prev Med Public Health*, 1(1):1004.

Vannutelli, S. (2023). The political economy of stimulus transfers. *Mimeo*, Available at: https://www.dropbox.com/scl/fi/qcngb69enlyc45y4fsotp/Vannutelli_80euro_20231115.pdf?rlkey=f5xboias4c8mmijbcpqt7sraz&dl=0.

Villamaina, L. and Acciari, P. (2023). Taxation and labour supply decisions: an evaluation of the earned income tax credit in italy. Technical report.

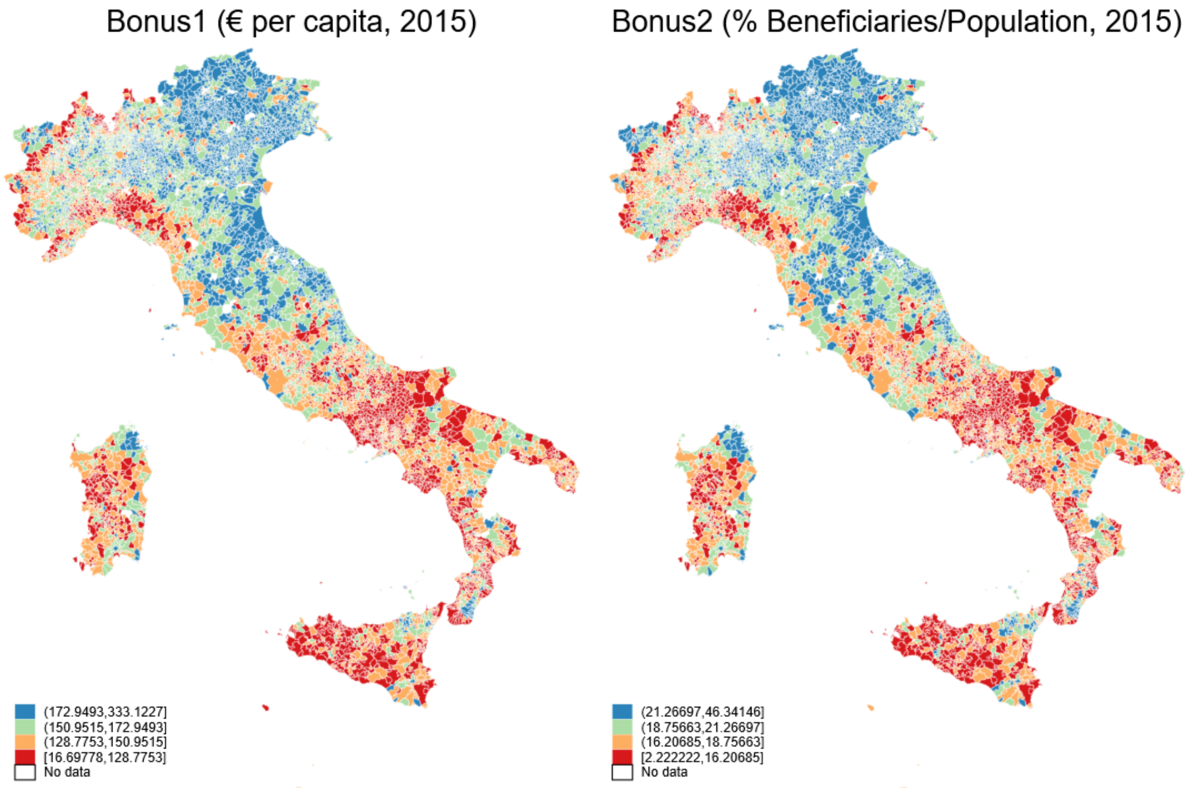
Wagenaar, A. C., Livingston, M. D., Markowitz, S., and Komro, K. A. (2019). Effects of changes in earned income tax credit: Time-series analyses of washington dc. *SSM-population health*, 7:100356.

WHO (2008). *Closing the gap in a generation: health equity through action on the social determinants of health: Commission on Social Determinants of Health final report*. World Health Organization.

WHO (2011). *Closing the gap: policy into practice on social determinants of health*. World Health Organization.

