Cash Transfer Policies in Developing Countries: Universal or Targeted?

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Abstract

This paper employs a heterogeneous-agent life-cycle model with inter-generational linkages calibrated to Brazilian data to compare Universal Basic Income (UBI) and Conditional Cash Transfer (CCT) policies. Both reduce short-term poverty, but the CCT, which is means-tested and requires school attendance, fosters sustained growth through human capital accumulation, further reducing poverty and inequality for future generations. In contrast, the UBI leads to long-term declines in savings and education, reducing income and welfare while increasing poverty. Despite this, a UBI would be favored by the current generation under a democratic majority rule due to its more equitable short-term benefits.

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Universal Basic Income (UBI) programs are transfer schemes that provide a uniform cash payment to every individual in society, without any conditionality. They have attracted attention recently due to their inherent simplicity and the promise of a widespread social effect, such as reducing poverty and inequality. The simplicity arises from the universal design of the transfers, which removes the need for monitoring and eases implementation. In addition, while the transfer amount is uniform, a UBI achieves redistribution by having a larger proportional effect on the incomes of the poor than on those of the rich.

UBI programs, however, are not without their perils. For one, they can generate large distortions to economic activity, affecting labor supply, savings, and human capital investment decisions, potentially leading to output and welfare losses (Conesa et al., 2020; Daruich and Fernández, 2024). In addition, they can require a substantial increase in government spending. This, in turn, can pose significant challenges, particularly for developing countries, which stand to gain considerable benefits from poverty alleviation and redistribution but are often more likely to face fiscal constraints.

Conditional Cash Transfers (CCT) programs present an attractive alternative for these nations. Such programs have been widely adopted, with prominent examples including Mexico's *Oportunidades* and Brazil's *Bolsa Família*. CCT programs display two distinguishing features from a UBI: first, they come with conditionalities ("strings attached"), usually requiring that recipients' children attend school and/or conduct regular health checks.[1] Second, they are means-tested. The latter feature ensures good targeting and a smaller fiscal burden for a given transfer size. Furthermore, the conditionality could offset some of the negative incentives generated by the cash transfer, particularly if targeted households are those whose behavior is most likely to be distorted.

This paper examines the effects of distinct cash transfer program designs within a developing country context. Specifically, we focus on comparing a UBI with a means-tested CCT that includes a school enrollment requirement, analyzing their dynamic impacts on macroeconomic and social outcomes, including income, labor productivity, poverty, inequality, and overall welfare. To this end, we build an overlapping-generations model where altruistic households face uninsurable idiosyncratic risk and make optimal decisions regarding consumption, savings, human capital investments, and labor supply.

The model features explicit intergenerational linkages, with parents investing in their children's education by enrolling them in school. We calibrate the model to match key features of the Brazilian economy, including estimating the wage process using panel microdata. We then employ the model as a laboratory to analyze the general equilibrium dynamics following the introduction of two "fiscally equivalent" policies: a CCT and a UBI with identical total transfer amounts. Our analysis sheds light on the mechanisms driving the impact of each of these policies, evaluates the tradeoffs involved in implementing conditionalities, and identifies the key factors behind the

[1] Conditional cash transfers can also require the recipient to spend the proceeds in a pre-specified way. An example is the Food Stamps program (SNAP) in the United States.

success or failure of cash transfer programs.

Our paper makes several contributions to the existing literature. First, while the impacts of Universal Basic Income transfers have been widely studied using quantitative macro models (e.g. Conesa et al. (2020), Jaimovich et al. (2022), Rauh and Santos (2022), Guner et al. (2023), Luduvice (2024), Daruich and Fernández (2024)), we compare the effects of distinct cash transfer designs systematically. Moreover, we conduct this analysis in a developing country, where conditions can significantly differ from those in developed nations. These differences include but are not limited to, higher levels of inequality, lower educational attainment, limited access to financial markets, and distinct pre-existing redistributive policy frameworks. Such factors are critical determinants of the potential benefits of redistribution and the scope for further human capital investments. Finally, our paper provides novel insights into the politico-economic challenges governments may face and the inter-generational welfare trade-offs they must consider when designing cash transfer programs.

The model is calibrated using Brazilian data from 2000, before the introduction of the *Bolsa-Família* program, a large-scale conditional cash transfer (CCT) policy launched in 2003. It replicates untargeted features of the data such as the earnings distribution conditional on age and education and the magnitude of empirical labor supply responses to unearned income. Our simulated CCT, which we compare to a fiscally equivalent Universal Basic Income (UBI), is based on the *Bolsa-Família* program.[2] In the short run, both policies reduce poverty by over 10%, with the CCT being slightly more effective. While per capita output declines marginally under the UBI, the drop is more pronounced with the CCT due to the reallocation of resources from physical capital to investments in education, whose returns take time to materialize.

A few years after its implementation, however, the CCT economy begins to reap the benefits of enhanced human capital accumulation, experiencing sustained economic growth driven by a virtuous cycle of higher educational attainment and increased physical capital. In contrast, the UBI economy sees a gradual but persistent decline in income, labor productivity, physical capital, and educational attainment. Notably, the initial poverty reduction achieved by the UBI is entirely reversed over time, with the poverty rate eventually rising by nearly 9%. Meanwhile, in the CCT economy, the poverty rate falls by a fifth over the long run, largely due to the indirect effects of higher per capita income.[3]

The CCT and UBI policies both yield overall welfare gains for the current generation, primarily benefiting low-education and low-income groups. However, the CCT delivers significantly greater gains to the poorest individuals, while the UBI distributes benefits more equally. In addition, the CCT economy delivers substantial gains for future generations, while welfare in the UBI economy steadily declines, ultimately resulting in a long-run loss. Nevertheless, the UBI is preferred by most of the current generation of voters due to its uniform distribution of benefits. This preference highlights a conflict between short-term political incentives and the pursuit of

[2]It initially covers approximately 30% of the population and represents 0.9% of GDP, with individual transfers amounting to 14.2% of the average recipients' earnings.

[3]These qualitative patterns are robust to variations in transfer size.

long-term societal welfare.

What drives these results? First, if taxes were held constant, both programs would have led to substantially better macroeconomic outcomes. Notably, the long-term effect of the UBI on per capita income would shift from a 4.7% decline in equilibrium to a 3.4% *gain*, highlighting the adverse effects of taxation. Next, we show that, in both cases, fixing savings or labor supply decisions at their initial levels improves long-term outcomes, revealing the harmful incentives these policies create. Finally, we show that fixing human capital decisions would have led to an 11.2% *decline* in output under the CCT, as opposed to a 5.5% gain. Thus, the schooling incentives embedded in the CCT prevent a catastrophic long-term income decline, suggesting that its school conditionality is a key determinant of its superior outcomes.

We examine two variations of the CCT: one that includes only the school attendance requirement and another that retains only the means-testing condition. In line with the mechanisms discussed above, we find that the schooling conditionality is essential for the policy's long-term success, as removing it would cause a significant deterioration in long-term outcomes. Interestingly, however, the version with only the means-testing condition yields the highest welfare gains for the current population, albeit at the cost of massive welfare losses for future cohorts. These findings underscore the intergenerational trade-offs governments might encounter when designing cash transfer programs.

Literature. We relate to a large and diverse literature that studies the impacts of cash transfer policies. Hanna and Olken (2018) and Gentilini et al. (2020) provide an extensive review of studies on UBI programs. As for empirical studies that consider general equilibrium effects, Angelucci and De Giorgi (2009) reports beneficial indirect effects associated with the introduction of Mexican cash transfer program Progresa, while Egger et al. (2019) examines the consequences of a one-time cash transfer program in Kenya, which result in a large fiscal multiplier. These studies exploit within-country regional-level variation to identify the consequences of introducing a cash transfer program. Our work instead considers a nation as a whole and studies the introduction of permanent transfer policies.[4]

Our paper is most closely related to a literature that studies the impacts of cash transfer programs using quantitative, general equilibrium frameworks. Several studies (e.g. Conesa et al. (2020); Boar and Midrigan (2022); Jaimovich et al. (2022); Guimarães and Lourenço (2024); Luduvice (2024); Daruich and Fernández (2024)) focus on UBI or similar redistributive policies. Regarding the impacts of UBI, while there are mixed findings concerning the welfare impact for current recipients, the literature generally agrees that it leads to detrimental outcomes over the long run. Below, we discuss in greater detail the studies most closely related to ours and highlight how our research complements and advances the existing literature.

Our framework is similar to that of Daruich and Fernández (2024), who focus on the impact of UBI policies in the United States, without comparisons to CCT alternatives. However, our study

[4]Recent empirical works consider the partial-equilibrium effect of cash transfers. Using a randomized controlled trial, Vivalt et al. (2024) finds that cash transfers reduce earnings and labor supply. In the context of Brazil, using propensity score matching, Balakrishnan et al. (2024) also finds a reduction in recipients' earnings due to the transfer.

introduces several distinctions, particularly in calibration, given its focus on a developing country context. In addition, a key difference lies in our treatment of human capital investments, as we use "schooling levels" (incomplete primary, middle and high school, and college) as our measures of human capital. We do so to ensure a clear connection between human capital investments and *school* conditionalities, a key object of our study. In terms of results, while we agree on the long-term predictions on UBI impacts, contrary to them we find that this policy delivers positive welfare gains for the current generation. We discuss possible reasons for this discrepancy in further detail in the welfare results section (Section 6).

Using a rich life cycle framework, Luduvice (2024) studies the implementation of different UBI schemes in the United States. A key difference between this study and ours is our inclusion of educational choices and inter-generational linkages, which are essential for analyzing the role of school conditionalities. This paper's headline finding is that a UBI funded by consumption taxes delivers positive welfare gains for current recipients and long-term declines in income. The same is true for a policy funded by earnings taxes, a finding we share. In a similar life cycle framework calibrated to the U.S. economy, featuring basic and non-basic consumption and without educational choices, Conesa et al. (2020) instead finds that a UBI policy generally leads to welfare losses for current recipients.

Other recent works analyze distributive policies from different perspectives. Lopez-Daneri (2016) studies a tax reform in the United States, considering rebates in the form of a lump-sum transfer, and finding positive welfare impacts from the introduction of a large UBI; in a model with infinitely-lived households, Pedroni and Dyrda (2020) study tax reforms in the U.S. taking into account the dynamic path of taxes, with the optimal scheme requiring a large increase in overall transfers; in a similar setting, Boar and Midrigan (2022) find that a single flat tax on capital and labor is nearly optimal; in a life cycle model with heterogeneity in household composition, Guner et al. (2023) find that a UBI does not improve the current transfer system in the U.S..

Using a search-and-matching framework, Rauh and Santos (2022) find small long-term welfare gains from the introduction of a UBI coupled with the removal of existing welfare programs in the U.S. This finding is mirrored by Jaimovich et al. (2022), who, in a similar framework, find that the tax distortions are the most important mechanism explaining changes in the economy following the implementation of a UBI. Guimarães and Lourenço (2024) considers implementation challenges such as incomplete take-up and administrative costs.

Finally, in an early work, Peruffo and Ferreira (2017) use a simpler two-period model to study the impact of the Bolsa Familia program in Brazil. We contribute to this paper by considering a much richer framework, including our estimation of earnings, comparing the predictions of the model concerning distinct cash transfer programs, and providing novel results regarding the potential intra-generational trade-off governments encounter when designing cash transfer programs.

The paper proceeds as follows: Section 1 presents our framework, Section 2 explains our calibration strategy, and Section 3 explains and contextualizes the policies we consider. Section

4 explores the long-run consequences of transfer policies, while Section 5 focuses on transitional dynamics. Section 6 discusses welfare implications, while Section 7 explores the mechanisms that explain our results. Section 8 concludes.

1 Model

Time is discrete and infinite; one model period corresponds to one calendar year.[5] There is no aggregate uncertainty. The economy is populated by a continuum of households whose age is indexed by g. The household is the relevant economic agent in this economy, and it can consist of one adult or one adult and f offspring individuals, where f is related to the fertility rate. Population grows at a constant rate n, and the law of motion for population is given by $N_{t+1} = (1+n)N_t$.

In the model, there are two mutually exclusive transfer policies. The first is Universal Basic Income, distributed equally to all individuals. The second is a Conditional Cash Transfer, which is given to individuals below a certain income threshold. These households must also meet certain conditions to receive the transfers, namely ensuring that the offspring attends school. We assume that, initially, no transfer policy is in place.

Demographics and Life Cycle. Figure 1 below summarizes individuals' life milestones. Newborns belong to an existing household previously consisting of one adult. They are idle and irrelevant to the model for their first ten years of life. From 10 to 17 years old, they can attend school. At the beginning of their eighteenth year, after receiving a bequest, they become independent and form a new household. Those who completed secondary school can choose to pursue a college education.

Work-life starts at 18; those who attend college can also work part-time, and retirement occurs at age 65. During this period, individuals give birth to a new offspring at age 30, and the household decides whether to work, how much to consume and save, and, whenever relevant, the offspring's school enrollment. The household breaks into two when the adult individual is aged 47, and its wealth is divided among the adult and the offspring, with proportions being determined endogenously.

At 48, the adult faces a probability Ψ_g of dying, where g indexes *household age* as we explain below.[6] Finally, individuals face certain death when they are about to become centenarians.

Technology. There is a representative firm that produces output Y_t according to:

$$Y_t = AK_{t-1}^{\alpha} N_t^{1-\alpha},$$

where A is the total factor productivity, K_{t-1} is the existing capital stock, and N_t consists of an aggregation of skilled and unskilled labor:

$$N_t = (N_t^s)^{\omega} (N_t^u)^{1-\omega}$$

[5] Online Appendix A provides a table with a full description of the notation we use in the model.

[6] To avoid taking a stand on which individuals would leave the model if an adult individual in a multi-individual household dies, we assume that death shocks only occur after the offspring has left.

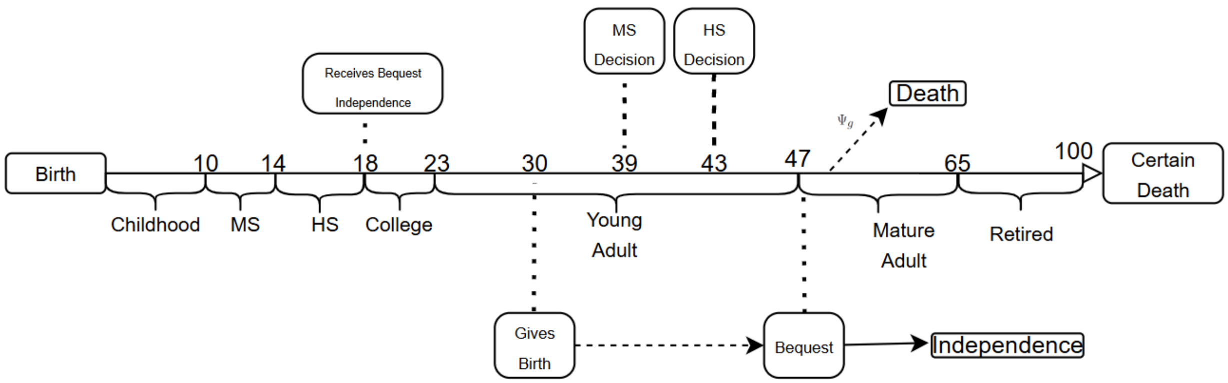

Figure 1: Life Cycle of an Individual

Notes: The figure illustrates the life cycle of an *individual*. MS and HS refer to middle school and high school, respectively. Ψ_g denotes the probability of a *household* exiting the model at age g.

Perfect competition implies that capital and each labor type are priced at their marginal products:

$$w_t^u = \frac{(1-\alpha)(1-\omega)}{1+\tau^w}\frac{Y_t}{N_t^u} \tag{1}$$

$$w_t^s = \frac{(1-\alpha)\omega}{1+\tau^w}\frac{Y_t}{N_t^s} \tag{2}$$

$$r_t + \delta = \alpha\frac{Y_t}{K_{t-1}}. \tag{3}$$

In the expressions above, r_t represents the rental rate of capital, w_t^s and w_t^u denote the wage rates for skilled and unskilled labor, and τ_w represents a payroll tax.

Human Capital. There are four levels of human capital, $h \in \{h_0, h_1, h_2, h_3\}$, which refer, respectively, to incomplete primary schooling, complete primary schooling ("middle school"), secondary schooling ("high school"), and college education. College-educated individuals supply skilled labor to the representative firm, while the non-college-educated supply unskilled labor. Each level of human capital is associated with a distinct earnings process, as we explain later in the calibration section. Finally, attending school entails a private flow cost in terms of units of goods, given by κ_h. These costs capture expenses such as transportation, school materials, and opportunity costs like employment.[7]

Labor Productivity and Earnings. Labor productivity depends on age, human capital, and a stochastic component, denoted by $z_g(h)$. Additionally, to account for on-the-job learning, we assume that household labor supply decisions influence the evolution of labor productivity. In particular, all else being equal, individuals who participate in the labor force will, on average, experience greater productivity gains than those who do not.

Adults' total endowment of hours is normalized to $l = 1$, but individuals who attend college can only work for up to $l = 1 - \bar{l}$ hours, with the remaining being devoted to their studies. For

[7] In Brazil, most students in primary and secondary education attend tuition-free public schools. In contrast, in tertiary education, only 24% of students attended public, tuition-free college in 2000 (the base year of our analysis).

individuals who participate in the labor force, pre-tax earnings are given by:

$$y = w(h)z_g(h)l,$$

where $w(h) = w^u$ if $h \in \{h_0, h_1, h_2\}$ and $w(h) = h^s$ if $h = h_3$[8].

Preferences. Households display preferences for consumption, leisure, and college education. The flow utility of consumption is of the CRRA form:

$$u(c) = \frac{c^{1-\sigma} - 1}{1 - \sigma}$$

At the beginning of each period, households receive a stochastic taste shock for leisure, given by ε^w. They then decide whether to participate in the labor force.The decision takes a simple discrete form given by:

$$V_g^\ell(x) = \max_{\ell \in \{0,1\}} \ell(V_g(x; \ell = 1) - \varepsilon^w) + (1 - \ell)V_g(x; \ell = 0), \tag{4}$$

where x represents the household individual variable, which depends on g as we soon elaborate. We assume that ε^w follows an *iid* logistic distribution with location parameter μ_w and dispersion parameter σ_w. These assumptions imply that the probability $P_g^w(x)$ that a working-age household whose state variable is x participates in the labor force is given by:

$$P_g^w(x) = \left(1 + e^{\frac{-(V_g(x;\ell=1) - V_g(x;\ell=0) - \mu_w)}{\sigma^w}}\right)^{-1}$$

1.1 Household Decisions

The household's decision-making problem formulation varies depending on their age, as we now explain in detail.

Newly Formed Households ($g = 1$) - College Decision. Households are born with $g = 1$, consisting of one individual whose biological age is 18, recently separated from their parent household. If they have completed high school education (i.e., $h = h_2$), they must decide whether or not to go to college. This decision happens at the beginning of the period, immediately after a college taste shock ε^c and labor productivity z are observed, but before the work-taste shock is observed. Thus, the maximization problem takes the form of the following discrete choice:

$$V_1^c(z, h_2, a, \varepsilon^c) = \max_{\mathbb{I}^c \in \{0,1\}} \mathbb{E}\left[\mathbb{I}^c(V_g^\ell(z, h_3, a, \varepsilon^w) - \varepsilon^c) + (1 - \mathbb{I}^c)V_g^\ell(z, h_2, a, \varepsilon^w))\right]$$

In the expression above, a denotes the household beginning-of-period wealth. Note that if $\mathbb{I}^c = 1$, i.e. the individual decides to pursue college, their human capital changes to $h = h_3$. We assume that ε^c follows an *iid* logistic distribution with zero average and dispersion parameter given by σ^c.

[8]With one exception: we assume that individuals enrolled in college supply unskilled labor. This is reflected in the aggregation condition given by expression 15

For a given individual state (z, h_2, a), the (ex-ante) probability of pursuing a college education is given by:

$$P^c(z, h_2, a) = \left(1 + e^{\frac{-(\mathbb{E}V_1^{\ell}(z,h_3,a) - \mathbb{E}V_1^{\ell}(z,h_2,a))}{\sigma^c}}\right)^{-1}$$

Young (College-Age) Individuals ($g \in \{1, 2, 3, 4, 5\}$). We assume that college education takes five years. After the labor supply decision is made (see equation (4)), the problem of college-aged individuals is given by:

$$V_g(z, h, a; \ell) = \max_{c,a'} u(c) + \beta \mathbb{E}^{\ell} V_{g+1}^{\ell'}(z', h, a') \tag{5}$$

subject to

$$\begin{aligned}
&c + a' + \kappa_3 \mathbb{I}(h = h_3) = (1 + (1 - \tau_a)r)a + (y - T(y)) + \mathbb{T}(z, h, a, \ell, g) + \eta(z)\ell \\
&y = (1 - \mathbb{I}(h = h_3)\bar{l})w^u z_g(h)\ell
\end{aligned}$$

In the expression above, $\mathbb{I}(\cdot)$ represents the indicator function, a' denotes savings, τ_a is a tax on capital returns, $T(y)$ is the total earnings tax, and $\mathbb{T}(z, h, a, \ell, g)$ represents a transfer, which could depend on households' states and choices, as we explain in Section 3. Note that, in the case of the UBI, $\mathbb{T}(z, h, a, \ell, g) = \overline{\mathbb{T}}$. In addition, the expectations term $\mathbb{E}^{\ell}$ is taken over the earnings risk component z' and the labor disutility shock $\varepsilon^{w'}$, the latter being implicit in the definition of $V^{\ell'}(\cdot)$ (expression (4)). It is indexed by ℓ to capture the dependence of future earnings on current labor force participation. Furthermore, since individuals at this stage have not completed college, they supply unskilled labor and are remunerated accordingly.