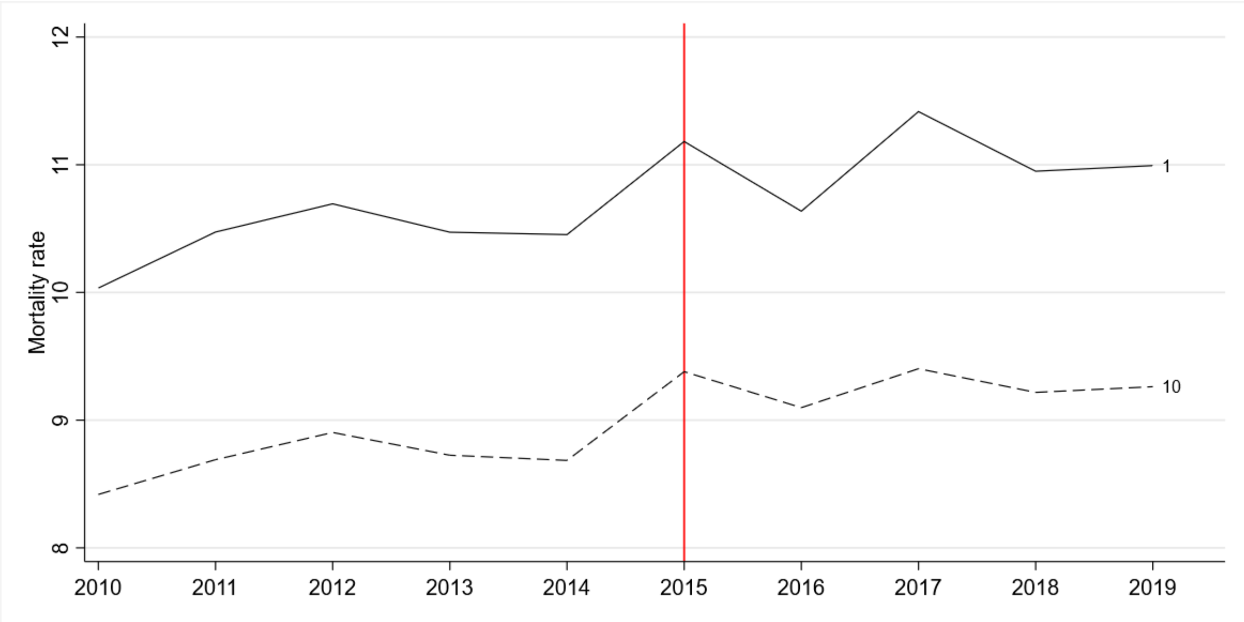
Figures and Tables

Figure 1: Treatment Distribution Across Municipalities



Notes: The two maps illustrate the geographical distribution of treatment across Italian municipalities in 2015. The left panel displays the per capita amount in euros of the total bonus allocated to each municipality, whereas the right panel displays the proportion of individuals who received the bonus out of the total municipal population.

Figure 2: Trends in Mortality Rates Before and After Intervention



Notes: The figure plots the trend in average mortality rates in municipalities grouped by treatment intensity, before and after the introduction of the 80-euro bonus. The two lines in the figure represent the first and the tenth decile respectively of the cumulative per capita bonus distribution in 2019, with 1 being the least treated (first decile) and 10 being the most treated (tenth decile).

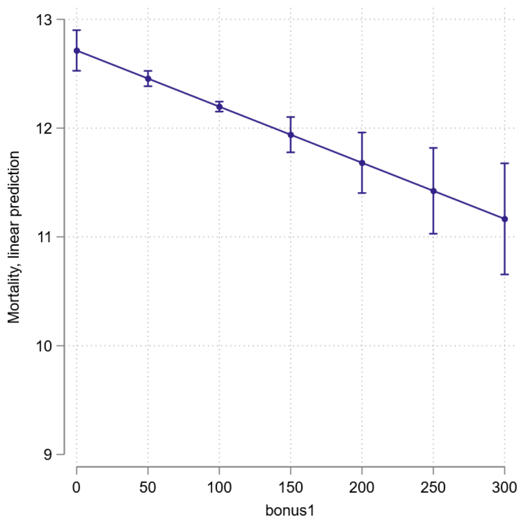
Table 1: Main Results

	(1)	(2)	(3)	(4)
bonus1	-0.005***		-0.004***	
	(0.001)		(0.001)	
bonus2		-0.049***		-0.033***
		(0.010)		(0.012)
Observations	78,675	78,675	78,253	78,253
R-squared	0.018	0.018	0.050	0.050
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	-	-	Yes	Yes

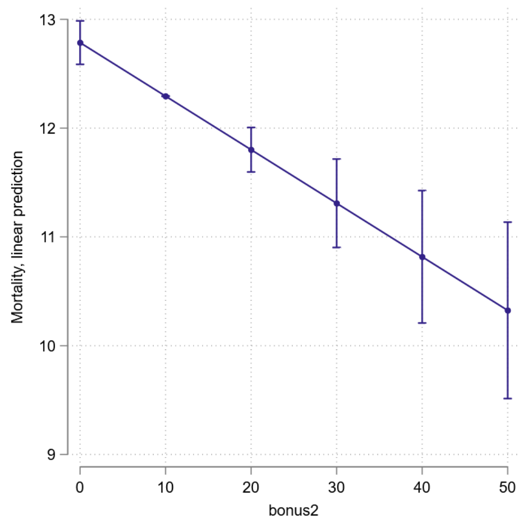
Notes: The table reports the estimated β coefficients in Equation 3. The variable *bonus1* represents the per capita bonus disbursed in each municipality, while the variable *bonus2* represents the share of the beneficiary population over the total. In all columns, the dependent variable is the mortality per thousand inhabitants. Standard errors in parentheses are clustered at the municipal level.

Figure 3: Linear Prediction of Mortality Rates

(a) Predictive margins of mortality rates for different levels of per capita bonus (€)



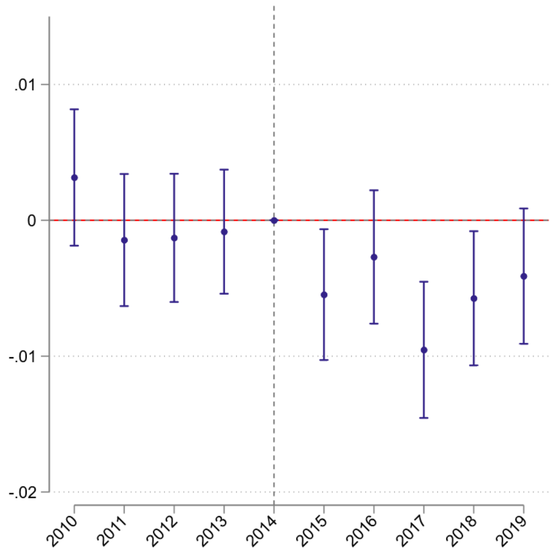
(b) Predictive margins of mortality rates for different shares of beneficiaries (%)



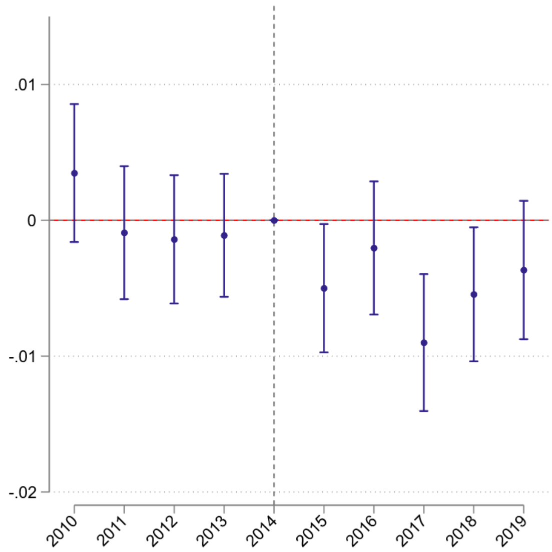
Notes: The figures illustrate the linear prediction of mortality values at various bonus levels, corresponding to regressions in columns (1) and (2) of Table 1. Figures in panels (a) and (b) show predicted mortality values for different levels of the per capita bonus (variable *bonus*1) and different shares of beneficiaries over municipal population (variable *bonus*2), respectively. Vertical lines indicate 95% confidence intervals.

Figure 4: Event Study

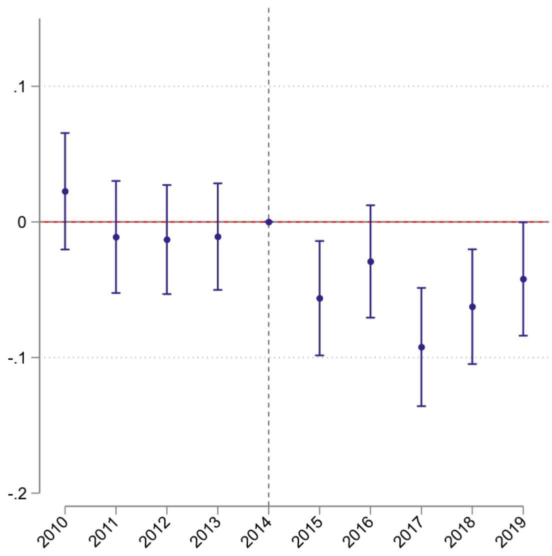
(a) Bonus per capita and mortality, regression without controls



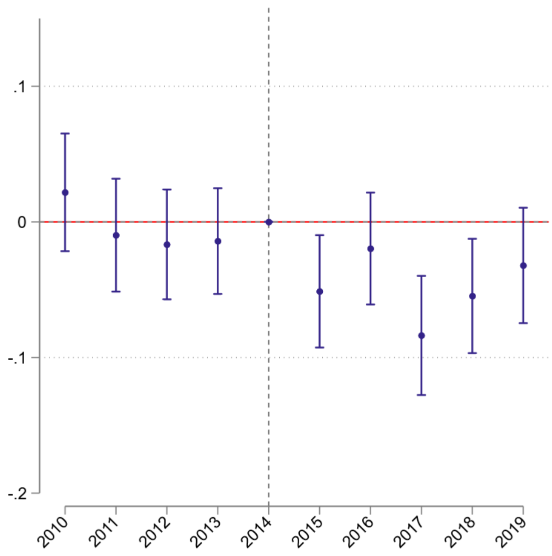
(b) Bonus per capita and mortality, regression with controls



(c) Share of beneficiaries in the municipality and mortality, regression without controls



(d) Share of beneficiaries in the municipality and mortality, regression with controls



Notes: The figures display the yearly coefficients of treatment in Equation 4, with 95% confidence intervals. Figures in panels (a) and (b) display the estimates for the treatment calculated as the per capita amount disbursed in each municipality in 2015 (variable *bonus*1). Figures in panels (c) and (d) display the estimates for the treatment calculated as the share of beneficiaries over the total municipal population in 2015 (variable *bonus*2). Regressions in panels (b) and (d) account for the full set of control variables. All regressions include municipality-fixed effects. Standard errors are clustered at the municipal level.