The term $\eta(z)$ represents home production, which we assume only occurs when hourly earnings are null, i.e., $z = 0$. We model this alternative to capture involuntary unemployment, an important component of individuals' earnings risk.[9] In Section 2, we explain how we incorporate an involuntary unemployment state in our estimation of workers' earnings. Finally, we assume that home production also incurs a labor disutility cost.

Young Adults ($g \in \{6, 7, ..., 20\}$). From $g = 6$ to $g = 11$ the household still consists of one adult, while at $g = 12$ it gives birth to offspring. Until the first school enrolment decision takes place, which happens at $g = 21$ (offspring aged 9), the household's problem remains similar to the one described for the young college-age individual. The difference is that individuals with a college education now supply skilled labor and do not incur a college fee or experience a reduction in their time endowment.[10]

Middle School Enrollment Decision ($g = 21$). When the offspring is 9, households decide whether to enroll them in middle school, which lasts four years.[11] In doing so, starting the following pe-

[9] According to the Institute for Applied Economic Research (IPEA), in 2001 the unemployment rate was 10%.
[10] Given the similarity we defer a detailed explanation of the young adult's problem to Online Appendix A.
[11] By default, we assume that all children complete all schooling stages before middle school.

riod, the household will incur a fee (κ_1), while offspring human capital becomes $h_o = h_1$. After the labor force participation decision, the household problem at $g = 21$ is given by:

$$V_{21}(z, h, a; \ell) = \max_{c, a', \mathbb{I}^{ms} \in \{0,1\}} u(c) + \beta \mathbb{E}^{\ell} \left[\mathbb{I}^{ms} V_{22}^{\ell'}(z', h, a', h_1) + (1 - \mathbb{I}^{ms}) V_{22}^{\ell'}(z', h, a', h_0) \right] \quad (6)$$

subject to

$$c + a' = (1 + (1 - \tau_a) r) a + (y - T(y)) + \mathbb{T}(z, h, a, \ell, g) + \eta(z)\ell$$
$$y = w(h) z_g(h) \ell$$

Note that the future household value, $V^{\ell'}(\cdot)$, also depends on the child's education level h_o.

Middle School Years ($g \in \{22, 23, 24\}$). During the first three years of middle school, no education decisions take place. While the first stage of the household problem is still given by (4), the second stage is given by:

$$V_g(z, h, a, h_o; \ell) = \max_{c, a'} u(c) + \beta \mathbb{E}^{\ell} \left[V_{g+1}^{\ell'}(z', h, a', h_o) \right] \quad (7)$$

subject to

$$c + a' + \kappa_1 \mathbb{I}(h_o = h_1) = (1 + (1 - \tau_a) r) a + (y - T(y)) + \mathbb{T}(z, h, a, h_o, \ell, g) + \eta(z)\ell$$
$$y = w(h) z_g(h) \ell$$
$$w(h) = w^u \text{ if } h \le h_2 \text{ and else } w(h) = w^s$$

Note that the conditional cash transfer may now depend on school enrollment.

High-School Enrollment and High-School Years ($g = \{25, 26, 27, 28, 29\}$). At $g = 25$) households whose children currently attend middle school must decide whether to enroll them in high school. By doing so, the children commit to attending high school for four years while the household pays the corresponding fee (κ_2). The problem that describes this decision is completely analogous to that of the middle school decision (see expression 6), and we relegate it to Online Appendix A. Similarly, the decision problem of households with offspring enrolled in high school resembles that of those with children enrolled in middle school, the only difference being the fee, and we also delegate it to Online Appendix A.

Households whose children did not attend middle school cannot enroll them in high school. In this case, their decision is described by the constrained maximization problem of the young adult (see Online Appendix A).

Household Split and Bequest Decision. Between $g = 29$ and $g = 30$, the household splits into two, one of which consists of the adult and the other of the offspring.[12] Accordingly, the household

[12]Technically, to ensure the match between the demographic of the model with that in the data, we assume that the household splits into "$1 + f$" households. The bequest is divided equally among the offspring.

divides its wealth among the two through the following maximization problem:

$$\tilde{V}(z,h,a,h_o) = \max_{0\leq \tilde{a}\leq a} (\mathbb{E}^{\ell} V_{30}^{\ell}(z,h,a-\tilde{a}) + \beta^B \mathbb{E} V_1^c(z_o,h_o,(1-\tau^{beq})\tilde{a})), \tag{8}$$

In the expression above, β^B denotes the relative altruism intensity, and τ^{beq} is a tax on bequests. Note that $V_1^c(z_o,h_o,(1-\tau^{beq})\tilde{a})$ represents the lifetime utility of a just-founded household, and the expectation is taken over earnings and the taste shocks of the offspring, unknown at the time of the separation. The realizations of earnings and the work-taste shock for the adult are also unobserved at this stage. As the evolution of earnings depends on the labor force participation decision at period 29, the expectation is indexed by (previous-period) ℓ.

Empty-Nesters ($g \in \{30, 31, ...47\}$). From the household split until retirement, households face the same decisions as the young adults: a labor force participation choice, followed by a consumption-savings problem. The only difference is that they now face an age-dependent probability of dying Ψ_g. Accordingly, their problem is analogous to that of the young adult (shown in Online Appendix A), with the objective function (12) now being given by:

$$V_g(z,h,a;\ell) = \max_{c,a'} u(c) + \beta(1-\Psi_g)\mathbb{E}^{\ell} V_{g+1}^{\ell'}(z',h,a') \tag{9}$$

Pensioners ($g \in \{49, ..., 99\}$). Retirees receive a fixed pension from the government and do not work. Since these individuals are not the focus of this paper, similarly to Daruich and Fernández (2024) and Luduvice (2024), we economize on the state space and employ a simplified pension rule that, while maintaining the floor, cap, and average replacement rate of the Brazilian system, assumes that the pension payout depends only on their last working period ($g = 48$) earnings. [13] We denote the pension size by $\xi \equiv \xi(z_g(h)) = \xi(z_{48}(h))$. The problem of the pensioner is then given by:

$$V_g(z,a,h) = \max_{c,a'} u(c) + \beta(1-\Psi_g)V'_{g+1}(z,a',h)$$

subject to

$$c + a' = (1 + (1-\tau_k)r)a + \xi(z,h) + \mathbb{T}(z,h,a)$$

We assume that accidental bequests are collected by the government.

1.2 Government

Taxes. There are four types of taxes in this economy: a proportional tax on capital returns τ_k, a proportional tax on bequests τ^{beq}, payroll taxes τ_w, and an earnings tax schedule, including contributions to social security.

Following the Brazilian legislation, the pension contribution is proportional to earnings up to

[13] In Brazil, pensions usually depend on average lifetime earnings. See Delalibera et al. (2023) for a detailed treatment of Brazilian retirement schemes.

a cap $\bar{y}^{pen}$, so that total pension tax for an individual with gross earnings y is given by $T_y^{pr}(y) = \tau_{pen}\min(y, \bar{y}^{pen})$, with y representing pre-tax earnings. The earnings tax schedule mimics the Brazilian system in 2000: it is progressive and features three brackets. Combining those two earnings taxes yields the following formula:

$$T(y) = \tau_{pen}\min\{y, \bar{y}^{pen}\} + \begin{cases} \lambda y, & \text{if } y \leq \bar{y}_0 \\ \lambda y + (y - \bar{y}_1)\tilde{\tau}_1, & \text{if } \bar{y} < y \leq \bar{y}_1 \\ \lambda y + (\bar{y}_1 - \bar{y}_0)\tilde{\tau}_1 + (y - \bar{y}_1)\tilde{\tau}_2, & \text{if } \bar{y}_1 < y \end{cases}$$

In the expression above, $\tilde{\tau}_i$ and $\bar{y}_i$, $i \in \{0, 1\}$, represent respectively the marginal tax rates and the bracket thresholds. In addition, λ is endogenously determined to satisfy the government budget constraint, as we explain soon.

Pensions. Pension payments are given by the function $\xi(z_{48}(h))$. We use a simplified version of the retirement by age modality from Delalibera et al. (2023), which consists of a pay-as-you-go system. Specifically, the pension formula is given by:

$$\xi(z_{48}(h)) = \max\{\min\{\nu y, y^{max}\} y^{min}\}, \tag{10}$$

where y^{min} and y^{max} represent respectively a floor and a cap on payments, ν is related to the generosity of the pension system, and $y = z_{48}(h)w(h)$ represents the pre-retirement (potential) earnings. Finally, following the Brazilian rules, we assume that pensions are not taxed in the benchmark economy.

Public Costs of Education. Since most students in Brazil are enrolled in public schools, we assume that the government incurs a per-student cost of education. Specifically, for each individual enrolled in middle school, high school, and college, the government bears respective costs of κ_1^g, κ_2^g, and κ_3^g.

Government Consumption. We assume that the government incurs a level of innocuous consumption given by G, assumed to grow at the same rate as the population throughout our counterfactual exercises.

Government Budget. The government runs a budget balance in every period. Expenses include public education, pensions, government consumption, and (eventual) transfers. Revenues consist of taxes on returns to savings, earnings taxes and pension contributions, accidental bequests, taxes on bequests, and payroll taxes. We formally define the government budget equation when detailing the equilibrium in the economy (see Online Appendix A).

Our benchmark calibration reflects the characteristics of the economy before the widespread implementation of *Bolsa Família*, the large-scale cash transfer program introduced in 2003. Consequently, the benchmark economy does not include transfer programs, thus $\lambda = 0$ in this case. The level of government consumption G is obtained as a residual in the government budget constraint (expression (17) in Online Appendix A). When conducting counterfactual exercises, we keep government consumption constant on a per-household basis and adjust λ to satisfy the government budget constraint. [14][15]

1.3 Aggregation and Equilibrium

Measure over States. We discretize possibilities for earnings ($z_g(h)$) and denote the measure of households over individual states as $\Lambda(x)$. The law of motion for this probability mass is given by several cases, depending on household age g. We relegate their full description to Online Appendix A.

Stationarity. Since population growth is different than zero, the stationary equilibrium (balanced growth path) features constant per household equilibrium variables $\hat{X}_t \equiv \frac{X_t}{1+n}$, with $X_t \in \{K_t, N_t^u, N_t^s, Y_t\}$ (among others). Thus, in the results sections, we always report changes in those variables on a per capita basis.

Equilibrium. The equilibrium consists of a series of value and policy functions such that, given initial conditions K_0 and $\Lambda_0(\cdot)$, government policies, and given a series of wages, interest rates, and taxes $\{w_t^u, w_t^s, r_t, \lambda_t\}_{t=0}^{\infty}$, households and firms solve their problems, there is market clearing in capital and each labor market, and the government budget constraint is satisfied.

2 Calibration

We calibrate the model to features of the Brazilian economy at the end of the 1990s, before the widespread implementation of *Bolsa Família*.

2.1 Parameterization

We distinguish the model parameters by those with a direct data counterpart, including policy parameters, and those identified by matching specific moments in the data. We calibrate the first set externally by using existing estimates or empirical observations. The second group is calibrated internally via a simulated moment-matching procedure. We begin by describing those that are externally calibrated.

Externally Calibrated Parameters. We set the capital share to $\alpha = 0.4$, reflecting the labor share observed in Brazil. In 2000, according to the Penn World Tables, the labor share was roughly 54%. Because we do not feature profits in our model, we select a conservative value of 0.4. The depreciation rate is set to 4.6% annually, taken from the Penn World Tables. Together, these parameters imply an equilibrium (net-of-depreciation) rate of return of $r = 11.6\%$, close to the value reported by the PWT (13.1%).

Age-specific mortality rates, population shares, and population growth are taken from the UN Population Prospects, following the same methodology as in Peruffo and Platzer (2024).

We set the risk-aversion parameter σ to 2 and assume households exhibit perfect altruism, i.e., they value adults and offspring equally ($\beta^B = 1$).[16] We set the dispersion in the work disutility

[14]In Online Appendix E, we show that our results are robust to alternative assumptions regarding how the government funds the cash transfer programs.

[15]In counterfactual economies with transfers, pensions are taxed at a rate λ.

[16]In Online Appendix E, we show that our results are unchanged if we set $\beta^B = 0.66$, as in Daruich and Fernández (2024).

shock to $\sigma_w = 0.25$ for lack of direct data counterpart. This parameter is closely related to how economic incentives such as wages and transfers affect an individual's labor supply.[17] In addition, we set $\bar{l}$ to 0.5, representing the proportion of time devoted to college studies, implying that college students can only work part-time.

We assume that the unemployed produce an amount equivalent to the extreme poverty line in Brazil, which in 2000 corresponded to a monthly R\$77. Converting that to per-household income yields $\eta(0) = 0.048$ (while $\eta(z) = 0$ if $z > 0$).

The policy parameters in Panel B of Table 1 are based on Brazilian tax regulations. All values are expressed in Brazilian Reais (BRL) for 2000 and converted into ratios relative to per-household income for that year. We set the bequest tax rate to 4%, which falls within the range observed across Brazilian states. Finally, public per-student education costs κ_g are obtained from the World Development Indicators.

Table 1: Externally Calibrated Parameters

Symbol	Meaning	Target	Source
Panel A: General Parameters			
σ	Risk Aversion	2	Standard
β^B	Relative Altruism	1	Perfect Altruism
δ	Depreciation	$\delta = 0.046$	PWT10 (2000)
α	Capital Share	$\alpha = 0.4$	Standard
σ_w	Dispersion - Work Disutility	0.25	See text
η	Home Production	R\$ 77 monthly	Extreme Poverty Threshold
n	Growth Rate	$n = 1.35\%$	United Nations (2022)
Panel B: Policy Parameters			
τ_A	Tax Rate on Capital Returns	15%	
κ_g	Public Education Costs	$\{0.13, 0.12, 0.53\}$	UNESCO
$\tilde{\tau}_i$	Marginal Tax Rates	$\{0.15, 0.225\}$	Tax Rules (2000)
$\bar{\tau}_i$	Tax Brackets	R\$ $\{900, 1800\}$ monthly	Tax Rules (2000)
τ^{pen}	Pension Contribution	9%	Tax Rules (2000)
$\bar{y}^{pen}$	Pension Contribution Cap	R\$ 1328.25 monthly	Tax Rules (2000)
y^{min}	Minimum Pension	R\$ 151 monthly	Pension Rules (2000)
y^{max}	Maximum Pension	R\$ 1328.25 monthly	Pension Rules (2000)
τ^w	Payroll Tax	8%	Tax Rules (2000)
τ^{beq}	Bequest Tax	4%	See text

Notes: The table shows the parameters set externally in the model calibration procedure.

Internally Calibrated Parameters. We are left with 10 parameters to be internally calibrated: (i) the fertility parameter f; (ii) the skilled labor share ω; (iii) the pension replacement parameter ν; (iv-vi) the private costs of education κ; (vii) the discount parameter β; (viii) the dispersion in the college taste shock σ_c; (ix) the labor disutility shock average (μ_w); and (x) total factor productivity A. These parameters are jointly calibrated to match data moments.

We select the parameter f to match an annual population growth of 1.34%, obtained from United Nations (2022). Given constant age population shares and mortality, the size of each period's new cohort is uniquely pinned down by the population growth rate, which in turn deter-

[17] Below, in subsection 2.3, we show that our model replicates the existing estimates of how individual labor supply reacts to *non-wage* earnings remarkably well, supporting our choice for this parameter.

mines the fertility rate (see Online Appendix B for further details). We calibrate ω, which determines wage rates (expressions (1) and (2)), to ensure relative earnings across skilled and unskilled labor are consistent with our estimation, which requires $w^u = w^s$. The parameter ν directly controls the generosity of pensions, and, thus, is set to match an average replacement rate over lifetime earnings of 0.9 (see Delalibera et al. (2023)).[18]

The private costs of education κ directly affect the incentives for schooling. Thus, we set it to ensure that the share of adults at each education level matches that of the data from the 2001 PNAD.[19] In turn, the parameter β regulates the intensity of incentives to save. Accordingly, we set it so that the model replicates a capital-to-output ratio of 2.5, as in Cavalcanti and Santos (2020).

The dispersion in the college shock (σ_c) influences the relative importance of economic incentives for attending college. When σ_c is large, the decision to attend college is primarily driven by the taste shock itself. Conversely, as $\sigma_c \to 0$, economic incentives, influenced by parents' wealth and education, are the dominant factor. Consequently, we calibrate σ_c to match the observed intergenerational persistence of college attendance. Specifically, it is set so that the probability of offspring attending college, conditional on their parent having done so, is 61%, as reported by Ferreira et al. (2024).

The parameter μ_w directly affects the incentives to work, with higher values resulting in a reduced labor supply. We calibrate μ_w to match the proportion of households with at least one adult participating in the labor force, which is 92.5% according to PNAD 2001. Finally, the TFP parameter (A) is set to normalize per-household output to one.

Table 2 summarizes the calibration procedure and shows that it matches the proposed data moments very well.

Table 2: Internally Calibrated Parameters

Symbol	Meaning	Moment Description	Data	Model
$f = 0.863$	Fertility Rate Parameter	Population Growth	$n = 1.34\%$	$n = 1.34\%$
$\omega = 0.20$	Share of Skilled Labor	Consistency in Earnings	$w_u - w_s = 0$	$w_u - w_s = 0.0007$
$\nu = 0.87$	Replacement Rate Parameter	Average Replacement Rate	0.9	0.896
$\kappa = \{0.058, 0.201, 0.463\}$	Private School Costs	School Completion Shares	$S = \{0.164, 0.241, 0.076\}$	$S = \{0.177, 0.243, 0.077\}$
$\beta = 0.903$	Discount factor	Capital-to-Output Ratio	2.5	2.5
$\sigma_c = 0.329$	Dispersion - College Taste	Intergenerational College Persistence	0.61	0.61
$\mu_w = 0.224$	Average Disutility of Labor	HH Labor Force Participation	92.5%	93.1%
$A = 0.158$	Per-HH GDP Normalization	Total Factor Productivity	1	0.999

Notes: The table shows the results of the calibration for the parameters selected via a moment matching procedure.

2.2 Earnings Estimation

We estimate the labor productivity process using the Brazilian Continuous National Household Survey (CPNAD) data from 2012 to 2019. The survey follows a standard rotating panel setup, following households (and individuals) for five consecutive quarters. The relevant variable for our

[18] To calibrate the replacement parameter ν, we simulate a panel of individuals, collect their average lifetime earnings, and compute the pension replacement rate implied by expression 10. In the calculations, we discard individuals whose pension equals the cap or the floor.

[19] We restrict attention to individuals aged 26-35, so that the model better captures the distribution of human capital in Brazil in the 2010s, an important period for our counterfactuals.

analysis is individual hourly earnings, computed by dividing total weekly earnings by hours.[20] To reduce measurement error, we discarded employed individuals who worked less than 30 hours and those who did not respond to the five quarters. Finally, we also discarded individuals out of the labor force in any of the surveyed periods.

We perform different estimations depending on age and education. We select individuals between 18 and 65 years old and group them using four schooling levels (analogous to the model) and 5-year age groups, except for the youngest individuals (18-20 years old). The estimation goal is to construct a discrete age-education-dependent Markov process representing the life cycle of earnings. We employ a "non-parametric" estimation process, similar to De Nardi et al. (2019). Unlike this paper, though, we do not residualize earnings by regressing them on individual demographics. We chose to do so to capture the full variation of earnings across individuals.

We categorize earnings by percentiles for each education-age group, with thresholds $p_h \in \{10, 20, 45, 60, 80, 95\}$. Given our focus, we choose a finer grid at the bottom of the earnings distribution. We then compute mean earnings between each percentile threshold, corresponding to the grid points for $z_g(h)$. In addition, we allow the possibility of involuntary unemployment ($z_g(h) = 0$) by re-including unemployed individuals.[21]

To construct the transition matrix across grid points, we compute the fraction of individuals transitioning between every group over successive years in the sample, i.e., we use the first and last observations for each individual.[22]

This process yields several eight-by-eight matrices P_{hg}. In addition, it delivers a hump-shaped life-cycle profile of earnings, with young individuals typically experiencing increases in earnings over time. To capture the fact that this pattern occurs due to on-the-job learning, we assume that individuals face a different earnings process depending on their labor force status, which, in Section 1, is captured by the expectations operator $\mathbb{E}^{\ell}$.