Table 2: Robusness Check Using Regional Time Trends

	(1)	(2)	(3)	(4)
bonus1	-0.005***		-0.003*	
	(0.002)		(0.002)	
bonus2		-0.049***		-0.028*
		(0.014)		(0.015)
Observations	78,675	78,675	78,253	78,253
R-squared	0.0022	0.022	0.055	0.055
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	-	-	Yes	Yes

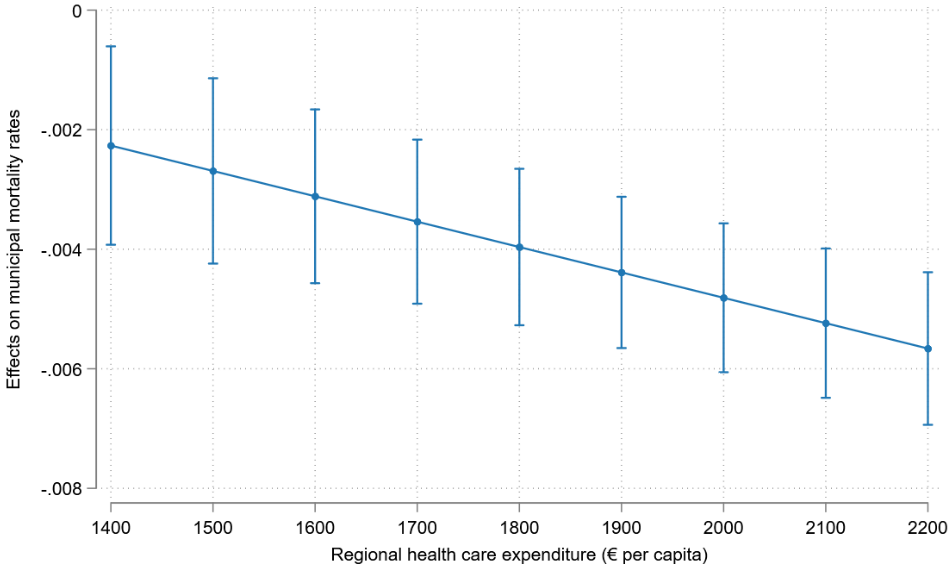
Notes: The table reports the estimated impact of the 80-euro bonus on mortality rates at the municipal level. The variable *bonus1* represents the per capita bonus disbursed in each municipality, while the variable *bonus2* represents the share of the beneficiary population over the total. In all columns, the dependent variable is the mortality per thousand inhabitants. In this model specification we account for region-year fixed effects. Standard errors in parentheses are clustered at the municipal level.

Table 3: The Role of Regional Healthcare Expenditure

	(1)	(2)
bonus1	-0.005***	
	(0.001)	
regionalexp	-0.001**	
	(0.000)	
bonus1#regionalexp		-0.001***
	(0.000)	
Observations	78,253	78,253
R-squared	0.049	0.050
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Controls	Yes	Yes

Notes: The table reports the estimated impact of the 80-euro bonus and regional per capita healthcare expenditure on mortality rates. The variable *bonus1* represents the per capita bonus disbursed in each municipality. In all columns, the dependent variable is the mortality per thousand inhabitants. Standard errors in parentheses are clustered at the municipal level.

Figure 5: Average Marginal Effect of the Bonus for Values of Regional Health Care Expenditure



Notes: The figure illustrates the average marginal effect of a unit increase in the variable *bonus*1 (per capita transfer) on municipal mortality rates for different values of regional healthcare spending. The corresponding estimates are presented in Table 3.

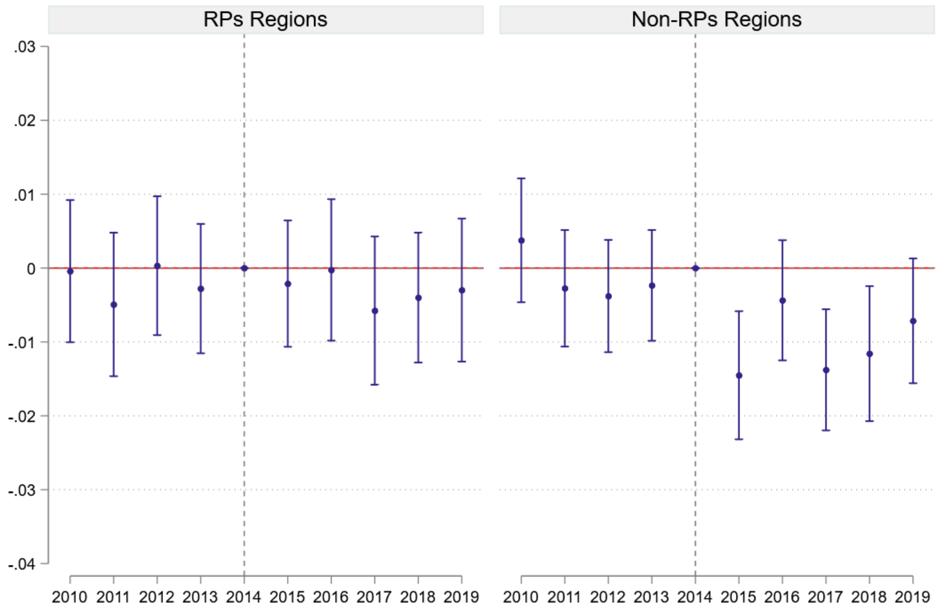
Table 4: Controlling for Recovery Plans (RP) Regions