In particular, for each value $z_g(h)$, we assume that the future productivity of non-participants ($z_{g+1}(h)$) is reduced by an education-age-dependent fraction $\delta_g(z, h)$. We then set each $\delta_g(z, h)$ so that expected earnings growth is, at best, nil for non-participating individuals.[23] In other words, individuals who decide not to participate in the labor force forfeit the on-the-job skill gains they would expect if they decided to work instead. In practice, we implement this feature by altering the transition matrices the non-workers face, as explained in detail in Online Appendix B.

[20] CPNAD asks individuals about their effective working hours on the reference week and also their usual working hours. We selected the latter variable to minimize measurement error because our model time frame is one year. Accordingly, we use usual earnings instead of earnings on the reference week.

[21] We consider an individual unemployed if they are not working and report having actively searched for a job in the reference week.

[22] Alternatively, we could compute quarterly transitions in the data, simulate the resulting earnings process, and repeat the estimation, aggregating the simulated data yearly. However, we find that this procedure results in a poor match of the cross-sectional distribution of earnings

[23] For the cases in which $\mathbb{E}^{\ell=1} z_{g+1}(h) < z_g(h)$, we set $\delta_g(z, h) = 0$. These typically occur at later stages in the life cycle.

2.3 Model Validation

Earnings Distribution. Figure 2 compares the hourly earnings distribution in the model and in the data. It illustrates the proportion of labor income earned by each 5-percent population segment, ranging from the lowest to the highest earners.[24] The analysis is limited to individuals actively participating in the labor force. The strong correspondence between the bars indicates that the model effectively captures the cross-sectional income distribution.

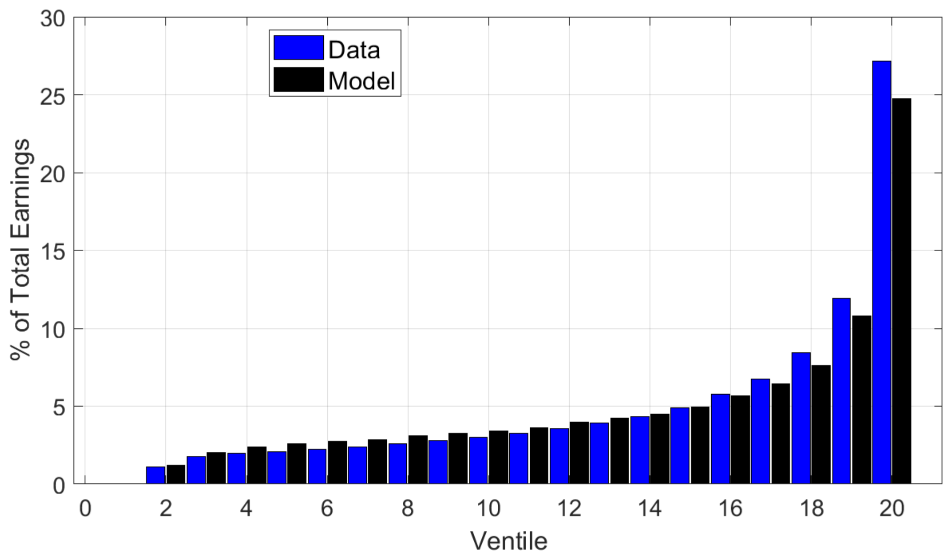

Figure 2: Earnings Distribution - Model vs. Data

Notes: The figure compares the share, in percent terms, of total earnings accrued by households in each ventile. For consistency with the model, when treating the data we assume that individuals work a constant amount of hours. Unemployed individuals in the data and those whose $z_g(h) = 0$ in the model are included in the samples.

In addition, Figure 3 displays the cross-sectional variance of log hourly earnings by age and education group, comparing the model (solid lines) and data (dashed lines). The model broadly captures the patterns observed in the data for all levels of education, particularly for high-school- and college-educated individuals.

Elasticities of Labor Supply. A desirable feature of our model economy is its ability to capture the labor supply response to transfers. This section shows that the model-implied (partial equilibrium) elasticity of labor supply to unearned income aligns remarkably well with existing studies. Online Appendix B details our replication of each of the estimates mentioned in this section.

Using administrative Swedish data, Cesarini et al. (2017) studies how households' earnings react to winning the lottery. Their point estimate for the elasticity of annual earnings to unearned lottery income is -0.013, i.e. for every additional Krona won in the lottery, annual earned income experiences a persistent decline of 1.3%. Similarly, using data from the United States, Golosov et al. (2023) estimate this elasticity to be -0.023.[25] By simulating a panel of households in partial

[24] For comparability between the model and the data, we assume uniform working hours for all individuals in the data.

[25] See Table 6, Total Household Effect, in Cesarini et al. (2017) and Table II, Per adult total labor earnings, in Golosov

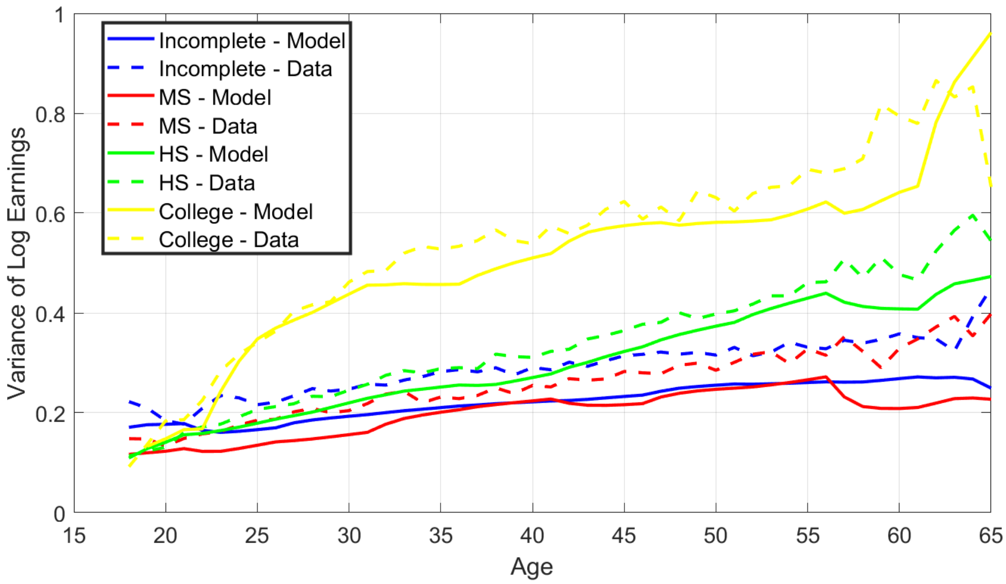

Figure 3: Comparison of Cross-Sectional Distribution of Earnings - Model vs. Data

Notes: The figure compares the variance of log earnings conditional on age and education level in the model and the data. MS and HS stand for middle and high school, respectively.

equilibrium, we find that transfers corresponding to 25%, 100%, and 1000% of average income yield elasticities of respectively -0.027, -.031, and -0.038.[26] Thus, our model can replicate this elasticity very well and is particularly close to the estimates in Golosov et al. (2023).

In addition, in an experiment conducted in the United States, Vivalt et al. (2024) provides \$1,000 to 1,000 individuals over three years. This study is particularly relevant in our context because the sample only included low-income individuals. They find that the UBI, which corresponds to 16.2% of average household income, induces a decline of 2.0 percentage points in labor force participation.[27] By reproducing their experiment in our model laboratory, we obtain a reduction of 1.9 percentage points. Once again, the close alignment between our model's predictions and the empirical findings suggests that our framework can effectively capture the magnitude of labor supply changes due to transfers.

All the papers above are focused on developed countries. Closer to our context, a recent working paper (Balakrishnan et al. (2024)) employs propensity score matching to estimate the impact of a means-tested cash transfer program in Maricá, a municipality in Southeastern Brazil. Compared to non-recipients, they find a 5% reduction in the number of working household members. By replicating their experiment in our model economy (in partial equilibrium), we find the same estimate to be 5.5%, which again suggests our model can capture the magnitude of empirical labor supply responses. The paper also reports a 5% increase in consumption for recipients, with a

et al. (2023).

[26] Golosov et al. (2023) restricts their sample to those winning at least \$30,000, or roughly 36% of average household income, which was roughly \$83,000 in 2016 according to U.S. census data.

[27] See Table 4, row *Whether the respondent is employed*. The pooled unemployment insurance and survey data instead yield a point estimate of 3.9 percentage points, with a standard error of 1 percentage point.

standard error of 2.69%. The model counterpart is 7.7%, lying within the 95% confidence interval of the estimates.

Overall, the model's responses to unearned income closely align with existing literature estimates, providing confidence in the quantitative results of the subsequent analysis.

3 Transfer Policies

Our primary analysis compares a UBI transfer system with a means-tested transfer policy requiring recipients to enroll their children in school. The Brazilian economy has had a CCT program of the latter kind since roughly 2003, the *Bolsa Família*, which consolidated Brazil's existing welfare programs into a unified system. Its key innovation was allowing transfers without restrictions on spending as long as families met eligibility criteria based on per capita income, school enrollment, and regular health checkups. Beneficiaries were categorized as being in a situation of extreme poverty (per capita income below R$70) or poverty (R$140).[28] Families below the extreme poverty line received a basic transfer of R$70, plus an additional transfer adjusted for their income and prior benefits. Both categories received a monthly variable benefit conditional on school enrollment.[29]

We proceed as follows: first, we introduce a conditional cash transfer (CCT) with parameters similar to the Brazilian *Bolsa Família*. We then simulate the economy's transitional dynamics toward a new stationary equilibrium under the CCT. Our main comparison exercise then involves evaluating these outcomes against those associated with the implementation of a permanent Universal Basic Income (UBI) program whose total transfers are equivalent to those of the CCT in the first period of implementation. In this sense, we impose a fiscal burden equivalence between the two policies. In addition, we also evaluate the outcomes of both transfer schemes with different levels of generosity.

Under the UBI, the transfer policy provides a uniform transfer, i.e. $\mathbb{T}(z, h, a, h_o, \ell, g) = \overline{\mathbb{T}}$. In contrast, in our benchmark CCT policy transfers are determined as: [30]

$$\mathbb{T}(z, h, a, h_o, \ell, g) = \overline{CCT} \times \begin{cases} \mathbb{I}(h_o = h_1) \times \mathbb{I}(ra + z_g(h)w(h)\ell \leq \overline{y}) & \text{if } g \in \{22, \ldots, 25\}, \\ \mathbb{I}(h_o = h_2) \times \mathbb{I}(ra + z_g(h)w(h)\ell \leq \overline{y}) & \text{if } g \in \{26, \ldots, 29\}, \\ \mathbb{I}(ra + z_g(h)w(h)\ell \leq \overline{y}) & \text{if } g \in \{1, .., 21, 30, ..., 47\}, \\ 0 & \text{otherwise.} \end{cases}$$

In the expression above, $\mathbb{I}$ denotes the indicator function, $\overline{CCT}$ is the transfer amount, and $\overline{y}$ is a pre-tax income threshold (means-testing). The first two lines correspond respectively to the middle- and high-school years. Thus, as is the case with the Brazilian *Bolsa Família* rules, school attendance is a requirement for receiving the transfer. In addition, retirees are not eligible for the

[28] Numbers are obtained from Soares (2011). In 2009, the dollar-to-real exchange rate averaged 1.58.

[29] Families with children aged 0-15 receive R$32 per child (up to five), while pregnant women and families with infants (0-6 months) also qualify. Families with adolescents (16-17) receive R$38 per teenager (up to two).

[30] Recall that, for households consisting of a single member, h_o is irrelevant.

program, as they receive pension income.

In reality, the *Bolsa Família* paid a different amount depending on the number of children, their age, and whether household income fell below the extreme poverty level. For simplicity, we assume that, upon satisfying the conditionalities, families receive a constant amount, $\overline{CCT}$, which we calibrate to correspond to the average benefit paid upon the program implementation, R$53.03 (in 2000 values), or 3.1% of average annual household income.

We set the threshold $\bar{y}$ so that the potential coverage – the number of households eligible under means-testing – matches that of the original *Bolsa Família*. According to the Institute for Applied Economic Research (IPEA), 35% of Brazilians lived below the poverty line in 1999.[31] Thus, we set $\bar{y}$ to correspond to the 35th percentile of the income distribution. In equilibrium, upon implementation, the individual transfer corresponds to 14.2% of the average recipients' income.

4 The Long-Run Effects of Transfer Policies

In this section we compare the long-run outcomes of our benchmark economy (without transfer policies), to those of an economy with a transfer similar to *Bolsa Família* ("CCT"), and an economy with a UBI that is equivalent to the CCT in terms of total transfers upon implementation. Table 3 presents the results.

Panel A illustrates the dramatically contrasting impacts of the two transfer programs on long-term economic activity. While the CCT raises long-run per capita output by 5.5%, the UBI lowers it by 4.7%. This discrepancy is due to differences in capital accumulation and changes in the total amount of efficiency units employed in the economy for both skilled and unskilled workers. The latter movement can be attributed almost entirely to shifts in labor productivity, as labor force participation remains relatively stable.

Table 3: Changes in Macroeconomic Indicators - CCT vs. UBI

Outcome	CCT	UBI	Outcome	CCT	UBI
Panel A: Macroeconomic Variables (% change)			*Panel B: Educational Outcomes (change in pp.)*		
Output	5.5	-4.7	No Schooling	-26.4	6.0
Consumption	6.3	-5.0	Primary Schooling	20.0	-0.0
Capital Stock	2.4	-5.9	Secondary Schooling	5.7	-5.5
Labor Force Participation	-0.9	0.3	College	0.8	-0.5
Labor Productivity	6.5	-4.9	*Panel C: Distributional Outcomes (pp change)*		
Efficiency Units - Unskilled	7.0	-3.28	Top 10% Earnings Share	-1.0	-0.6
Efficiency Units - Skilled	10.2	-6.66	Earnings Gini (x100)	-1.77	-0.92
Marginal Tax Rate Increase (λ)	1.06	2.53	Earnings Gini (Not Inclusive of Transfers)	-0.36	-0.26
Transfers-to-GDP Ratio	0.80	0.93	Poverty Rate	-7.1	3.0
			Poverty Rate (Not Inclusive of Transfers)	-2.0	5.4

Notes: The table compares the impact of the UBI and CCT policies over the long run (steady state). Both policies are set to have the same total transfers-to-GDP ratio in the first period of their implementation, but not necessarily over the long run. Panel A displays percentage changes, while Panels B and C show changes in percentage points. When computing the poverty rate or the Gini *not inclusive of transfers*, we exclude the transfers from the calculation of earnings. Output, consumption, capital, and efficiency units are given in per capita terms.

The marginal tax required to fund the policies in the long run is higher for the UBI (2.53%)

[31]There is no information for 2000, but, according to the same source, the poverty rate remained at roughly 35% in 2001.

compared to the CCT (1.06%). In addition, even though both transfers are fiscally equivalent upon their introduction, as explained in the previous section, in the new equilibrium, the UBI economy has a slightly larger share of total transfers to GDP. These differences arise because output in the CCT economy is higher, which results in greater tax revenues. Thus, a lower tax rate is required, and transfers constitute a smaller share of output. Interestingly, labor force participation *declines* under the CCT, but it *increases* under the UBI. The reason is that, in the long run, the UBI economy becomes poorer, and the resulting wealth effect promotes an increase in labor supply, reversing the substitution effect due to higher taxes. The opposite is true in the case of the CCT.

As shown in Panel B, the introduction of the CCT significantly impacts education outcomes, which explains the increase in labor productivity. Most notably, the CCT reduces the proportion of uneducated individuals by approximately 50%, or 26.4 percentage points, while increasing the proportion of individuals completing primary, secondary, and college education. In contrast, the UBI raises the proportion of uneducated individuals by six percentage points and decreases the share of those with secondary and college education.

Panel C presents the distributional outcomes. It shows that, in the long run, the CCT outperforms the UBI in reducing poverty and inequality. Notably, the CCT lowers the poverty rate by approximately seven percentage points, while the UBI *increases* it, owing to lower income and education levels. [32]

Additionally, the last two rows of Panel C indicate that, if we consider household income net of transfers, the poverty reduction under the CCT drops by 5.1 percentage points (from a 7.1 pp reduction to 2.0 pp). For the UBI, the corresponding decline is only 2.5 pp (from an increase of 5.5 pp to 3.0 pp). This difference underscores that the direct impact of transfers on poverty reduction is more significant under the CCT, a consequence of its means-tested design. A similar pattern emerges for inequality, as reflected in the disparity in the Gini coefficient with and without transfers.

Overall, the results in Table 3 indicate that, in the long run, Conditional Cash Transfer policies outperform Universal Basic Income policies by increasing average income and reducing poverty and inequality.

Does Size Matter? Although the policies considered have the same fiscal burden upon their introduction, the per-household transfer size differs substantially. CCT recipients receive approximately 3.5 times more than those under the UBI. To what extent are the results represented in Table 3 driven by this difference? Figure 4 helps us answer this question by considering the effect of various transfer sizes in both cases, ranging from zero (benchmark steady state) to a transfer twice as large as the calibrated CCT policy.

Regardless of transfer size, a CCT policy leads to superior outcomes compared to the UBI. In particular, output, capital, consumption, and labor productivity always increase in the CCT economies, contrary to the UBI case. In addition, the latter policy fails to reduce poverty in the

[32] The magnitude of the CCT's impact on poverty and inequality aligns with empirical findings from de Souza et al. (2019). However, their analysis uses data from 2017, so a more appropriate comparison should account for transitional dynamics (see Section 5).

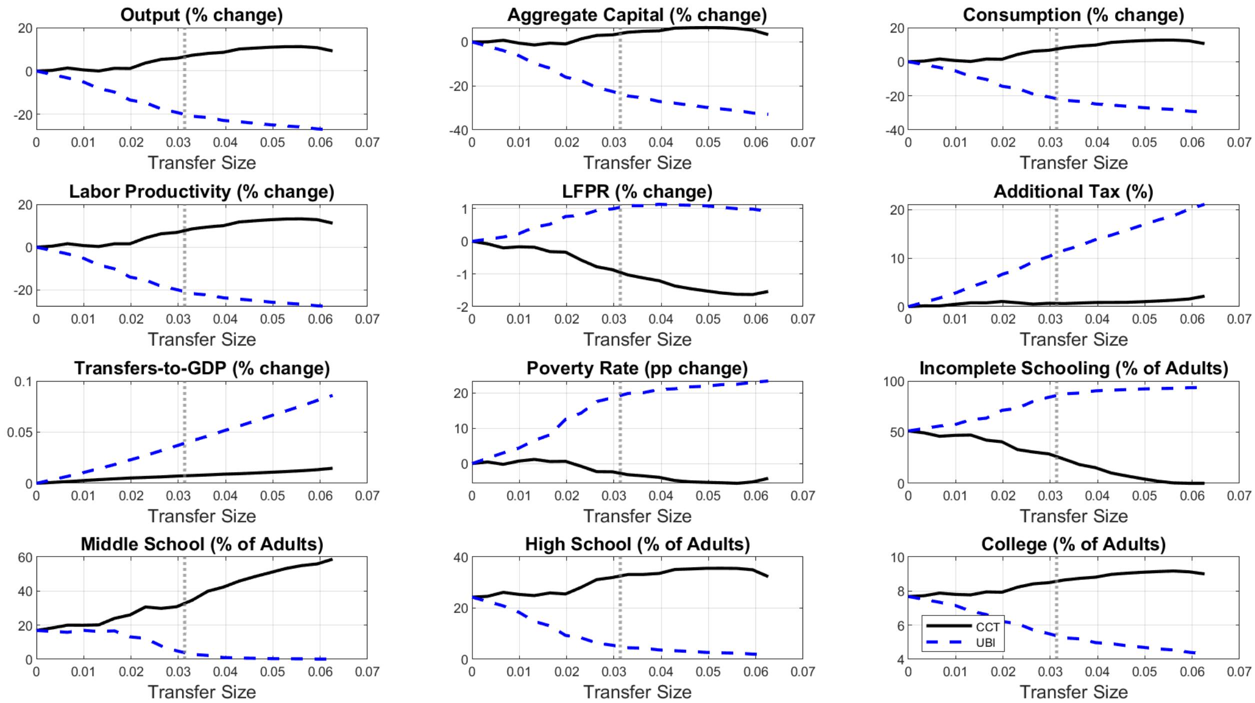

Figure 4: Effect of Transfer Policies - The Role of Transfer Size

Notes: The figure displays changes in selected outcomes over the long run (steady state) in response to the introduction of a UBI or a CCT (as explained in Section 3) of varying transfer sizes. The solid black line refers to the CCT, while the dashed blue lines refer to the UBI. LFPR stands for labor force participation rate. Changes are displayed relative to the initial (no-transfers) steady state. The gray vertical dotted line indicates the baseline CCT individual transfer level.

long run, irrespective of transfer size.

For small transfer sizes, however, the CCT has a muted impact and even causes a slight increase in poverty. Note however that, as the transfer size increases, the CCT begins to have a larger impact on school attendance, which is then associated with a reduction in poverty and improvements in other outcomes. Thus, our results suggest that the CCT transfer size has to be sufficiently large to promote investments in human capital, which are then associated with long-run benefits in other macroeconomic outcomes. It also suggests that differences in incentives to accumulate human capital are crucial in determining the different outcomes observed in Table 3 and in Figure 4 across policies.