	RPs regions		Non-RPs regions	
	(1)	(2)	(3)	(4)
bonus1	0.001		-0.006***	
	(0.003)		(0.002)	
bonus2		0.012		-0.057***
		(0.023)		(0.016)
Observations	32,791	32,791	45,462	45,462
R-squared	0.057	0.0057	0.046	0.046
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	-	-	Yes	Yes

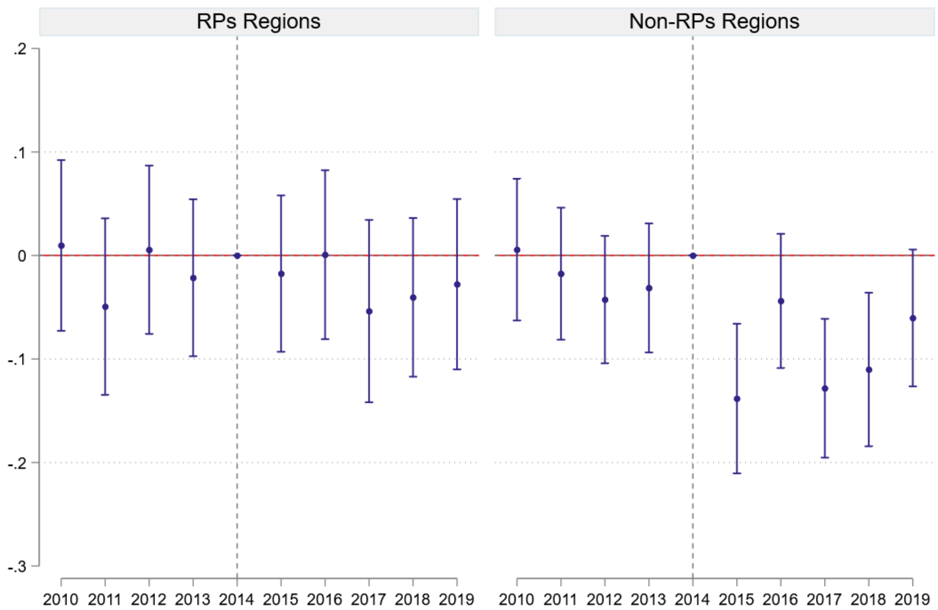
Notes: The table reports the estimated impact of the 80-euro bonus distinguishing between the sub-sample of municipalities belonging to Recovery Plans Regions (Columns 1 and 2) and the sub-sample of municipalities in regions not subjected to Recovery Plans (Columns 3 and 4). The variable *bonus1* represents the per capita bonus disbursed in each municipality, while the variable *bonus2* represents the share of beneficiary population over the total. In all columns, the dependent variable is the mortality per thousand inhabitants. Standard errors in parentheses are clustered at the municipal level.

Figure 6: Event Study in Recovery Plans (RP) and Non-RP Regions

(a) Treatment: bonus-per capita (€)

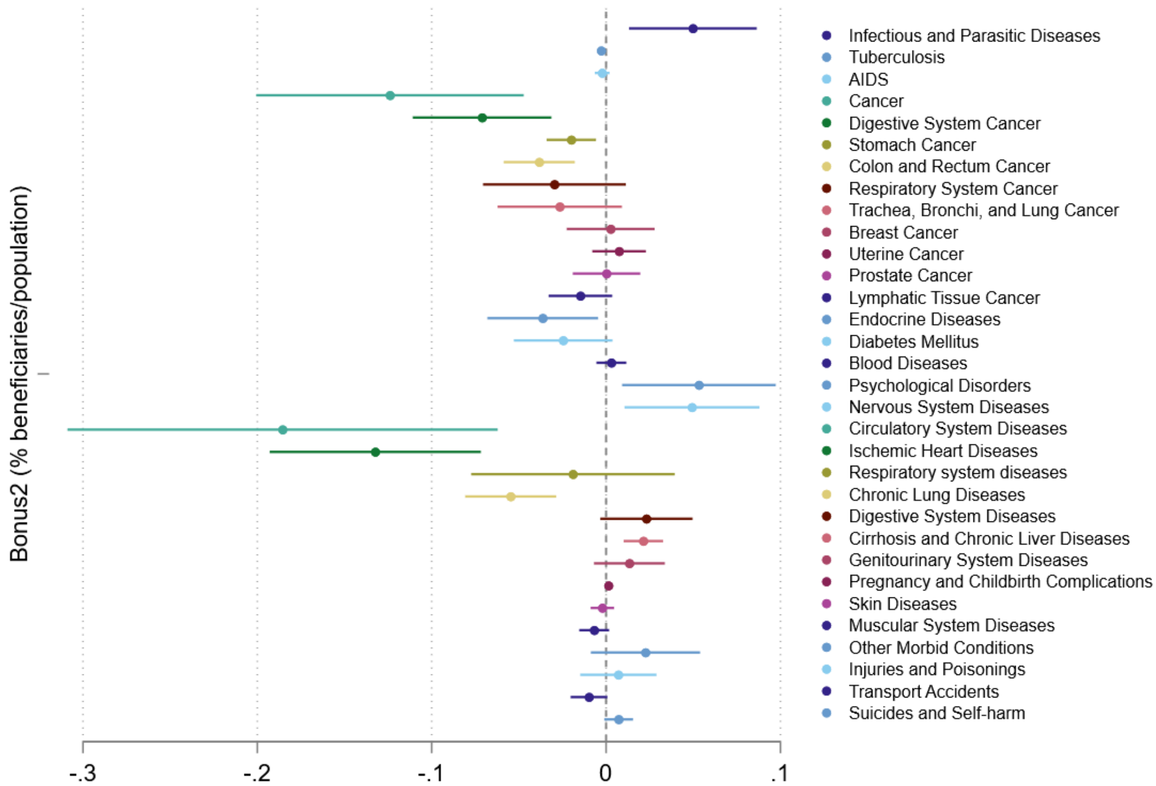


(b) Treatment: share of beneficiaries (%)



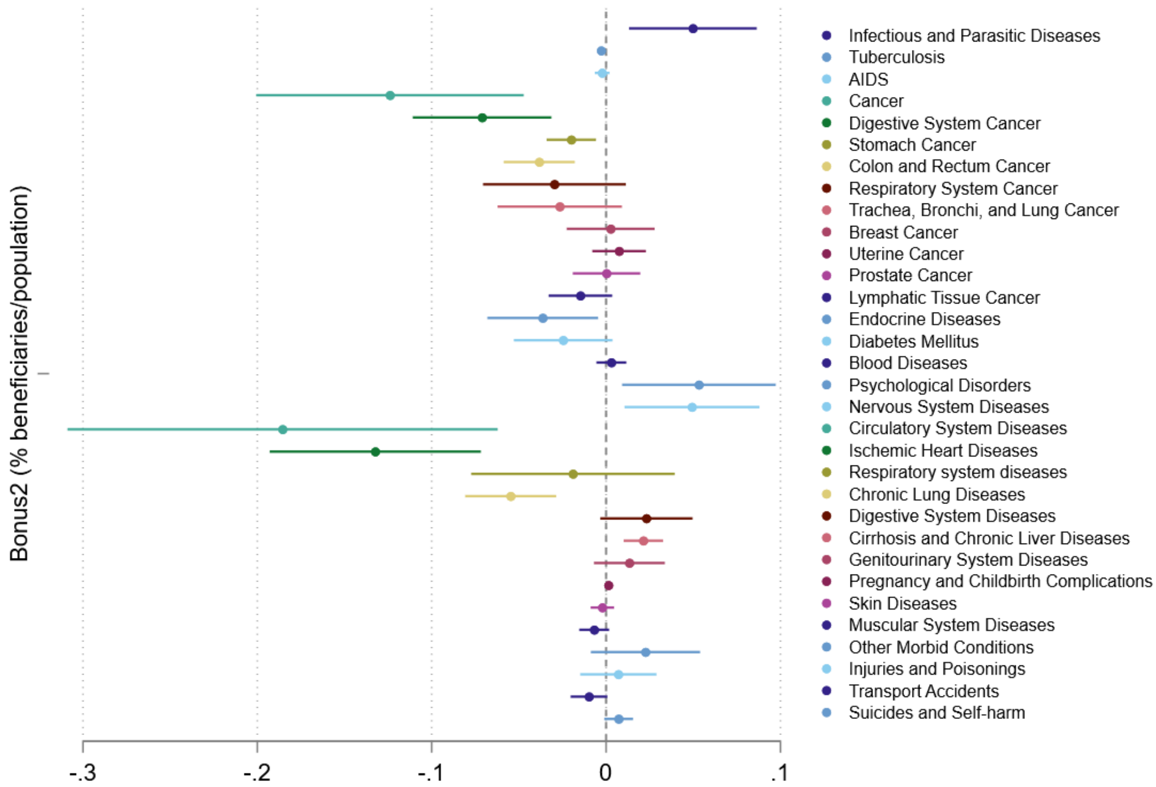
Notes: The figures display the yearly coefficients of treatment intensity, distinguishing between the sub-sample of municipalities belonging to Recovery Plans Regions and the sub-sample of municipalities in regions not subjected to Recovery Plans. Figures in Panel (a) display the estimates for the bonus variable calculated as the per capita amount disbursed in each municipality in 2015 (*bonus*1), whereas figures in Panel (b) considers the share of beneficiaries over total municipal population in 2015 (*bonus*2). All regressions include municipality-fixed effects and the full set of control variables. Standard errors are clustered at the municipal level. Vertical lines indicate 95% confidence intervals.