In Figure 4, the gray vertical line indicates the baseline CCT individual transfer level. Suppose a UBI policy of that size is implemented. In that case, the long-term outcome is devastating, with output and labor productivity declining by nearly 20% and poverty rising by roughly the same amount.

Note that as the transfer size increases, total transfers as a share of GDP grow much faster under the UBI. This is because the CCT, being means-tested, targets only the poorest households. Consequently, the additional tax required to fund the UBI rises significantly faster than for the CCT, exacerbating perverse incentives and amplifying the UBI's negative impact.[33]

[33] We will revisit the role of taxes in Section 7.

In conclusion, Figure 4 indicates that, if the transfer is large enough to incentivize investments in human capital, the results in Table 3 are qualitatively robust to different transfer sizes. Quantitatively, a larger UBI transfer leads to worse outcomes, while the opposite is true for the CCT. In all, Conditional Cash Transfers are vastly superior to a Universal Basic Income scheme in generating long-term prosperity and reducing poverty.

We will return to analyze the long-run consequences of different cash transfer schemes in Section 7, where we take a deeper look at which mechanisms drive the results represented in Table 3 and the role of the means-testing and education conditionalities. We now move to investigate the transitional dynamics of the economy following the policy implementation, as well as their welfare consequences.

5 Short Run and Transitional Dynamics

The long-run analysis in the previous section overlooks key considerations related to short-run and transitional dynamics. We now address these aspects by examining the economy's progression from the baseline equilibrium to long-run counterfactual steady states under the UBI and CCT policies. The economy is assumed to be in its stationary equilibrium in the initial period ($t = 0$), when the policy is unexpectedly introduced. Agents are then assumed to perfectly foresee the consequences of this implementation, adjusting their expectations and decisions accordingly.[34]

Figures 5 and 6 show the evolution of key macroeconomic and social indicators in response to the policy change. In the short run (i.e., the first few years upon introduction), both policies have similar qualitative impacts, with per capita output, capital, poverty and labor productivity experiencing a decline.

The short-run decline is stronger in the case of the CCT policy, as capital drops by almost 7% and output by 2%. This is because the economy reallocates resources into building human capital, whose benefits take time to come to fruition. These trends revert roughly 20 years after the introduction of the policy, and income, capital, and labor productivity rise as more educated individuals enter the labor force, as shown by Figure 6. As a result, the CCT economy experiences long-lasting economic growth.

In contrast, the short-term trends do not reverse in the UBI economy; the downward trajectory persists. As we later show in Section 7, the UBI is detrimental to savings, labor supply, and investments in human capital. Consequently, output, physical capital, and labor productivity continue to decline in a vicious cycle.

Note that, initially, the tax rate required to fund the conditional cash transfer is slightly higher than for the UBI. This is primarily due to the government incurring additional costs for each enrolled student (κ_g). This effect, together with the fact that the CCT focuses on poorer individuals, whose labor supply is more sensitive due to wealth effects, explains the larger decline in the labor force participation rate in the CCT.

[34] While in the plots we restrict attention to the first 100 years of the transition, the simulations allow the economy to converge to the new stationary equilibrium in 600 years.

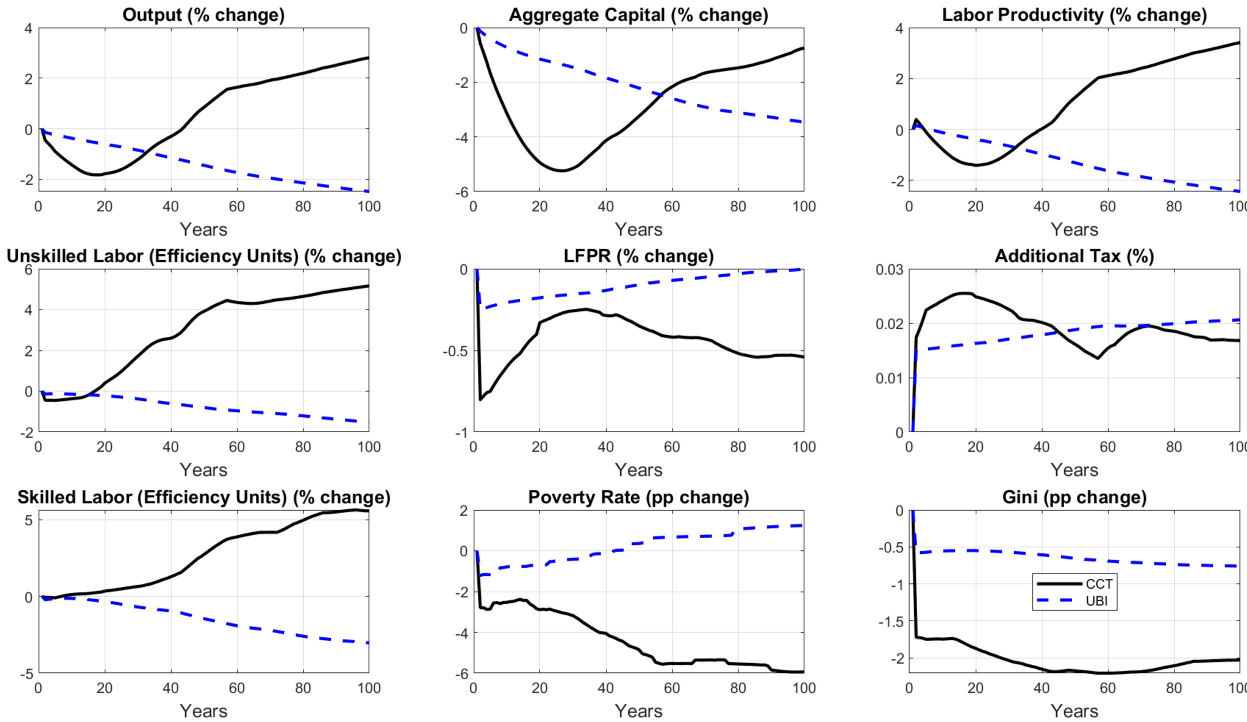

Figure 5: Dynamics of selected aggregate variables along the transition between the baseline steady-state and the policy steady-state.

Notes: The figure shows the dynamics of selected variables after the implementation of each policy. LFPR stands for labor force participation rate. Changes are displayed relative to the initial (no-transfers) steady state.

After roughly 40 years, this general pattern is reversed. This is because, over time, incomes rise in the CCT economy and fall in the UBI case. Consequently, the tax rate required to fund the policy for the former declines while it increases for the latter. In addition, as incomes rise, the share of households who receive the CCT falls, further contributing to the decline in the additional tax λ. This is shown in Figure 7. These patterns result in a feedback loop whereby lower (higher) taxes encourage (discourage) human and physical capital accumulation.

This is a relatively slow process, whose full consequences span a few generations. This becomes evident in the context of education, as shown in Figure 6. In the case of the CCT, after a brief period during which young individuals are still completing their schooling, there is a continuous decrease in the percentage of those with incomplete primary education and a steady increase in the proportion of those who complete middle school. In contrast, under the UBI, there is a continuous rise in those with incomplete primary education and a decline in middle and high school graduates. Similarly, the trends for college graduates move in opposite directions—increasing under the CCT and decreasing under the UBI—from the early years following the introduction of these policies. As we will see later, the education conditionality of the CCT plays an important role here, as it requires families receiving transfers to enroll their children in school.

Finally, the short-run impact of both policies on inequality and poverty reduction is similar, with the UBI economy reproducing some empirical findings in the literature that highlight its

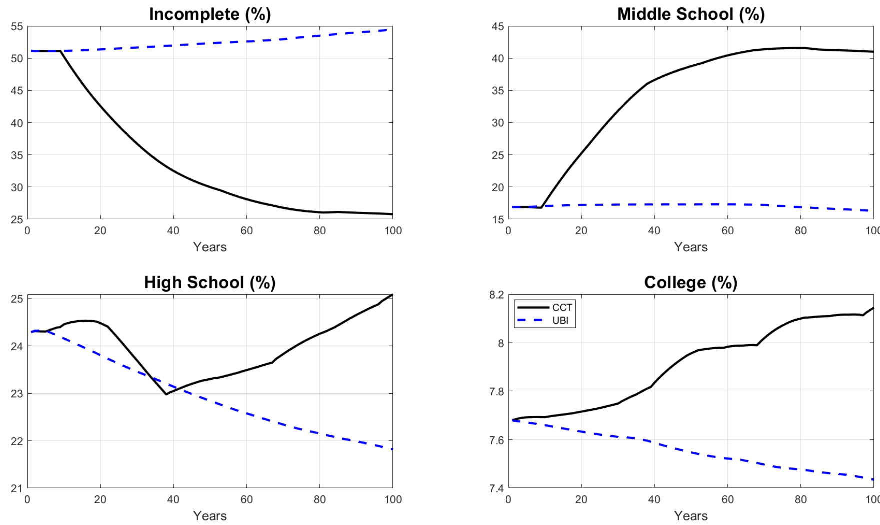

Figure 6: Dynamics of Educational Outcomes.

Notes: The figure illustrates the evolution of the labor force shares for each education group following the implementation of each policy.

success in reducing poverty.[35] In the long run, however, due to disincentives for physical and human capital accumulation under this policy, the initial poverty reduction is reversed. In contrast, the CCT economy grows wealthier over time, with poverty falling about three times the initial short-run decline.

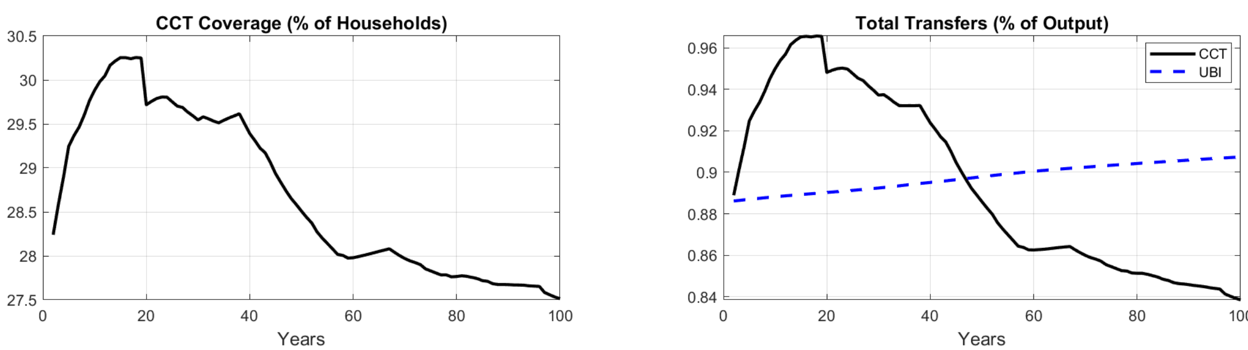

Figure 7: Dynamics of Transfers Coverage and Expenditures

Notes: The figure illustrates the evolution of the CCT coverage (left) and total-transfers-to-GDP (right) for each policy.

Despite its negative medium- to long-term consequences, the UBI's relative short-term success raises the question of whether policymakers should impose school attendance and means-testing conditions in cash transfer programs. To address this, we now move to our welfare analysis.

[35] See Gentilini et al. (2020).

6 Welfare

Following standard practice in the literature (e.g. Daruich and Fernández (2024) and Luduvice (2024)), we measure welfare in terms of consumption-equivalent units. Specifically, we ask how much consumption households i belonging to a specific group, $i \in \mathcal{S}$, would be willing to accept (or forego) to move out of the benchmark economy into a counterfactual economy with a transfer policy in place.

In Online Appendix C, we show that, under the veil of ignorance (i.e. before the revelation of identities), our measure of welfare changes, in percentage terms, upon the implementation of the policy is given by:

$$\Delta(\mathcal{S}) = 100 \left[\times \left(\frac{\int_{\mathcal{S}} \left(V_g^{\ell,P}(x) - V_g^{\ell,ss}(x) \right)}{\int_{\mathcal{S}} \mathbb{E}U(c)} + 1 \right)^{\frac{1}{1-\sigma}} - 1 \right], \tag{11}$$

where $V_g^{\ell,ss}(x)$ represents households' beginning-of-period value function in the steady state, $V_g^{\ell,P}(x)$ is the value function of an individual when the policy P is introduced, and x is the individual state. In addition, $\mathbb{E}U(c)$ is the expected discounted utility flow yielded by consumption of the own households and its offspring, the latter being weighted by the altruism parameter. Note that aggregation, restricted to group $\mathcal{S}$, uses the distribution of households in the benchmark economy. Thus, we investigate the welfare impacts of each policy by considering the economy's transitional dynamics and evaluating changes in households' value functions immediately after the policy is introduced.

Figure 8 displays the results for selected groups based on age, earnings, and education. The top left shows that, although both policies are welfare-improving, the CCT yields the largest benefits. Households' welfare increase in this policy is 1.52%, against 0.83% in the UBI. In other words, the gains associated with the CCT are more than 80% greater than those from the UBI.

The remaining panels of Figure 8 help us understand this result. The bottom-left and top-right panels show that, for both policies, the welfare gains are concentrated in low-education, low-income individuals. In contrast, welfare losses are concentrated among highly educated, high-income individuals. In the case of the CCT, those are also concentrated among retirees (bottom-right panel), who bear the tax burden without receiving transfers. Notably, the CCT gains for individuals with incomplete primary school are more than twice as large as those of the UBI for this group. The same is true for the first decile of the income distribution. On the other hand, for highly-educated, high-income individuals the losses are greater under the CCT policy compared to the UBI. Taken together, these facts underscore the powerful redistributive nature of the CCT.

Finally, the bottom-right panel highlights the heterogeneity in welfare changes by age. In the case of the UBI, welfare changes are roughly homogenous across groups, given the uniform nature of the transfer. In contrast, the CCT represents a welfare gain, particularly for the young (aged 17-39), but also for middle-aged individuals, and a loss for the old. The large welfare gains for the

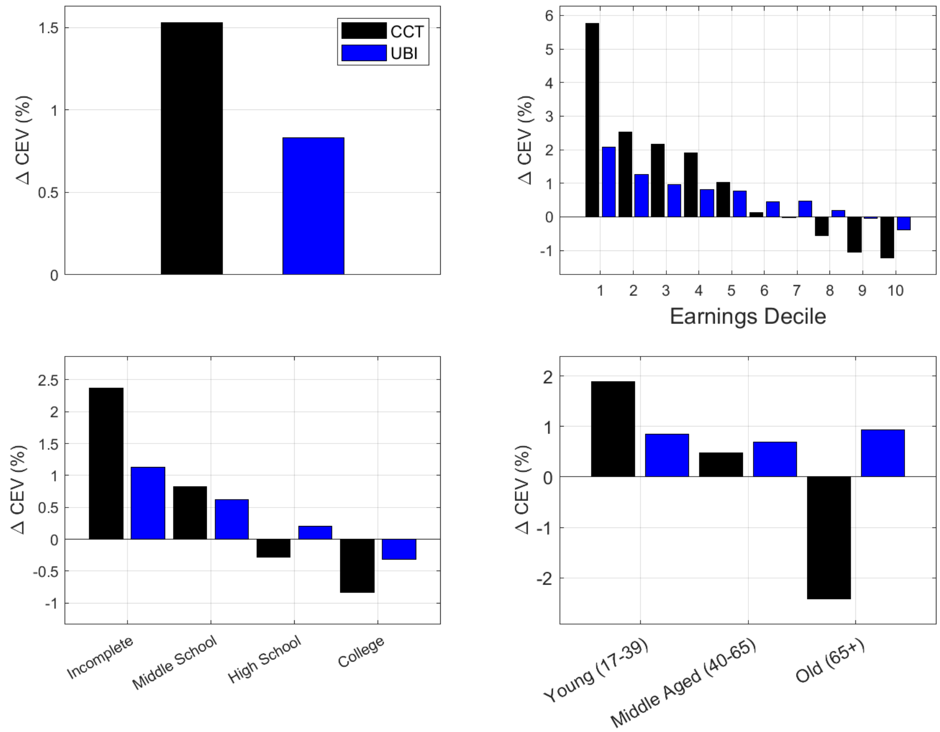

Figure 8: Consumption-Equivalent Welfare Changes for Selected Groups

Notes: The figure illustrates the change in welfare for selected groups for cohorts living at the time of each policy's implementation. Welfare is measured in percent changes in permanent consumption equivalent units ($\Delta CEV\%$), computed using expression 11.

young are due to lower average income (including a higher chance of involuntary unemployment) at these ages, making individuals more likely to be eligible and have a high marginal utility of consumption. Retired individuals, on the other hand, receive the age pension and thus do not qualify for the CCT due to its means-tested nature.

Before proceeding, it is worth highlighting that, unlike some recent papers evaluating the welfare effects of UBI, we find positive welfare gains when this policy is funded by taxes on earnings.[36] For instance, the benchmark UBI policy in Daruich and Fernández (2024) yields welfare losses to all cohorts, while ours provides gains at all ages. A similar result is obtained in Conesa et al. (2020), although the exercise in this paper also replaces existing transfer policies with the UBI. A notable exception is Luduvice (2024), which finds larger welfare gains if an expenditure-neutral UBI is funded via labor taxes, rather than consumption taxes. [37]

The studies mentioned above are focused on the United States. As a consequence, we conjecture that the differences stem from our focus on a developing country, which is characterized by

[36] Our result is robust to considering a more progressive taxation scheme, as shown in Online Appendix E.

[37] Other exceptions are Rauh and Santos (2022) and Jaimovich et al. (2022), which find welfare gains in a search-and-matching framework. Jaimovich et al. (2022) finds that only a small UBI, with a relative size similar to our benchmark, yields welfare gains. However, these studies only consider steady-state differences in welfare, in which case we predict large welfare losses, as do Daruich and Fernández (2024) and Conesa et al. (2020).

a distinct earnings process, degree of inequality, returns on savings (and consequently higher discounting of the future), credit constraints, distinct pre-existing transfer policies initially in place, as well as a likely higher potential for further human capital investments.[38]

Figure 9 shows the welfare of cohorts living at each point in time as the effects of the policies unfold.[39] The figure reveals that, although the initial cohorts gain more welfare from the CCT, a few years later the UBI economy is preferable to the CCT. The reason is related to the evolution of capital, labor productivity, and output shown in Figure 5. During the first years of the policy implementation, resources are reallocated from physical to human capital investments, whose benefits take longer to materialize, resulting in temporarily lower income in the CCT economy. About 15 years after the implementation of the policy, as the benefits of a higher educated labor

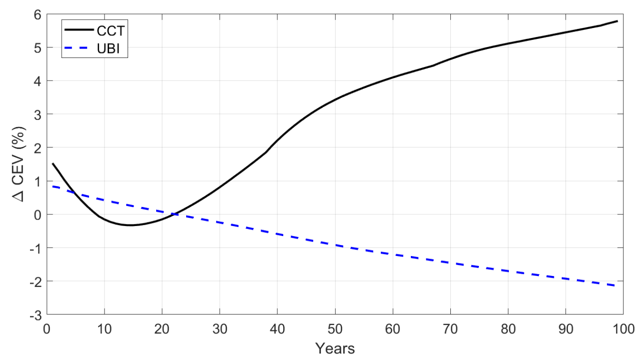

Figure 9: Consumption-Equivalent Welfare Changes over Time

Notes: The figure illustrates changes of welfare of the population over time, relative to the initial steady state. See text for further details.

force slowly materialize, the welfare of the CCT economy begins to increase, as opposed to that of the UBI economy, which experiences a slow and steady decline. Consequently, cohorts alive twenty-five years after the CCT is implemented begin to reap the benefits of the policy, culminating in a new steady-state welfare roughly 6.5% greater, in consumption-equivalent terms, than in the benchmark economy. On the other hand, welfare in the UBI economy is still declining more than one hundred years after the policy implementation, culminating in a steady-state loss of roughly 4%.

The Political Economy of Cash Transfers. The previous analysis shows that welfare gains to the current generation are greater in the CCT compared to the UBI. Does that mean that the current generation would choose to implement the CCT, rather than the UBI? To address this question, we compare the proportion of households that would favor the CCT rather than the UBI, i.e. $V_{g,t}^{\ell,CCT}(x) > V_{g,t}^{\ell,UBI}(x)$. In doing so, we can assess whether each of the policies would be imple-

[38] Further exploration of this divergence offers a promising avenue for future research. In this paper, however, we focus on comparing the UBI and CCT under a fixed taxation scheme.

[39] In this case, we modify the welfare calculation in equation (11) to $\Delta_t = 100 \times \left[\left(\frac{\left(\int_{\mathcal{S},t} V_{g,t}^{\ell,P}(x) - \int_{\mathcal{S},0} V_0^{\ell,ss}(x)\right)}{\int_0 \mathbb{E}U(c)} + 1\right)^{\frac{1}{1-\sigma}} - 1\right]$, where $\int_{\mathcal{S},t}$ represents an aggregation within group $\mathcal{S}$, using the distribution of households at time t.

mented if the decision was based on a democratic majority rule.[40] Figure 10 shows the results and analyses the preferences of selected groups.