Figure 7: Bonus1 (€ per capita) and Mortality Rates by Cause
Estimates at the Provincial Level



Notes: The figure displays the estimated coefficients of the variable *bonus*1 (€ per capita) in regressions where the dependent variables are mortality rates by cause. The regressions include the full set of control variables, time-fixed effects, and provincial effects. Standard errors are clustered at the provincial level, and the horizontal lines represent 95% confidence intervals.

Figure 8: Bonus2 (% beneficiaries/population) and Mortality Rates by Cause
Estimates at the Provincial Level



Notes: The figure displays the estimated coefficients of the variable *bonus*2 (% beneficiaries/population) in regressions where the dependent variables are mortality rates by cause. The regressions include the full set of control variables, time-fixed effects, and provincial effects. Standard errors are clustered at the provincial level, and the horizontal lines represent 95% confidence intervals.

Appendix A: Additional Figures and Tables

Table A.1: Summary Statistics at the Municipality Level

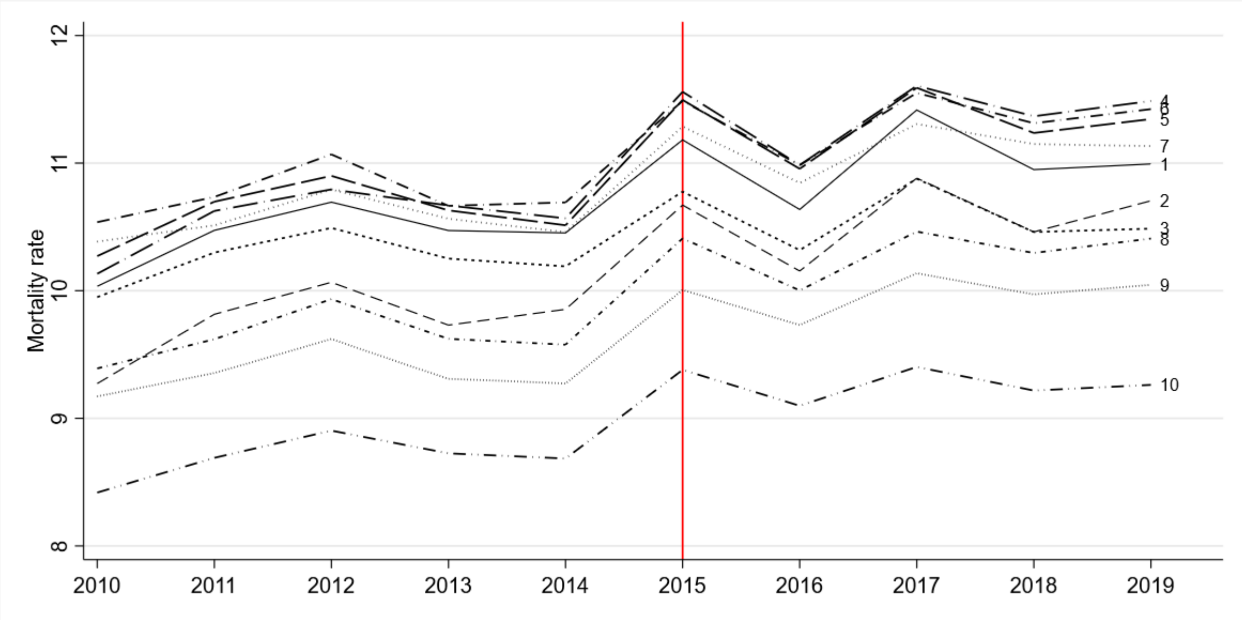
	Obs.	Mean	S.D.	p25	p50	p70
Mortality (per 1,000 inhabitants)	78,825	12.30	5.66	8.78	11.17	14.45
Bonus1 (€ per capita)	39,313	160.63	32.55	137.64	161.03	183.97
Bonus2 (% beneficiaries over population)	39,313	19.78	3.88	17.08	19.79	22.43
Population	78,831	7608.76	41795.52	1052.00	2517.00	6354.00
Income (per capita)	78,289	9844.37	2306.07	7859.32	10145.87	11554.92
% Population Over 65	78,825	0.24	0.06	0.20	0.23	0.27
% Female	78,825	0.51	0.02	0.50	0.51	0.52
% Payroll Employees	78,289	0.34	0.07	0.30	0.34	0.38
% Income 10-26K	78,262	0.33	0.06	0.28	0.34	0.37
Regional Expenditure (€ per capita)	79,203	1851.65	112.58	1774.00	1833.00	1925.00

Notes: the table presents descriptive statistics for the full sample of Italian municipalities during the period 2010-2019. *bonus1* and *bonus2* variables are summarized over years after 2015.