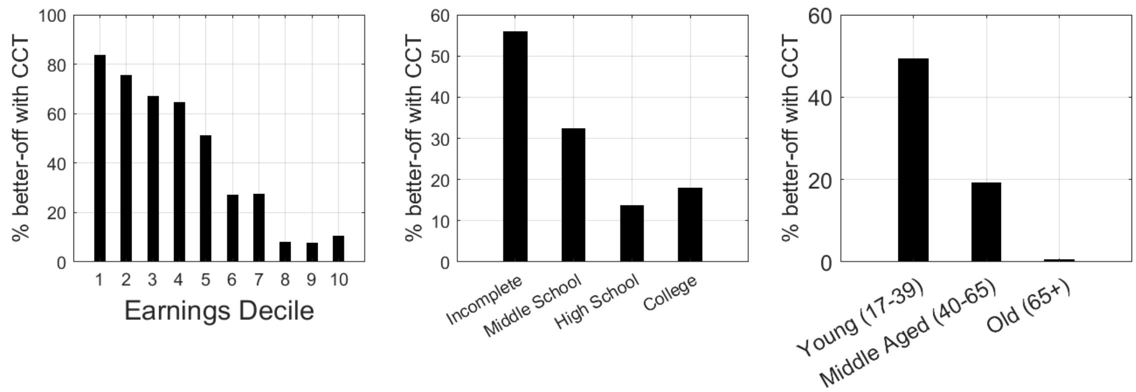

Figure 10: Share of Individuals Better-off with the CCT, Compared to the UBI - Selected Groups

Notes: The figure displays the percentage of households, within each group, that would be better off under the implementation of the CCT compared to the UBI.

The left and middle panels reveal that low-education, low-income individuals are the strongest supporters of the CCT, underscoring once again the redistributive nature of this policy. The central panel, however, shows that, across education levels, the CCT has the support of the majority only among individuals with incomplete primary schooling. In addition, the right panel shows that the UBI is preferred in any of the three age groups considered. In all, the share of individuals favoring the CCT is only 38.8%. This happens because the UBI provides welfare gains to the vast majority of households (nearly 80%), while only 51% of individuals are better-off under the CCT, compared to the case without transfers. In other words, despite delivering the largest welfare gains, under a democratic majority rule, the CCT would not be chosen.

Overall, the results in this section suggest that (democratic) governments may struggle or be unwilling to implement a policy that delivers substantial welfare gains for the current generation alongside much greater benefits for future residents. Instead, they may be inclined to adopt a policy that prioritizes the majority of current voters, even if it results in lower welfare gains and ultimately impoverishes future generations. Thus, our results raise important concerns about the intergenerational tradeoff surrounding the design and implementation of cash transfer programs. Specifically, they reveal the existence of a possible tension between political incentives and long- and even short-term societal welfare.

7 Mechanisms - What Drives the Success of Transfer Policies?

In this section, we investigate the mechanisms that explain the results shown in Sections 4 and 5. We begin by conducting a decomposition analysis to understand the differences in long-term

[40]Naturally, this statement assumes that individuals' vote is based on self-interest. In addition, this analysis forces households to choose between the two policies, not allowing for the status quo to be preserved.

Table 4: Changes in Macroeconomic Indicators in Partial Equilibrium - CCT vs. UBI

Outcome	CCT - $\lambda = 0$ (2)	UBI - $\lambda = 0$ (3)	CCT - Fixed HC (4)	UBI - Fixed HC (5)	CCT - Fixed Sav. (6)	UBI - Fixed Sav. (7)	CCT - Fixed P_g^w (8)	UBI - Fixed P_g^w (9)
Panel A: Macroeconomic Variables (% change)								
Output	10.3	3.4	-11.2	-3.4	11.0	-2.9	8.6	-3.7
Consumption	11.0	3.7	-8.3	-3.8	11.3	-3.4	8.7	-4.3
Capital Stock	9.6	6.7	-16.1	-4.9	10.8	-3.4	7.0	-4.6
Labor Force Participation	-1.5	-0.7	0.4	0.1	-1.7	0.1	-0.5	0.4
Labor Productivity	12.0	4.12	-11.6	-3.5	13.0	-3.0	9.2	-4.1
Efficiency Units - Unskilled	7.0	-3.6	-2.2	-0.23	8.2	-2.8	7.4	-3.1
Efficiency Units - Skilled	26.8	22.1	-26.8	-10.8	23.4	-1.8	19.0	-3.5
Panel B: Educational Outcomes (pp change)								
No Schooling	-27.6	1.5	9.3	2.5	-30.7	4.1	-27.3	5.6
Primary Schooling	16.5	-1.1	-1.9	-0.4	19.3	0.6	19.1	-0.0
Secondary Schooling	9.0	-2.2	-5.4	-1.3	9.6	-4.6	6.9	-5.3
College	2.1	1.8	-2.0	-0.8	1.8	-0.1	1.4	-0.3
Panel C: Distributional Outcomes (pp change)								
Top 10% Earnings Share	-0.2	1.4	-1.6	-0.8	-0.8	-0.5	-0.7	-0.5
Poverty Rate	-7.8	-1.5	-2.0	2.0	-7.3	2.6	-7.5	2.8
Earnings Gini	-0.88	0.87	-3.78	-1.00	-1.19	-0.65	-1.23	-0.71

Notes: Columns (2) and (3) recompute outcomes in the final steady state with the counterfactual assumption that $\lambda = 0$, keeping other general equilibrium variables (w^u, w^s, r) unchanged. Columns (4) and (5), (6) and (7), and (8) and (9) recompute outcomes in the final steady state with the counterfactual assumption that choices (household policy functions) human capital (middle and high school and college), savings, and labor force participation are unchanged, respectively. General equilibrium variables (w^u, w^s, r, λ) are unchanged. Output, consumption, capital, and efficiency units are given in per capita terms.

macroeconomic outcomes across policies. We then examine what drives welfare differences across policies. We conclude this section by evaluating different policy parameters for the UBI and the CCT, to understand what drives their success (or failure). In particular, we focus on the education and the means-testing conditionalities.

7.1 Mechanisms - Macroeconomic Outcomes

To further investigate the mechanisms behind the results of the UBI and CCT policies, we compute four different counterfactual exercises. First, to analyze the role of (dis)incentives arising from tax changes, we hold taxes constant ($\lambda = 0$) and re-compute the ('pseudo') equilibrium under the implemented policies.

We then compute three distinct counterfactuals, keeping household policy functions (choices) constant. First, to investigate the role of human capital accumulation, we keep education decisions fixed (at their initial steady-state level). Second, to explore the role of savings and physical capital accumulation, we hold savings policy functions constant. Finally, to study the role of labor supply decisions, we keep those (i.e. P_g^w) unchanged. In each exercise, we maintain equilibrium objects – w^s, w^u, r, and λ – at the final steady-state (post-policy) levels. This allows us to focus on the individual effect of each specific change. Table 4 displays the results.

A comparison of columns 2 and 3 in Table 4 with the corresponding values in Table 3 reveals the substantial impact of additional taxes required to fund the policies. Without tax adjustments, the per capita output impact would increase from 5.5% to 10.3% for the CCT and shift from a 4.7% decline to a 3.4% increase for the UBI. Under both policies, labor supply and capital stock would also be significantly higher. Notably, poverty would have decreased by 1.5 percentage points in the UBI without tax variation, contrasting with the 3 pp increase observed in general equilibrium. This effect, alongside higher capital and labor supply, is further supported by a slight improvement in educational outcomes. These results suggest that a major challenge of cash transfer policies is the impact of taxes required to finance the program. Specifically, for the UBI, the rise in tax rates is a key factor behind its adverse economic effects and its limited impact on poverty.

Column 4 of Table 4 indicates that human capital is the primary driver of change in the CCT case. Without shifts in educational decisions, this policy would result in an 11.2% decline in per capita output rather than a 5.5% increase. Here, even with human capital policy functions fixed, higher taxes reduce savings and, consequently, the capital stock. This, in turn, decreases income, indirectly affecting human capital accumulation. As a result, school attendance drops despite the fixed human capital policy functions.

Column 6 of Table 4 shows that if savings decisions were unchanged, the CCT would have led to a higher output, labor productivity, and capital stock. The same is true for labor supply decisions (column 8). In other words, this policy discourages physical capital accumulation and labor supply. Those incentives are, however, overcome by the induced human capital accumulation, which explains the outcomes in Table 3.

Turning our attention to the UBI, columns 5, 7, and 9 show that keeping respectively human capital, savings, and labor supply fixed leads to slightly better outcomes than those shown in Table 3. In each of these cases, per capita output, labor productivity, and poverty are slightly more favorable than the equilibrium values shown in Table 3. In other words, the incentives driven by the UBI contribute to a long-term decline in income.

Overall, the results in Table 4 suggest that while both policies discourage savings and labor supply, the CCT's school attendance requirement offsets these negative effects. By fostering a more educated workforce, the CCT also stimulates long-term physical capital accumulation, leading to higher per capita income and lower poverty rates.

7.2 Mechanisms - Welfare

We now investigate in further detail the driving mechanisms of the changes in welfare explained in Section 6. In particular, we decompose the welfare changes into three components: (i) the effects of the transfer only, (ii) the effect of the required increase in taxes, and (iii) the impact of equilibrium changes in wages (w^u and w^s) and the interest rate r.

We follow the procedure in Nord et al. (2024) to implement this analysis. Namely, we simulate three counterfactual transitional dynamics. In the first case, we keep taxes, wages, and the interest rate at their initial steady-state levels and simulate the dynamic response of the economy to an unexpected permanent implementation of each transfer scheme. In the second case, we simulate the economy in response to *only* the path of changes in taxes (λ) implied by the equilibrium response of the economy to the policy change. In this case, wages and the interest rate are kept constant, at their initial steady-state level, and transfers are absent. Third, we simulate the economy in response to the path of changes in wages and the interest rate implied by the equilibrium response of the economy to the policy change. In this case, $\lambda = 0$, and transfers are absent. Naturally, in all three cases, the equilibrium conditions are not enforced. Results are displayed in Figure 11.

The figure reveals that most of the effects of both policies on welfare are due to their direct

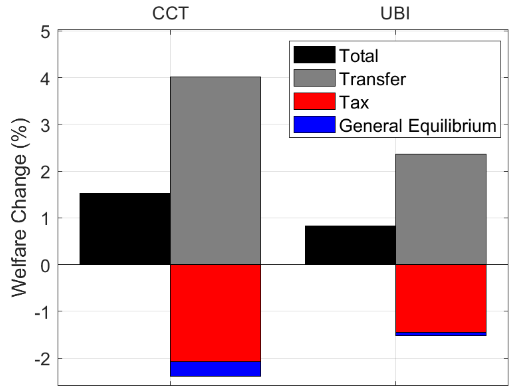

Figure 11: Decomposition of Welfare Impacts - CCT vs. UBI

Notes: The figure shows the decomposition of welfare changes due to the direct impact of transfers (gray bars), the direct impact of taxes (red bars), and the impact of general equilibrium changes in wages and the return on saving (w^u, w^s, and r). These changes are computed by (counterfactually) simulating the response of the economy to the change on the equilibrium path of each of those variables. The total impact for each policy is displayed in the black bar.

redistributive effects, and not due to their equilibrium impact on wages and the interest rate. The partial impact of the transfer (gray bars) is greater in the CCT, compared to the UBI, a consequence of its better targeting.[41] On the other hand, the (negative) effect of the increase in taxes brought about by the CCT is larger, as the required tax under this policy is higher than that of the UBI over the first years of the transition (see Figure 5), which is the relevant time horizon for the cohorts living at the time of policy implementation. However, the welfare costs associated with higher taxation are insufficient to overturn the greater welfare benefits of the CCT.

Do the results above mean that equilibrium changes are irrelevant in determining the impact of Cash Transfer Policies? The answer is no: equilibrium changes in the *distribution of households* are key in determining not only the long-term macroeconomic impact of transfer policies (as seen in Table 4) but also in assessing the welfare of different cohorts over time. To explore the latter argument, we conduct the following exercise: after the policy implementation, we consider counterfactual evolutions of the distribution over individual states, keeping one policy function (labor supply, savings, and human capital decisions) fixed at a time. We then compute the welfare change for living cohorts over time, similarly to Figure 9. This exercise is informative about the role of changes in decisions associated with each policy, which in turn affect the future distribution of households and, consequently, the welfare of future generations. Figure 12 displays the results.

First, note that the solid lines reproduce those of Figure 9. Second, the lines referring to labor supply (fixed P^w, dashed) and savings (fixed g^a, dotted) lie above their respective solid counterparts for the UBI and the CCT. This means that absent changes in these decisions, welfare would have been higher for living cohorts throughout the entire transition period. In other words, both policies introduce (dis)incentives for savings and labor supply, which in turn reduce wealth accumulation and income over time and ultimately lead to a decline in welfare for future generations

[41]Note that, in principle, because the CCT restricts the choice set of households (by requiring school attendance), better targeting (at high marginal utility individuals) does not necessarily guarantee higher welfare returns.

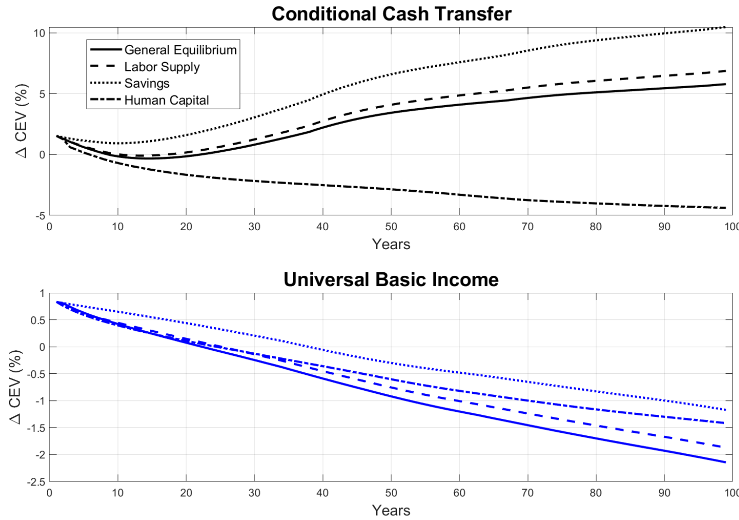

Figure 12: Decomposition of Intergenerational Welfare Impacts - CCT vs. UBI

Notes: The figure decomposes the intergenerational welfare impacts of the Conditional Cash Transfer (CCT) and Universal Basic Income (UBI) policies. Solid lines reproduce the welfare changes shown in Figure 9, while dashed, dotted, and dash-dotted lines depict welfare changes under counterfactual scenarios where labor supply, savings, or human capital decisions, respectively, remain fixed.

due to equilibrium changes in the distribution of households.

The contrasting feature between both panels of Figure 12 is the impact of human capital decisions. For the CCT, the dash-dotted line indicates that absent changes in these choices, welfare would have been substantially lower for all cohorts after the policy introduction. In other words, the Conditional Cash Transfer program ensures that future generations are more educated, and the associated changes in the distribution of households lead to not only substantially superior macroeconomic outcomes (Table 4) but also significantly higher welfare. In contrast, in the bottom panel, the dash-dotted line lies above the solid line, meaning that the (dis)incentives to accumulate human capital introduced by the UBI lead to a loss in welfare for all future cohorts.

Once again, this section highlights the role of incentives for human capital accumulation in driving the differences between the outcomes resulting from the introduction of distinct cash transfer programs. *A priori*, this result indicates that a desirable feature of a CCT is its school enrollment requirement. In the next section, however, we argue that that is not necessarily the case.

7.3 What Drives the Success of a Cash-Transfer Program?

We will now examine in greater detail the role of the two features that distinguish the CCT from the UBI: the school attendance and means-testing conditionalities. To this end, we analyze (i) a CCT policy that includes the school enrollment requirement but excludes income conditioning, and (ii) a means-tested policy that does not impose a school enrollment requirement. In both cases, we adjust the size of the individual transfer to ensure that total transfers in the first period of policy implementation are consistent with those in our previous analysis, in agreement with our definition of "fiscal budgetary equivalence."

Table 5, similar to Table 3, displays the long-term comparison between the three proposed policies: column (2) replicates the one on Table 3, while column (3) displays the results for the CCT with *only* the school attendance conditionality and column (4) considers the CCT with the means-testing element but without the school conditionality.

Table 5: Changes in Macroeconomic Indicators - Different CCT Conditionalities

Outcome	Baseline CCT (2)	CCT - *Only Schooling* (3)	CCT - *Only Means-Testing* (4)
Panel A: Macroeconomic Variables (% change)			
Output	5.5	11.4	-20.3
Consumption	6.3	12.3	-21.9
Capital Stock	2.4	11.6	-25.4
Labor Force Participation	-0.9	-1.3	1.4
Labor Productivity	6.5	13.0	-21.3
Efficiency Units - Unskilled	7.0	10.2	-13.2
Efficiency Units - Skilled	10.2	15.9	-28.9
Marginal Tax Rate Increase (λ)	1.06	-0.36	7.3
Transfers-to-GDP Ratio	0.80	0.82	1.62
Panel B: Educational Outcomes (change in pp.)			
No Schooling	-26.4	-22.7	33.4
Primary Schooling	20.0	5.7	-12.0
Secondary Schooling	5.7	15.8	-19.3
College	0.8	1.1	-2.0
Panel C: Distributional Outcomes (pp change)			
Top 10% Earnings Share	-1.0	-0.4	-2.7
Earnings Gini (x100)	-1.77	-0.55	-3.9
Gini (Not Inclusive of Transfers)	-0.36	-0.0	-1.22
Poverty Rate	-7.1	-9.0	16.4
Poverty Rate (Not Inclusive of Transfers)	-2.0	-5.8	20.5

Notes: The table compares the impact of distinct CCT policies over the long run (steady state). All policies are set to have the same total transfers-to-GDP ratio in the first period of their implementation, but not necessarily over the long run. *Only Schooling* refers to a CCT policy that includes the school enrollment requirement but excludes income conditioning, while *Only Means-Testing* refers to a means-tested policy that does not impose a school enrollment requirement. Panel A displays percentage changes, while Panels B and C show changes in percentage points. When computing the poverty rate or the Gini *not inclusive of transfers*, we exclude the transfers from the calculation of earnings.

The results reaffirm the crucial importance of the human capital requirement for the long-term success of the policy. Without such a requirement, the policy would lead to a massive 20.3% decrease in output, as opposed to an increase of 5.5% in the baseline. The mechanism is clear from Panel B: there is a very large reduction in school attendance, with consequent impacts on labor productivity, whose long-term decline in the *Only Means-Testing* policy is larger than 20%. Strikingly, even though the policy is still means-tested, and thus well targeted at the poor, poverty rises by 16.4 percentage points, an increase of almost 65%.

The long-term outcomes of the *Only Means-Testing* program are significantly inferior to those of the baseline UBI of Section 4. The reason is that a means-tested policy provides incentives for individuals to earn an income below the threshold and, consequently, receive the transfer. This, in turn, has perverse consequences for human capital accumulation and savings. This mechanism has limited importance over the short run, as outcomes of the baseline CCT and the *Only Means-*

Testing are similar (see Figure D1 in Online Appendix D). However, over time, the absence of school conditionality leads to a slow but steady deterioration in income, ultimately causing the large decline shown in Table 5.

The *Only Schooling* version of the CCT (column 3), in contrast, displays very beneficial long-term outcomes. For instance, output increases by more than 11%, as opposed to 5.5% in the benchmark policy. Accordingly, consumption, capital stock, and labor productivity rise. These results owe to a much more educated labor force, a direct consequence of the school attendance requirement. In addition, poverty is reduced by a fourth (9 percentage points).

These results highlight the importance of the school requirement in promoting the success of the CCT program in increasing income and reducing poverty. Without this feature, the long-term outcomes of the CCT policy would be catastrophic. Do similar conclusions hold when evaluating the welfare implications of these policies? Figure 13, analogous to Figure 8, shows that the answer is negative.

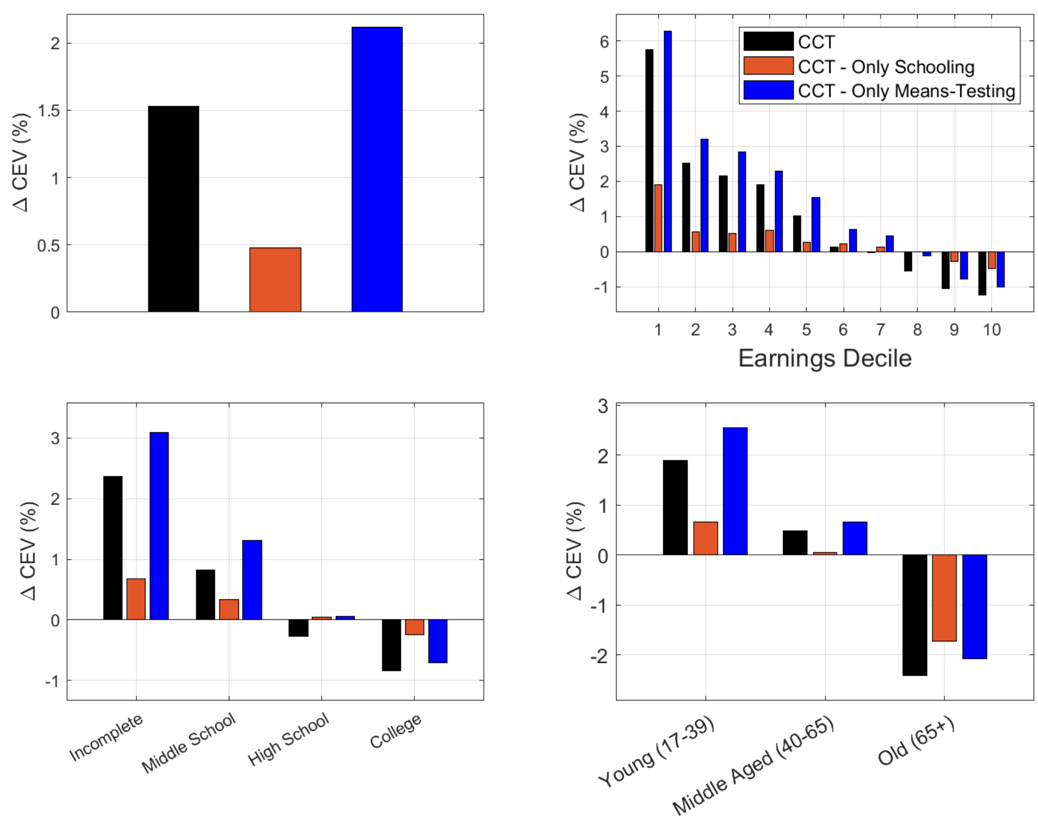

Figure 13: Welfare Comparison - Different CCT Conditionalities

Notes: The figure illustrates the change in welfare for selected groups for cohorts living at the time of each policy's implementation. Welfare is measured in percent changes in permanent consumption equivalent units ($\Delta CEV\%$), computed using expression 11.

Focusing on the aggregate welfare impacts, the top-left panel shows that the CCT with only the school requirement (orange bar) delivers substantially lower welfare gains than the benchmark CCT. The top-right and bottom-left panels indicate that this result is due to poor targeting: welfare gains are more evenly distributed across the income spectrum in this case, but they are considerably smaller for lower-income households.

In contrast, the *Only Means-Testing* policy (blue bars) yields more significant welfare gains than the benchmark CCT. This result is intuitive for two reasons. First, all else equal, the school conditionality reduces individuals' choice set, with a consequent potential reduction in welfare. Our quantitative evaluation shows that general equilibrium effects due to shifts in labor supply and human and physical capital accumulation cannot reverse this partial equilibrium logic.[42] Second, this policy preserves the means-testing, the key driver of welfare gains, as evident from the top-right and bottom-left panels.

The results in this Section highlight another inter-generational dilemma a government may face when designing cash transfer programs. Under a utilitarian welfare criterion, among the policies considered in this section, *Only Means-Testing* yield the highest gains. However, this policy leads to massive impoverishment over the long run, as shown in Table 5. Furthermore, it would reduce welfare by more than 10% (see Figure D3 in Online Appendix D) for future generations. In stark contrast, the *Only Schooling* CCT results in long-term welfare gains exceeding 10%, more than twice those of the benchmark CCT policy. There is clearly a conflict between short- and long-term welfare benefits.

8 Conclusion

This paper studies the macroeconomic and welfare effects of Universal Basic Income (UBI) and Conditional Cash Transfers (CCT) using an overlapping generations model with intergenerational linkages, uninsurable earnings risk, and human and physical capital investments. The model is calibrated to Brazilian data, accurately capturing the earnings distribution and labor supply responses to unearned income observed in empirical studies. Our main findings highlight key trade-offs policymakers face when designing cash transfer programs.

While the redistributive simplicity and broad appeal of a UBI make it a politically attractive option, its implementation presents significant drawbacks. Specifically, our results suggest that although it yields immediate welfare gains for the current generation, which are accompanied by a reduction of poverty and inequality, it imposes substantial long-term costs. Over time, it leads to declines in income and educational attainment, ultimately harming future generations. Notably, poverty levels rise in the long run.

In contrast, a means-tested CCT program with school enrollment requirements delivers greater welfare gains than the UBI along with higher educational attainment and enhanced physical capital accumulation. Over time, these benefits translate into stronger macroeconomic performance, greater welfare gains for future generations, and significant poverty reduction. Our analysis shows that despite reducing welfare gains for the current generation, the school atten-

[42] The insurance-efficiency trade-off of redistributive policies is widely studied in the literature on optimal taxation and optimal unemployment insurance. See McKay and Reis (2021) for a recent example in the context of business cycles.

dance conditionality is key to ensuring the program's long-term success.

Ultimately, the design of cash transfer programs reflects a broader intergenerational trade-off: while the UBI prioritizes modest, immediate welfare gains for most current recipients, CCT programs prioritize the welfare of the poorest individuals, while building a foundation for sustained economic growth and inter and intra-generational equity. Policymakers must weigh these trade-offs carefully.

References

Angelucci, M. and De Giorgi, G. (2009), 'Indirect effects of an aid program: How do cash transfers affect ineligibles' consumption?', *American Economic Review* **99**(1), 486–508.

Balakrishnan, S., Costa, R., Haushofer, J. and Waltenberg, F. (2024), Welfare effects of a permanent unconditional cash transfer program: Evidence from maricá, brazil, Working Paper 33089, National Bureau of Economic Research.
URL: *http://www.nber.org/papers/w33089*

Boar, C. and Midrigan, V. (2022), 'Efficient redistribution', *Journal of Monetary Economics* **131**, 78–91.

Cavalcanti, T. and Santos, M. (2020), '(MIS)Allocation Effects of an Overpaid Public Sector', *Journal of the European Economic Association* **19**(2), 953–999.
URL: *https://doi.org/10.1093/jeea/jvaa038*

Cesarini, D., Lindqvist, E., Notowidigdo, M. J. and Östling, R. (2017), 'The effect of wealth on individual and household labor supply: Evidence from swedish lotteries', *American Economic Review* **107**(12), 3917–46.
URL: *https://www.aeaweb.org/articles?id=10.1257/aer.20151589*

Conesa, J. C., Li, B. and Li, Q. (2020), Universal Basic Income and Progressive Consumption Taxes, Department of Economics Working Papers 20-01, Stony Brook University, Department of Economics.

Daruich, D. and Fernández, R. (2024), 'Universal basic income: A dynamic assessment', *American Economic Review* **114**(1), 38–88.

De Nardi, M., Fella, G. and Paz-Pardo, G. (2019), 'Nonlinear Household Earnings Dynamics, Self-Insurance, and Welfare', *Journal of the European Economic Association* **18**(2), 890–926.
URL: *https://doi.org/10.1093/jeea/jvz010*

de Souza, P. H. G. F., Osorio, R., Paiva, L. H. and Soares, S. (2019), Os efeitos do programa bolsa família sobre a pobreza e a desigualdade: Um balanço dos primeiros quinze anos, Texto para Discussão 2499, Instituto de Pesquisa Econômica Aplicada, Rio de Janeiro.

Delalibera, B. R., Ferreira, P. and Parente, R. (2023), 'Social security reforms, retirement and sectoral decisions', *UB Economics–Working Papers, 2023, E23/454* .

Egger, D., Haushofer, J., Miguel, E., Niehaus, P. and Walker, M. W. (2019), General equilibrium effects of cash transfers: Experimental evidence from Kenya, Working Paper 26600, National Bureau of Economic Research.

Ferreira, P. C., Monge-Naranjo, A. and Pereira, L. T. d. M. (2024), Of cities and slums, FGV EPGE Economics Working Papers (Ensaios Economicos da EPGE) 844, EPGE Brazilian School of Economics and Finance - FGV EPGE (Brazil).
URL: *https://ideas.repec.org/p/fgv/epgewp/844.html*

Gentilini, U., Grosh, M., Rigolini, J. and Yemtsov, R. (2020), *Exploring Universal Basic Income : A Guide to Navigating Concepts, Evidence, and Practices*, Washington, DC: World Bank.
URL: *https://openknowledge.worldbank.org/handle/10986/32677*

Golosov, M., Graber, M., Mogstad, M. and Novgorodsky, D. (2023), 'How Americans Respond to Idiosyncratic and Exogenous Changes in Household Wealth and Unearned Income*', *The Quarterly Journal of Economics* **139**(2), 1321–1395.
URL: *https://doi.org/10.1093/qje/qjad053*

Guimarães, L. and Lourenço, D. (2024), 'The imperfections of conditional programs and the case for universal basic income'.

Guner, N., Kaygusuz, R. and Ventura, G. (2023), 'Rethinking the welfare state', *Econometrica* **91**(6), 2261–2294.
URL: *https://onlinelibrary.wiley.com/doi/abs/10.3982/ECTA19921*

Hanna, R. and Olken, B. A. (2018), 'Universal basic incomes versus targeted transfers: Anti-poverty programs in developing countries', *Journal of Economic Perspectives* **32**(4), 201–26.

Jaimovich, N., Saporta-Eksten, I., Setty, O. and Yedid-Levi, Y. (2022), 'Universal basic income: Inspecting the mechanisms'.

Lopez-Daneri, M. (2016), 'Nit picking: The macroeconomic effects of a negative income tax', *Journal of Economic Dynamics and Control* **68**(C), 1–16.
URL: *https://EconPapers.repec.org/RePEc:eee:dyncon:v:68:y:2016:i:c:p:1-16*

Luduvice, A. V. D. (2024), 'The macroeconomic effects of universal basic income programs', *Journal of Monetary Economics* **148**, 103615.
URL: *https://www.sciencedirect.com/science/article/pii/S0304393224000680*

McKay, A. and Reis, R. (2021), 'Optimal automatic stabilizers', *The Review of Economic Studies* **88**(5), 2375–2406.

Nord, L., Peruffo, M. and Mendicino, C. (2024), 'Distributive effects of banking sector losses'.

Pedroni, M. Z. and Dyrda, S. (2020), Optimal Fiscal Policy in a Model with Uninsurable Idiosyncratic Shocks, 2020.

Peruffo, M. and Ferreira, P. C. (2017), 'The long-term effects of conditional cash transfers on child labor and school enrollment', *Economic Inquiry* **55**(4), 2008–2030.

Peruffo, M. and Platzer, J. (2024), Secular Drivers of the Natural Interest Rate in the US: A Quantitative Evaluation, Technical report.
URL: *https://raw.githubusercontent.com/mcperuffo/website*$_{m}arcel_{p}eruffo/main/PP2023$*.pdf*

Rauh, C. and Santos, M. R. (2022), How do transfers and universal basic income impact the labor market and inequality?, Cambridge Working Papers in Economics 2208, University of Cambridge and INSPER.

Soares, F. V. (2011), 'Brazil's bolsa família: a review', *Economic and Political Weekly* pp. 55–60.

United Nations (2022), World population prospects 2022, online edition, Technical report, Department of Economic and Social Affairs, Population Division.

Vivalt, E., Rhodes, E., Bartik, A. W., Broockman, D. E. and Miller, S. (2024), The employment effects of a guaranteed income: Experimental evidence from two u.s. states, Working Paper 32719, National Bureau of Economic Research.
URL: *http://www.nber.org/papers/w32719*

Supplemental Appendix

A Additional Details - Model

A.1 Notation Table.

Table A1 below details the notation used in the exposition of our model.

Table A1: Notation Table

Symbol	Meaning	Symbol	Meaning
	Demographics and Life Cycle		
g	Household age	Ψ_g	Probability of household death at age g
f	Fertility rate	n	Population growth rate
$\bar{g}$	Retirement age	n_g	number of generations
	Earnings and Labor		
$z_g(h)$	Stochastic earnings component	h	Human capital level
l	Total endowment of hours	$\bar{l}$	Hours devoted to college education
y	Pre-tax earnings	w^u, w^s	Wages for unskilled and skilled labor
	Education		
$\{h_0, h_1, h_2, h_3\}$	Education levels	$\{\kappa_1, \kappa_2, \kappa_3\}$	Private cost of education
$\{\kappa_1^g, \kappa_2^g, \kappa_3^g\}$	Public cost of education		
	Production		
Y	Output	K	Capital
N	Labor composition	N^u	Unskilled labor (efficiency units)
N^s	Skilled labor (efficiency units)	α	Capital share
A	Total factor productivity (TFP)	ω	Weight on skilled labor
	Taxes and Transfers		
τ_a	Tax on capital returns	τ^{beq}	Tax on bequests
τ_{pen}	Payroll tax	$\bar{y}^{pen}$	Pension tax cap
λ	Earnings tax shifter	$\tilde{\tau}_i$	Marginal tax rates
$\bar{y}_i$	Tax bracket thresholds	$\mathbb{T}$	Transfer amount
	Pensions		
$\xi(z_{48}, h)$	Pension amount	y^{min}, y^{max}	Pension floor and cap
	Household Problem		
a	Assets	$\mathbb{I}^c, \mathbb{I}^{ms}$	College and school enrollment decisions
$\varepsilon^w, \varepsilon^c$	Work and college taste shocks	σ^w, σ^c	Dispersion of taste shocks
μ^w	Location parameter of work taste shock		
$P_g^w(x)$	Probability of labor force participation		
	Preferences and Utility		
σ	Risk aversion	$u(c)$	Flow utility of consumption
β^B	Altruism towards offspring	β	Discount factor

A.2 Additional Details - Households' Problems

Young Adults ($g \in \{6, 7, ..., 20\}$). Beyond deciding whether to participate in the labor force (see expression (4) in the main text), the consumption-savings problem of the young adult is given by:

$$V_g(z,h,a;\ell) = \max_{c,a'} u(c) + \beta \mathbb{E}^{\ell} V_{g+1}^{\ell'}(z',h,a') \tag{12}$$

subject to

$$\begin{aligned} c + a' &= (1+(1-\tau_a)r)a + (y - T(y)) + \mathbb{T}(z,h,a,\ell) + \eta(z)\ell \\ y &= w(h) z_g(h)\ell \\ w(h) &= w_u \text{ if } h \leq h_2 \text{ and else } w(h) = w^s \end{aligned}$$

High School Decision ($g = 25$). For households whose offspring attends middle school, in addition to consumption, savings, and labor supply, at $g = 25$ there is a high-school enrollment decision. Beyond the labor force participation choice, households face the following problem:

$$V_{25}(z,h,a,h_1;\ell) = \max_{c,a',\mathbb{I}^{hs}} u(c) + \beta \mathbb{E}^{\ell}\left[(\mathbb{I}^{hs} V_{26}^{\ell'}(z',h,a',h_2) + (1-\mathbb{I}^{hs}) V_{26}^{\ell'}(z',h,a',h_1)\right] \tag{13}$$

subject to

$$\begin{aligned} c + a' + \kappa_1 &= (1+(1-\tau_a)r)a + (y - T(y)) + \mathbb{T}(z,h,a,h_1,\ell) + +\eta(z)\ell \\ y &= w(h) z_g(h) h \ell \end{aligned}$$

Finally, the problem of households aged $g^{hs} - 1$ whose children are not attending middle school is the same as for those aged between $g = g^{ms}$ and $g = g^{hs} - 1$, to which we now move.

High School Years - Households with Enrolled Children ($g \in \{26, 27, 28, 29\}$) From $g = 26$ to 29, the household consists of one adult and one offspring at high school age. For those enrolled in school, the consumer problem is described below:[43]

$$V_g(z,h,a,h_o;\ell) = \max_{c,a'} u(c) + \beta \mathbb{E}\left[V_{g+1}^{\ell'}(z',h,a',h_o)\right] \tag{14}$$

subject to

$$\begin{aligned} c + a' + \kappa_2 \mathbb{I}(h_o = h_2) &= (1+(1-\tau_a)r)a + (y - T(y)) + \mathbb{T}(z,h,a,h_o,\ell) + \eta(z)\ell \\ y &= w(h) z_g(h)\ell \end{aligned}$$

A.3 Aggregation.

In our implementation, we approximate the households' problem using discretized grids for assets and labor productivity, and thus present the aggregation equations accordingly. We define the measure of households over individual states (z, h, a, h_o) (before the realization of taste shocks) as

[43] At the age of $g = 29$, the relevant future value for the household is the pre-bequest value, which we denote by $\tilde{V}(z,h,a,h_o)$. Accordingly, the objective function at that period is $V_{29}(z,h,a,h_o;\ell) = \max_{c,a'} u(c) + \beta \mathbb{E}\left[\tilde{V}(z',h,a',h_o)\right]$.

$\Lambda(x)$. In addition, for life stages in which the offspring human capital is a relevant state variable, for simplicity, we use the following convention:

$$P^w_{gt}(z,h,a) \equiv \sum_{h_o} P^w_{gt}(z,h,a,h_o)\Lambda(z,h,a,h_o)$$
$$\Lambda(z,h,a,g) \equiv \sum_{h_o} \Lambda(z,h,a,h_o)$$

Aggregation - Workers. Unskilled workers consist of non-college-educated individuals (including those who currently attend college). Total efficiency units of unskilled labor are given by:

$$N^u_t = \sum_{g=1}^{\bar{g}-1} \sum_{z,a,h\leq h_2} P^w_{gt}(z,h,a) z_g(h) \Lambda_t(z,h,a,g) + \sum_{g=2}^{5}\sum_{z,a} P^w_{gt}(z,a,h_3) z_g(h_3) \Lambda(z,h_3,a,g) \tag{15}$$

The second term of the equation above corresponds to college students, while the first corresponds to the other workers without college degrees. Total efficiency units of skilled labor are given by:

$$N^s_t = \sum_{g=6}^{\bar{g}-1} \sum_{z,a,h} P^w_{gt}(z,h_3,a) z(h_3) \Lambda(z,h_3,a,g) \tag{16}$$

Market clearing for capital is obtained through aggregating total household savings:

$$\begin{aligned}
K_t = & \sum_{g\notin\{22,..,29\}} \sum_{z,h,a} \left(P^w_{gt}(z,h,a) g_a(z,a,h;\ell=1) + (1-P^w_{gt}(z,h,a)) g_a(z,a,h;\ell=0)\right) \Lambda_t(z,h,a,g) \\
& + \sum_{g=22}^{29} \sum_{z,h,a,h_o} \big(P^w_{gt}(z,h,a,h_o) g_a(z,h,a,h_o;\ell=1) \\
& + (1-P^w_{gt}(z,h,a,h_o)) g_a(z,h,a,h_o;\ell=0)\big)\Lambda_t(z,h,a,h_o,g)
\end{aligned}$$

The government budget balance is given by:

$$\underbrace{\sum_{g=\bar{g}}^{n_g} \sum_{z,h,a} \xi(z,h)\Lambda_t(z,h,a,g) + G_t + exp^{\mathbb{T}}_t + exp^{hc}_t}_{exp_t} = \tag{17}$$

$$\underbrace{\tau_a r_t K_{t-1} + \sum_{g=1}^{\bar{g}-1}\sum_{z,h,a} P^w_g(z,h,a) T(z_g(h)w(h))\lambda_t(z,h,a,g) + \tau_{beq} beq_{t-1} + (1+r_t) beq^{acc}_{t-1} + \tau_w(w^u N^u_t + w^s N^s_t)}_{rev_t}$$

In the expression above, exp^{hc}_t and $exp^{\mathbb{T}}_t$ correspond respectively to total government expenses with education and transfers. as follows:[44]

$$
\begin{aligned}
exp_t^{CCT} = & \sum_{g \notin \{22,..,29\}} \sum_{z,h,a} \left(P_{gt}^{w}(z,h,a)\mathbb{T}(z,a,h,1,g) + (1 - P_{gt}^{w}(z,h,a))\mathbb{T}(z,a,h,0,g) \right) \Lambda_t(z,h,a,g) \\
& + \sum_{g=22}^{29} \sum_{z,h,a,h_o} \big(P_{gt}^{w}(z,h,a,h_o)\mathbb{T}(z,h,a,h_o,1,g) \\
& + (1 - P_{gt}^{w}(z,h,a,h_o))\mathbb{T}(z,h,a,h_o,0,g) \big) \Lambda_t(z,h,a,h_o,g) && (18) \\
exp_t^{hc} = & \sum_{g=22}^{25} \sum_{z,h,a} + \kappa_1^g \Lambda_t(z,h,a,h_1,g) + \sum_{g=26}^{29} \sum_{z,h,a} \kappa_2^g \Lambda_t(z,h,a,h_2,g) + \\
& + \sum_{z,a} \kappa_3^g P^c(z,h_2,a)\Lambda_t(z,h_2,a,1) + \sum_{g=2}^{5} \sum_{z,a} \kappa_3^g \Lambda_t(z,h_3,a,g) && (19)
\end{aligned}
$$

In addition, endogenous and accidental bequests are given respectively by:

$$
\begin{aligned}
beq_t = & \sum_{z,h,a,h_o} \big(P_g^{w}(z,h,a,h_o) g^b(z,h,g_a,h_o;\ell=1) \\
& + (1 - P_g^{w}(z,h,a,h_o)) g^b(z,h,g_a,h_o;\ell=0) \big) \Lambda_t(z,h,a,h_o,30) \\
beq_t^{acc} = & \sum_{g=47}^{99} \sum_{z,h,a} \Psi_g \left(P_{gt}^{w}(z,h,a) g_a(z,a,h;\ell=1) + (1 - P_{gt}^{w}(z,h,a)) g_a(z,a,h;\ell=0) \right) \Lambda_t(z,h,a,g)
\end{aligned}
$$

In the expression for endogenous bequests above, $g_{\tilde{a}}$ represents the policy function induced by the bequest problem (8) and $\Lambda_t(z,h,a,h_o,30)$ is the pre-split distribution of households over states induced by policy functions in the previous period for households aged 29.