Figure A.1: Italian GDP trend (1996-2023)

Source: DIPE's elaboration on ISTAT data (DIPE: Department of Planning and Coordination of Economic Policies, ISTAT: Italian National Institute of Statistics).
Notes: Real GDP at constant prices (2005 prices) in millions of euros, seasonally and working-day adjusted data.

Figure A.2: Trends in Mortality Rates Before and After Intervention



Notes: The figure plots the trend in average mortality rates in municipalities grouped by treatment intensity, before and after the introduction of the 80-euro bonus. Each line in the figure represents a different decile of the cumulative per capita bonus distribution in 2019. The lines are labeled with numbers from 1 to 10, with 1 being the least treated (first decile) and 10 being the most treated (tenth decile).

Table A.2: Summary Statistics at the Provincial Level

	Obs.	Mean	S.D.	p25	p50	p75
Bonus1 (€ per capita)	533	161.86	22.88	143.74	162.87	179.78
Bonus2 (% beneficiaries over population)	533	19.89	2.67	17.70	19.97	21.99
Overall Mortality (per 1,000 inhabitants)	1,088	10.73	1.51	9.58	10.62	11.71
Mortality rates by cause						
Infectious and Parasitic Diseases	1,088	0.23	0.09	0.16	0.21	0.28
Tuberculosis	1,088	0.01	0.00	0.00	0.01	0.01
AIDS	1,088	0.01	0.01	0.00	0.01	0.01
Cancer	1,088	3.02	0.44	2.66	2.97	3.31
Digestive System Cancer	1,088	1.00	0.16	0.88	0.99	1.11
Stomach Cancer	1,088	0.17	0.05	0.13	0.16	0.20
Colon and Rectum Cancer	1,088	0.33	0.06	0.29	0.32	0.36
Respiratory System Cancer	1,088	0.61	0.13	0.52	0.60	0.70
Trachea, Bronchi, and Lung Cancer	1,088	0.55	0.11	0.47	0.55	0.63
Breast Cancer	1,088	0.40	0.09	0.34	0.39	0.46
Uterine Cancer	1,088	0.10	0.03	0.08	0.10	0.12
Prostate Cancer	1,088	0.26	0.06	0.23	0.26	0.30
Lymphatic Tissue Cancer	1,088	0.25	0.05	0.22	0.25	0.28
Endocrine Diseases	1,088	0.48	0.12	0.39	0.48	0.57
Diabetes Mellitus	1,088	0.37	0.11	0.28	0.35	0.45
Blood Diseases	1,088	0.05	0.02	0.04	0.05	0.07
Psychological Diseases	1,088	0.36	0.14	0.25	0.34	0.44
Nervous System Diseases	1,088	0.46	0.12	0.38	0.45	0.53
Circulatory System Diseases	1,088	3.97	0.69	3.42	4.00	4.46
Ischemic Heart Diseases	1,088	1.20	0.27	1.01	1.17	1.37
Circulatory Disorders of the Brain	1,088	0.79	0.18	0.65	0.77	0.91
Chronic Lung Diseases	1,088	0.39	0.09	0.32	0.38	0.45
Digestive System Diseases	1,088	0.40	0.08	0.34	0.39	0.45
Cirrhosis and Chronic Liver Diseases	1,088	0.10	0.03	0.08	0.10	0.12
Genitourinary System Diseases	1,088	0.20	0.05	0.17	0.20	0.23
Pregnancy and Childbirth Complications	1,088	0.001	0.004	0.00	0.00	0.00
Skin Diseases	1,088	0.02	0.01	0.01	0.02	0.03
Muscular System Diseases	1,088	0.06	0.02	0.04	0.06	0.07
Other Morbid Conditions	1,088	0.22	0.11	0.14	0.20	0.29
Injuries and Poisonings	1,088	0.42	0.08	0.36	0.41	0.47
Transport Accidents	1,088	0.07	0.02	0.05	0.07	0.08
Suicides and Self-harm	1,088	0.07	0.03	0.06	0.07	0.09
Population (in thousands)	1,088	553.40	606.04	228.28	379.48	597.72
Income (per capita)	1,098	10315.58	2330.74	8220.66	10857.03	12110.77
% Population Over 65	1,098	0.22	0.03	0.21	0.22	0.24
% Female	1,088	0.51	0.00	0.51	0.51	0.52
% Payroll Employees	1,098	0.35	0.06	0.32	0.35	0.39
% Income 10-26K	1,098	0.31	0.06	0.27	0.33	0.36

Notes: The table presents descriptive statistics for the full sample of Italian Provinces during the period 2010-2019. *bonus*1 and *bonus*2 variables are summarized over years after 2015.