A.4 Laws of Motion - Individual States.

Let $H(x)$ denote the savings policy as a function of individual state x. Let the matrices P_g and P_g^0 correspond to the transition matrices referring respectively to labor force participants $\ell = 1$ and non-participants ($\ell = 0$). We explain how we construct P^0 below in Appendix Section B. In addition, we employ the following auxiliary term:

$$
\begin{aligned}
H_{gt}(z,h,a;a',z') = & P_{gt}^{w}(z,h,a)\mathbb{I}(g_t^a(z,h,a;\ell=1) = a')P_g(z'|z) \\
& + (1 - P_{gt}^{w}(z,h,a))\mathbb{I}(g_t^a(z,h,a;\ell=1) = a')P_g^0(z'|z)
\end{aligned}
$$

The auxiliary term $H_{gt}(z,h,a;a',z')$ captures the proportion of households with pre-taste-shock state (z,h,a) whose savings equal a' and future z will equal z'. We define $H_{gt}(z,h,a,h_o;a',z')$ in the same way.

Below, we describe the law of motion for $\Lambda(x)$, depending on household age g. Throughout, $\mathbb{I}$ refers to the indicator function.

[44] In the expression 18, we employ a slight abuse of notation in assuming that for retirees, $\ell = 1$.

1. if $g = 1$ and $h = h_2$:

$$\Lambda_{t+1}(z', h_3, a', g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)P^c(z, h, a)H_{gt}(z, h, a; a', z', \mathbb{I}^c = 1)$$
$$\Lambda_{t+1}(z', h_2, a', g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)(1 - P^c(z, h, a))H_{gt}(z, h, a; a', z', \mathbb{I}^c = 0)$$

2. if $g = 1$ and $h \in \{h_0, h_1\}$ or if $2 \leq g \leq 20$

$$\Lambda_{t+1}(z', h, a', g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a; a', z')$$

3. if $g \geq 47$[45]

$$\Lambda_{t+1}(z', h, a', g+1) = \frac{\Psi_g}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a; a', z')$$

4. if $g = 21$

$$\Lambda_{t+1}(z', h, a', h_1, g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a; a', z')\mathbb{I}_{ms}(z, h, a)$$
$$\Lambda_{t+1}(z', h, a', h_0, g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a; a', z')(1 - \mathbb{I}_{ms}(z, h, a))$$

5. if $g = 25$ and $h_o = h_1$:

$$\Lambda_{t+1}(z', h, a', h_2, g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a, h_o; a', z')\mathbb{I}_{hs}(z, h, a)$$
$$\Lambda_{t+1}(z', h, a', h_1, g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, g)H_{gt}(z, h, a, h_o; a', z')(1 - \mathbb{I}_{hs}(z, h, a))$$

6. if $22 \leq g < 25$, or $g = 25$ and $h_o = h_0$, or $26 \leq g < 29$:

$$\Lambda_{t+1}(z', h, a', h_o, g+1) = \frac{1}{1+n}\Lambda_t(z, h, a, h_o, g)H_{gt}(z, h, a, h_o; a', z')$$

7. $g = 29$, the mass of newly founded households is:

$$\Lambda_{t+1}(z', h_o, \tilde{a}, 1) = \frac{f}{1+n}\Lambda_t(z, h, a, h_o, 29)\Big[$$
$$P^w_{29t}(z, h, a, h_o)\mathbb{I}(g^a_t(z, h, a; \ell = 1) = a')\bar{P}(z')\mathbb{I}[((1 - \tau^{beq})g^b(z, a', h, h_o; \ell = 1))$$
$$+ (1 - P^w_{gt}(z, h, a, h_o))\mathbb{I}(g^a_t(z, h, a; \ell = 1) = a')\bar{P}(z')\mathbb{I}[((1 - \tau^{beq})g^b(z, a', h, h_o; \ell = 0)) = \tilde{a}]\Big]$$

Note the difference in the transition matrices P, now indicated by $\bar{P}$. These probabilities are independent from previous realizations of P, and mimic the percentiles used in the discretization of the earnings process.

[45] For the case of retirees, the transition matrix P is diagonal.

8. The mass of continuing households after the bequest period is given by:

$$\Lambda_{t+1}(z', h, \tilde{a}, 30) = \frac{1}{1+n}\Lambda_t(z, h, a, h_o, 29)\Big[$$
$$P^w_{29t}(z, h, a, h_o)\mathbb{I}(g^a_t(z, h, a; \ell = 1) = a')P_g(z'|z)\mathbb{I}[(a' - g^b(z, a', h, h_o; \ell = 1))$$
$$+ (1 - P^w_{gt}(z, h, a, h_o))\mathbb{I}(g^a_t(z, h, a; \ell = 1) = a')P^0_g(z'|z)\mathbb{I}[(a' - g^b(z, a', h, h_o; \ell = 0)) = \tilde{a}]\Big]$$

Note that, in the expressions above, the bequest policy function depends on the previous working choice because the transition matrix P also depends on it.

B Calibration - Additional Details

B.1 Demographics

We now detail our assumptions regarding the demographic dynamics of the economy. The discussion below is based on Peruffo and Platzer (2024) (see their Appendix B).

Let N_{gt} be the *size* of generation g at time t, M_{gt} be the *size* of the net migration flow at time t. Our task is to select the migration flows to ensure that, in the stationary equilibrium, the population age shares in the model are identical to those of Brazil in 2000. If, instead, we selected migration flows to be nill, empirical mortality rates together with population growth n would imply a stationary distribution of age shares ϕ_g different than those observed in the data.[46]

Population shares are given by $\phi_{gt} \equiv \frac{N_{gt}}{N_t}$, with $\sum_g N_{gt} = N_t$. The flow of population aged g is given by:

$$N_{gt} = (1 - \Psi_{g-1})N_{g-1,t-1} + M_{g-1,t-1}$$

Population shares are then given by:

$$\begin{aligned}\phi_{gt} &= (1 - \Psi_{g-1})\frac{N_{g-1,t-1}}{N_t} + \frac{M_{g-1,t-1}}{N_t} \\ &= \frac{1}{1+n}((1 - \Psi_{g-1})\phi_{g-1,t-1} + m_{g-1,t-1}),\end{aligned}$$

where $m_{g-1,t-1} \equiv \frac{M_{g-1,t-1}}{N_{t-1}}$.[47]

Computing f. Conditional on stable population age shares, the parameter f depends on the relative size of the cohort at $g = 29$, and the population growth parameter n. To compute it, we proceed as follows: assume that Φ_t, a row vector whose entries sum to one, represents the distribution of household ages. We construct Q, the transition matrix across ages, whose entries are denoted by q_{ij}. This matrix is time-invariant, given our stationarity assumption regarding the demographic structure of the population and mortality rates. We then define the following objects:

[46] M can also be interpreted as residuals, stemming from the fact that the empirically observed population shares are not stationary.

[47] We assume that conditional on a particular age g, the wealth and earnings distributions among "migrants" are the same as that among domestic citizens.

- $\mathbf{1}$ is a column vector of ones with the same size as Φ_t (n_g)
- Γ is a matrix whose entries γ_{ij} respect:

$$\gamma_{ij} = \begin{cases} 1 \text{ if } i = 29\text{, and } j = 1 \\ 0 \text{ otherwise} \end{cases}$$

That is, the matrix Γ selects only the non-zero entries of Q in the case of transition from the state immediately before the household breakup to the newly founded household.

Consider the following operation:

$$\mathbf{v}_{t+1} = \Phi_t(Q + f \times Q \circ \Gamma),$$

where $\circ$ represents an element-wise matrix multiplication. The vector $\mathbf{v}_{t+1}$ represents population age *quantities* (not shares) in period $t+1$. We propose computing the value of f to ensure a constant population growth n. In other words, we want to find f such that:

$$\mathbf{v}_{t+1} \cdot \mathbf{1} = (1+n)\Phi_t \cdot \mathbf{1} = (1+n),$$

where we use the fact that $\Phi_t \cdot \mathbf{1} = 1$. We can then solve the following equation:

$$\begin{aligned} \mathbf{v}_{t+1} &= \Phi_t(Q + f \times Q \circ \Gamma) \\ \mathbf{v}_{t+1} \cdot \mathbf{1} &= \Phi_t(Q + f \times Q \circ \Gamma) \cdot \mathbf{1} \\ (1+n) &= \Phi_t Q \cdot \mathbf{1} + f \times (Q \circ \Gamma) \cdot \mathbf{1} \end{aligned}$$

Rearranging:

$$f = \frac{1 + n - \Phi_t Q \cdot \mathbf{1}}{(Q \circ \Gamma) \cdot \mathbf{1}} \tag{20}$$

Note that the distribution of agents over states in period $t+1$ is given by:

$$\Phi_{t+1} = \frac{\mathbf{v}_{t+1}}{1+n}$$

Finally, assuming $\Phi_t = \Phi_{t+1} = \Phi$, we compute f by applying the observed age shares, taken from United Nations (2022), to Expression 20.

B.2 Construction of Transition Matrices for Out-of-the-labor-force Households ($\ell = 0$)

We now explain how we introduce expected earnings losses in the case of households who choose not to work. Consider the row vector of grid points $z = [z_1, z_2, ..., z_N]$ and corresponding transition matrix P, with rows referring to the current state and columns referring to future states. In this explanation, for clarity, we avoid the subscripts referring to age and education groups.

To introduce earnings losses, we assume that non-workers face a matrix $P^0 = [p_1^0{\prime}, p_2^0{\prime}, ..., p_N^0{\prime}]$, where p_i^0, $i \in \{1, 2, ..., N\}$, are column vectors. If the household's current state is z_1, i.e. the worst possible labor productivity, we posit assume the following transition probabilities:[48]

$$p_1^0 = [p_{11} + x\left(\sum_{j>1}^{N} p_{1,j}\right), p_{1,2}(1-x), ...p_{1N}(1-x)]',$$

where p_{ii} are elements of P. In words, we decrease the probability of this household moving to each higher z by proportional amount x, and, accordingly, increase the probability of the household staying at z_1. Finally, x is selected so that the expected value of (future) z under the measure p_1^0 is $1 - \delta_1^{hc}$ times that of the same expected value under the measure p_1:

$$z \cdot p_1^0 = (1 - \delta_1^{hc}) z \cdot p_1$$

For households whose $z \neq z_1$, we assume the following:

$$p_1^j = [(1+x)p_{j1}, (1+x)p_{j2}, ..., p_{j,j} - x\left(\sum_{k=1}^{j-1} p_{j,k}\right), ...p_{jN} - x\left(\sum_{k=1}^{j-1} p_{j,k}\right)]',$$

In this case, we increase the probability of obtaining a lower z by a factor of x, while reducing the probability of this household maintaining or increasing the current productivity accordingly.[49] Again, we select x to ensure that:

$$z \cdot p_j^0 = (1 - \delta_j^{hc}) z \cdot p_j$$

B.3 Average Earnings over the Life Cycle

Figure B1 below plots the average earnings over the life cycle obtained from simulating the earnings process using the Markov transmission matrices generated in the estimation procedure. Earnings are shown relative to the average earnings of 18-year-olds with incomplete schooling. The figure shows the massive gap between the hourly earnings of college- versus non-college-educated individuals in Brazil, which generally widens with age.

[48]The unemployment state is added incorporated after the adjustments described in this Section are made.

[49]In case any resulting entry of the vector prescribed by the formula above lies below or above one, we keep that entry at (respectively) 0 or 1 and adjust x accordingly.

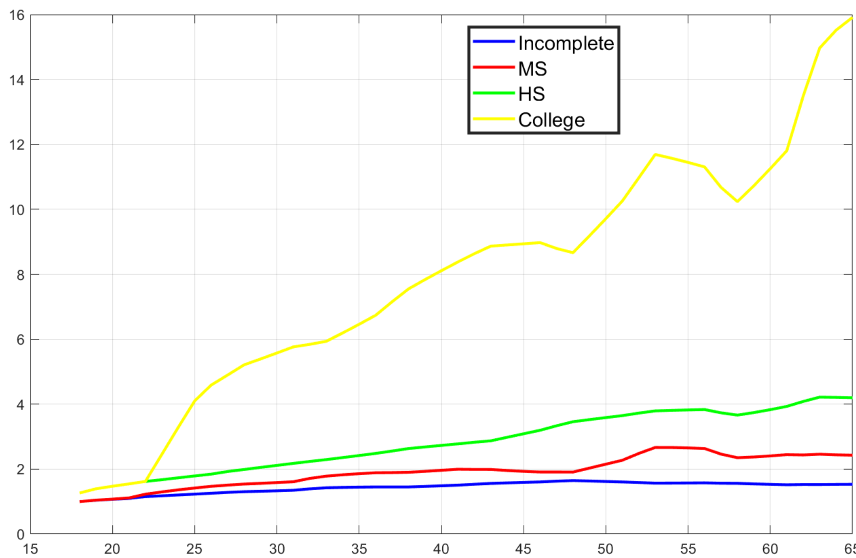

Figure B1: Average Earnings by Age and Education

Notes: The figure shows the average earnings by age and education for participants in the labor force.

B.4 Replication of Empirical Estimates

In Section 2, we conduct a series of partial equilibrium experiments to benchmark the behavior of households against those of existing empirical estimates. We now detail how we replicate those in our model.

To replicate the estimates of Golosov et al. (2023), we simulate a one-time unexpected transfer to all households – similar to a lottery – in partial equilibrium. We then compute the average elasticity in the labor force participation decision ($P_g(x)$), relative to the lottery size, across households. We report the average of those elasticities for different transfer sizes.

To replicate the estimates in Vivalt et al. (2024), we simulate the economy's response to a temporary implementation of a Universal Basic Income (UBI) program that lasts for three years. The transfer amount corresponds to 16.2% of the average household income. We then compute the change in the labor force participation rate, reporting the result in percentage points.

The policy studied by Balakrishnan et al. (2024), in contrast, is a means-tested transfer paid only to households whose income falls below a specific threshold. In particular, only households registered in the *Cadastro Único* qualify for the benefit. According to the authors, "*the Cadastro Único is restricted to households with a total monthly income less than or equal to three times the monthly minimum wage*".

To compare our estimates with those of Balakrishnan et al. (2024), we adopt the following approach. First, we target the transfer to households with incomes below the 55.5th percentile, which approximates the share of households registered in the *Cadastro Único* in 2022. Second, we calibrate the transfer size to be equivalent to 18.7% of recipients' average income, or a monthly

USD 180 PPP per household. The transfer is permanent, which is known by households.

To compute households' labor supply response, we compare the pre- and post-policy labor force participation rate *among recipients* at the implementation period, given that the time frame analyzed in Balakrishnan et al. (2024) is less than a year. For consumption, we compute the percent change in aggregate recipients' consumption.

C Welfare - Additional Details

In this appendix section, we show how to obtain Expression 11, determining our measure of welfare change. Let $V_g^{\ell,ss}(x)$ represent households' beginning-of-period value function in the steady state:[50]

$$V_g^{\ell,ss}(x) = \mathbb{E}\left\{\sum_{t=g}^{n_g} \beta^{t-g}\left(\prod_{k=g}^{t-g}\Psi^{k-g}\right)\left(\frac{(g_{t-g}^c(x))^{1-\sigma}-1}{1-\sigma}+\varepsilon_{w,t-g}\right)+(\beta^B)^{30-g}V_1(\tilde{x})\right\},$$

where g^c represents consumption policy functions and $\tilde{x}$ represents the state variable of the newly founded household, which is induced by the bequest policy.

Consider increasing the consumption of a household permanently – including that of their offspring – by a factor of Δ. Their value function is then:

$$V_g^{\ell,ss}(x;\Delta) = \mathbb{E}\left\{\sum_{t=g}^{n_g} \beta^{t-g}\left(\prod_{k=g}^{t-g}\Psi^{k-g}\right)\left(\frac{(g_{t-g}^c(x)(1+\Delta))^{1-\sigma}-1}{1-\sigma}+\varepsilon_{w,t-g}\right)+(\beta^B)^{30-g}V_1(\tilde{x};\Delta)\right\},$$

Similarly, let $V_g^{\ell,P}(x)$ represent the value function of an individual when the policy P is introduced (first period of the transition). Following Daruich and Fernández (2024), we characterize the consumption-equivalent unit welfare variation of a household due to the introduction of the policy as $\Delta_g^P(x)$ that solves:

$$V_g^{\ell,P}(x) = V_g^{l,ss}(x;\Delta)$$

Because $V_1(\tilde{x})$ is also characterized by a discounted sum of consumption utility and additive preference shocks, $\Delta_g(x)$ is represented by Expression 11, with $\mathcal{S} = x$.

D Additional Results - Section 7

Figures D1 and D2 below reproduce the transitional dynamics for the policies considered in Section 7.3:

Figure D3, analogous to Figure 9 shows the evolution of the welfare of living cohorts after the implementation of the policies.

[50]The exception being $g = 1$ for potential college attendants.

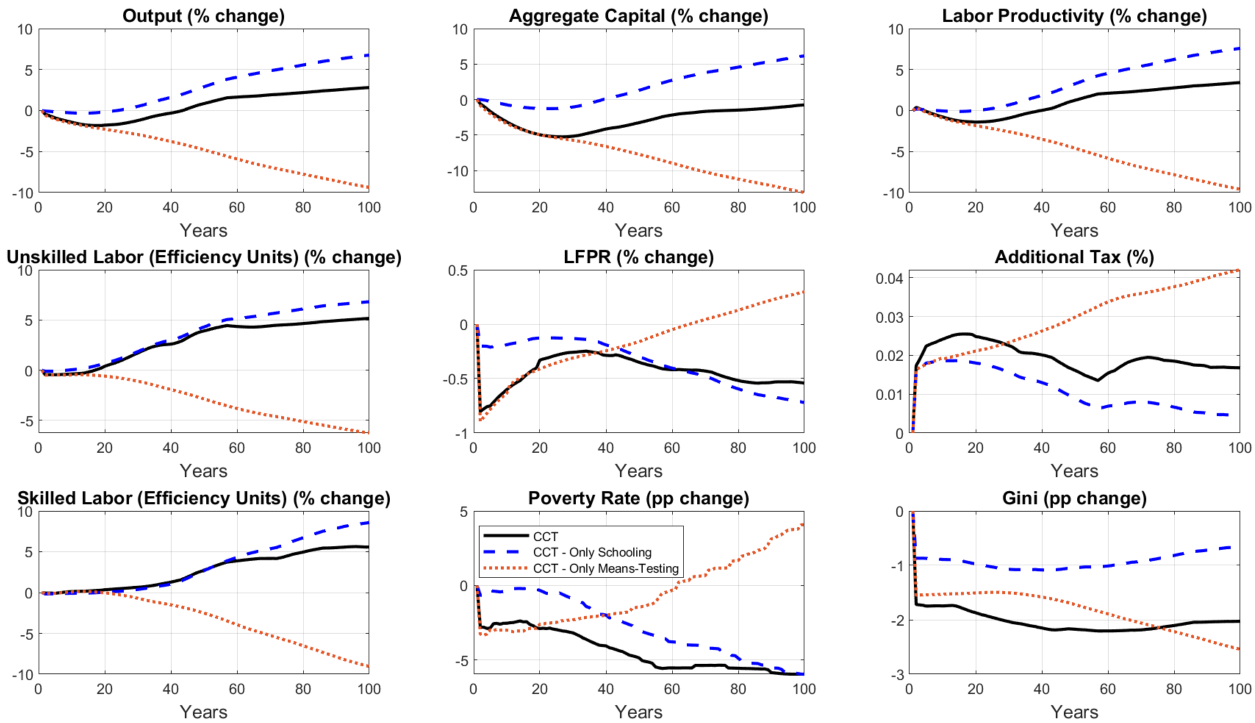

Figure D1: Dynamics of Selected Aggregate Variables - Different Conditionalities

Notes: The figure shows the dynamics of selected variables after the implementation of each policy. LFPR stands for *labor force participation rate. Changes are displayed relative to the initial (no-transfers) steady state.*

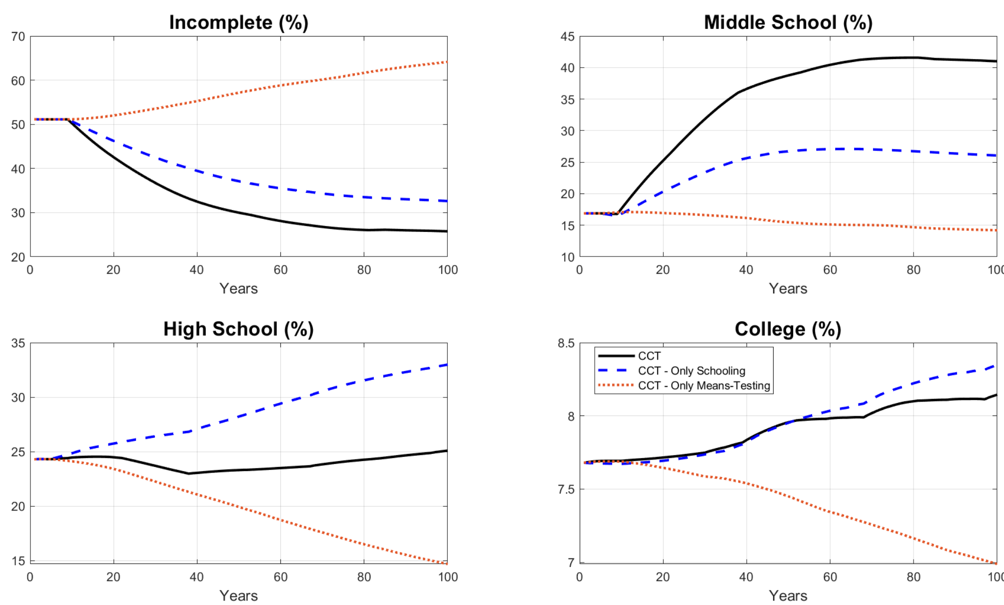

Figure D2: Dynamics of Educational Outcomes - Different Conditionalities

Notes: The figure illustrates the evolution of the labor force shares for each education group following the implementation of each policy.

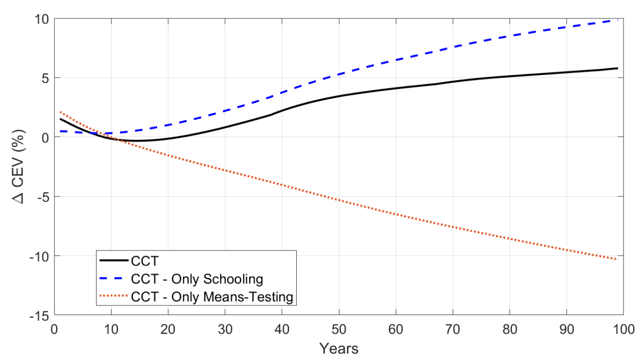

Figure D3: Consumption-Equivalent Welfare Changes over Time - Different CCT Policies

Notes: The figure illustrates changes of welfare of the population over time, relative to the initial steady state.

E Robustness

E.1 Robustness Check - Altruism Parameter β^B

To test the robustness of our exercise to our assumption on the parameter β^B, we re-conduct the whole analysis presented in Sections 4, 5, and 6 using $\beta^B = 0.66$, as in Daruich and Fernández (2024). Tables 2 (internal re-calibration of parameters), 3, and Figures 5, 6, and 8 are replicated below:

Table E1: Internally Calibrated Parameters - $\beta^B = 0.66$

Symbol	Meaning	Moment Description	Data	Model
$f = 0.863$	Fertility Rate Parameter	Population Growth	$n = 1.34\%$	$n = 1.34\%$
$\omega = 0.21$	Share of Skilled Labor	Consistency in Earnings	$w_u - w_s = 0$	$w_u - w_s = -0.0005$
$\nu = 0.87$	Replacement Rate Parameter	Average Replacement Rate	0.9	0.898
$\kappa = \{0.059, 0.188, 0.430\}$	Private School Costs	School Completion Shares	$S = \{0.164, 0.241, 0.076\}$	$S = \{0.148, 0.243, 0.073\}$
$\beta = 0.914$	Discount factor	Capital-to-Output Ratio	2.5	2.5
$\sigma_c == 0.387$	Dispersion - College Taste	Intergenerational College Persistence	0.61	0.66
$\mu_w = 0.043$	Average Disutility of Labor	HH Labor Force Participation	92.5%	95.9%
$A = 0.154$	Per-HH GDP Normalization	Total Factor Productivity	1	0.997

Notes: The table shows the results of the calibration for the parameters selected via a moment matching procedure. In this case, $\beta^B = 0.66$.

Table E2: Changes in Macroeconomic Indicators - CCT vs. UBI - $\beta^B = 0.66$

Outcome	CCT	UBI	Outcome	CCT	UBI
Panel A: Macroeconomic Variables (% change)			*Panel B: Educational Outcomes (change in pp.)*		
Output	5.3	-4.2	No Schooling	-20.4	6.1
Consumption	6.2	-4.5	Primary Schooling	12.8	-1.6
Capital Stock	2.2	-5.3	Secondary Schooling	6.8	-4.1
Labor Force Participation	-0.5	0.1	College	0.8	-0.4
Labor Productivity	5.8	-4.3	*Panel C: Distributional Outcomes (pp change)*		
Efficiency Units - Unskilled	6.5	-2.8	Top 10% Earnings Share	-0.7	-0.5
Efficiency Units - Skilled	10.6	-5.6	Earnings Gini (x100)	-1.6	-0.8
Marginal Tax Rate Increase (λ)	0.7	2.3	Earnings Gini (Not Inclusive of Transfers)	-0.1	-0.2
Transfers-to-GDP Ratio	0.77	0.89	Poverty Rate	-7.8	3.4
			Poverty Rate - Not Inclusive of Transfers	-2.3	4.6

Notes: The table compares the impact of the UBI and CCT policies over the long run (steady state). Both policies are set to have the same total transfers-to-GDP ratio in the first period of their implementation, but not necessarily over the long run. Panel A displays percentage changes, while Panels B and C show changes in percentage points. When computing the poverty rate or the Gini *not inclusive of transfers*, we exclude the transfers from the calculation of earnings. Output, consumption, capital, and efficiency units are given in per capita terms. In this case, $\beta^B = 0.66$.

The takeaways are unchanged: the CCT delivers higher welfare changes and long-lasting economic growth. In contrast, the UBI delivers smaller welfare gains coupled with long-term decreases in output and a rise in poverty.

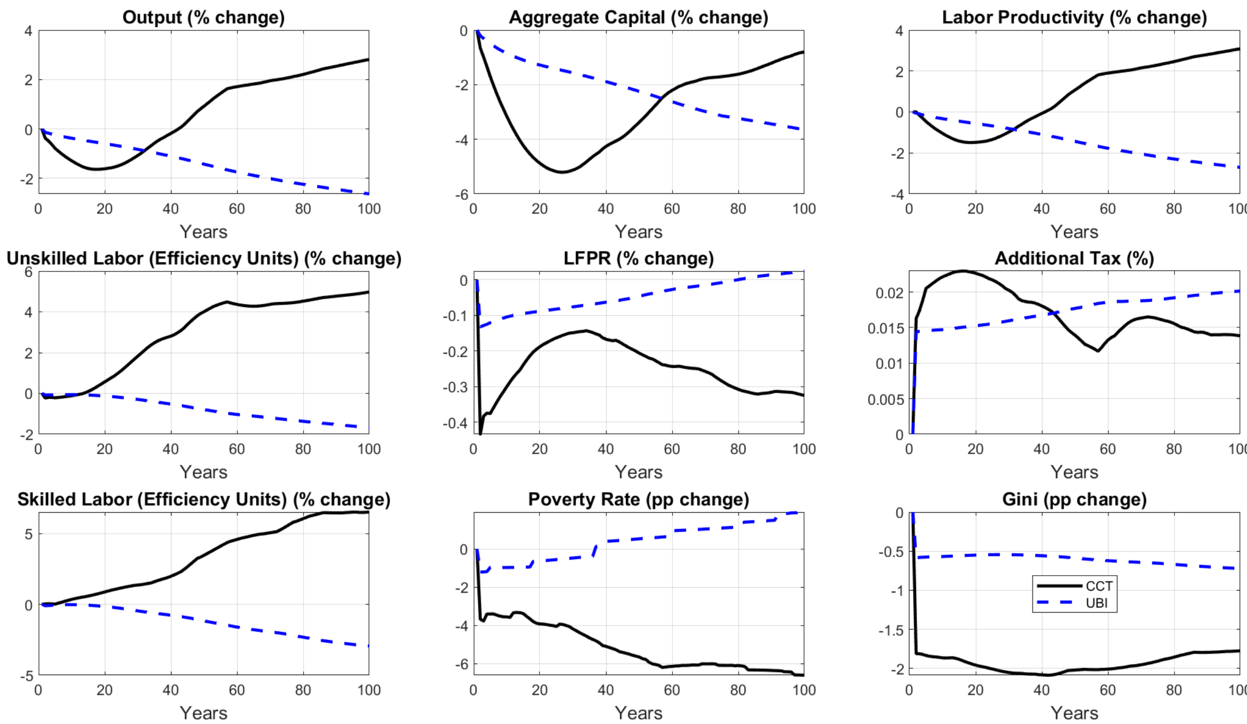

Figure E1: Dynamics of selected aggregate variables along the transition between the baseline steady-state and the policy steady-state. $\beta^B = 0.66$.

Notes: The figure shows the dynamics of selected variables after the implementation of each policy. LFPR stands for labor force participation rate. Changes are displayed relative to the initial (no-transfers) steady state. In this case, $\beta^B = 0.66$.

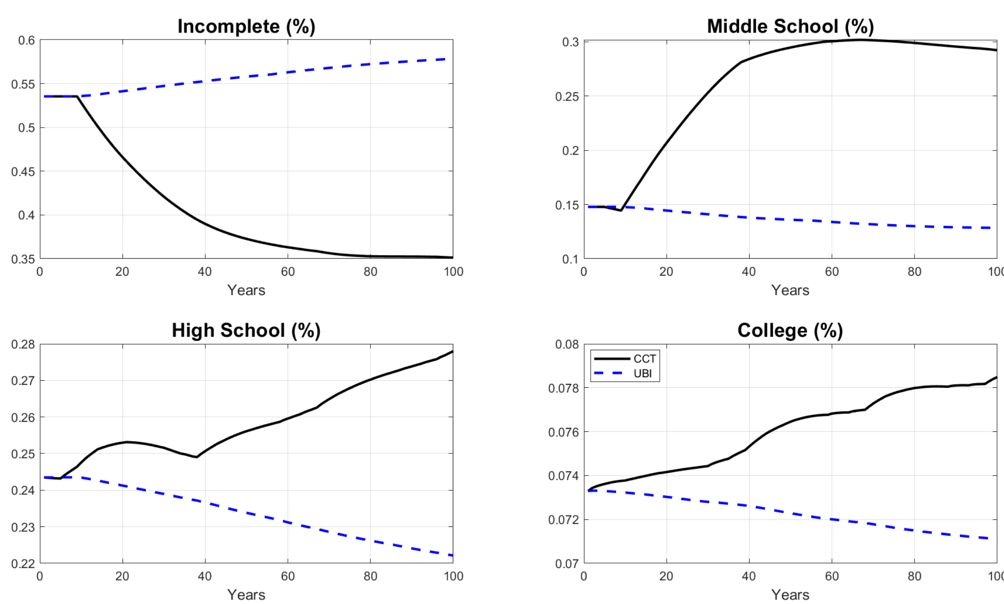

Figure E2: Dynamics of Educational Outcomes - $\beta^B = 0.66$

Notes: The figure illustrates the evolution of the labor force shares for each education group following the implementation of each policy. In this case, $\beta^B = 0.66$.

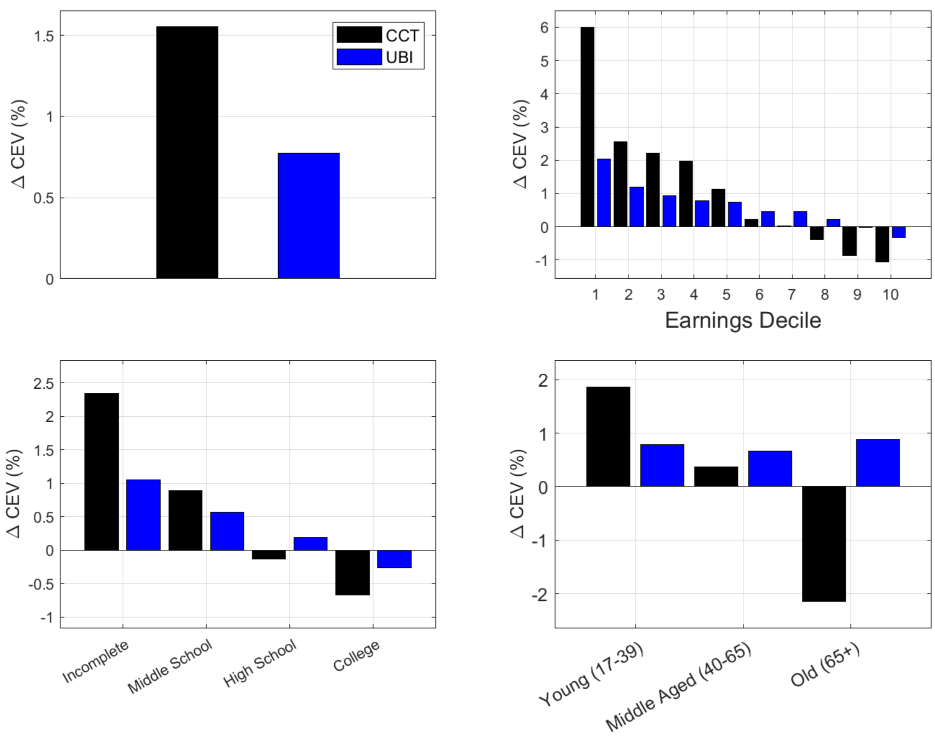

Figure E3: Consumption-Equivalent Welfare Changes for Selected Groups - $\beta^B = 0.66$

Notes: The figure illustrates the change in welfare for selected groups for cohorts living at the time of each policy's implementation. Welfare is measured in percent changes in permanent consumption equivalent units ($\Delta CEV\%$), computed using expression 11. This simulation uses $\beta^B = 0.66$ and a re-calibration of parameters.

E.2 Proportional Tax

We now replicate the main results using a different formulation for the change in taxes brought about by the cash transfer programs. In particular, we assume that the marginal tax rates change proportionately, such that the tax function is now:

$$T(y) = \tau_{pen} \min\{y, \bar{y}^{pen}\} + \begin{cases} 0, & \text{if } y \leq \bar{y}_0 \\ (y - \bar{y}_1)\tilde{\tau}_1(1+\lambda), & \text{if } \bar{y} < y \leq \bar{y}_1 \\ (\bar{y}_1 - \bar{y}_0)\tilde{\tau}_1(1+\lambda) + (y - \bar{y}_1)\tilde{\tau}_2(1+\lambda), & \text{if } \bar{y}_1 < y \end{cases}$$

This formulation consists of a more progressive form of taxation, with increases in taxes being more detrimental to high-income individuals. In addition, we also assume that the tax on the return on savings adjusts similarly:

$$\tau_t^a = 0.15 \times (1+\lambda),$$

The calibration is the same as that presented in Section 2, and main results are presented below:

Table E3: Changes in Macroeconomic Indicators - CCT vs. UBI - Progressive λ

Outcome	CCT	UBI	Outcome	CCT	UBI
Panel A: Macroeconomic Variables (% change)			*Panel B: Educational Outcomes (change in pp.)*		
Output	1.8	-16.8	No Schooling	23.6	16.5
Consumption	2.4	-18.9	Primary Schooling	21.1	-1.1
Capital Stock	-3.5	-26.2	Secondary Schooling	2.1	-13.6
Labor Force Participation	-0.4	2.0	College	0.4	-1.8
Labor Productivity	2.6	-18.5	*Panel C: Distributional Outcomes (pp change)*		
Efficiency Units - Unskilled	5.9	-6.6	Top 10% Earnings Share	-1.2	-2.1
Efficiency Units - Skilled	6.7	-22.3	Earnings Gini (x100)	-0.9	-2.7
λ	0.20	0.81	Earnings Gini (Not Inclusive of Transfers)	-2.3	-2.0
Transfers-to-GDP Ratio	0.79	0.96	Poverty Rate	-5.7	9.9
			Poverty Rate - Not Inclusive of Transfers	-0.8	10.9

Notes: The table compares the impact of the UBI and CCT policies over the long run (steady state). Both policies are set to have the same total transfers-to-GDP ratio in the first period of their implementation, but not necessarily over the long run. Panel A displays percentage changes, while Panels B and C show changes in percentage points. When computing the poverty rate or the Gini *not inclusive of transfers*, we exclude the transfers from the calculation of earnings. Output, consumption, capital, and efficiency units are given in per capita terms. In this case, a progressive tax scheme is used to clear the government budget.

Overall, the comparison across different policies in Table E3 delivers similar insights to that presented in Section 4. There are, however, important nuances. First, note that the proposed taxation scheme delivers worse outcomes for both policies, compared to our main results, with lower income, labor productivity, and higher poverty. The CCT still delivers generally positive long-term outcomes, while in the UBI case losses are particularly dire. The reason is that the additional tax required is detrimental to both physical and human capital investments. Because of how the brackets are designed, the tax is particularly distortionary for high levels of human capital i.e. for those who pay earnings taxes. In the benchmark economy, only 9.5% of households pay any earnings tax. In the case of the UBI, average incomes fall and, consequently, the proportion of households paying any amount of earnings taxes declines, which in turn requires an even higher λ, with further associated distortions.[51] In all, though, the relative comparison across policies remain unchanged.

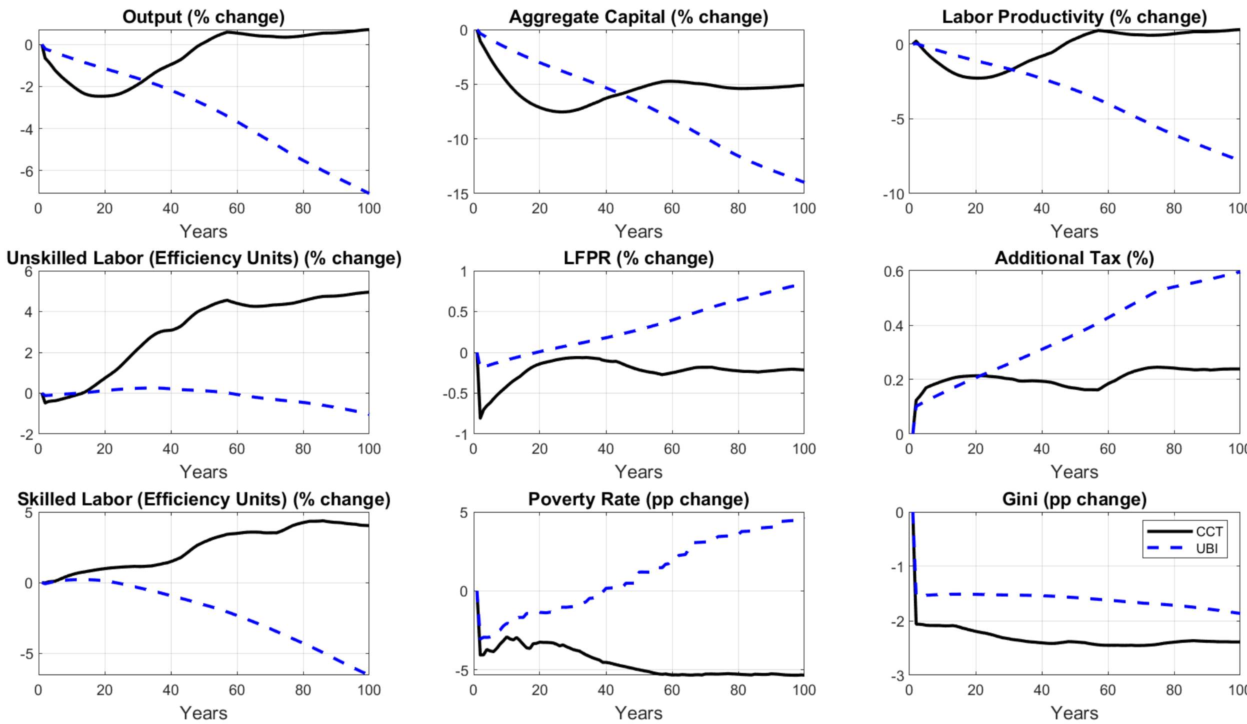

Figure E4: Dynamics of selected aggregate variables along the transition between the baseline steady-state and the policy steady-state - Proportional λ

Notes: The figure shows the dynamics of selected variables after the implementation of each policy. LFPR stands for labor force participation rate. In this case, a progressive tax scheme is used to clear the government budget.

Overall, the dynamics of the economies remain qualitatively unchanged relative to those presented in Section 4. The exception is capital under the CCT, which remains below its steady-state value over the long run, dampening the effect of this policy on labor productivity.

Figure E6 shows that the progressive taxation scheme delivers additional gains for both policies, relative to their Section 6 counterparts. This is particularly true for the CCT, which delivers an economy-wide welfare gain of 2.3% (in consumption-equivalent terms), compared to 1.52% with a flat tax. Equivalent numbers for the UBI are 1.08%, compared to 0.83% in Section 6. These results are explained by the fact that a more progressive taxation scheme ensures transfers are funded by the very rich, and consequently very low-marginal-utility household. Finally, under a democratic majority voting rule, the UBI with progressive tax would remain the preferred policy, but this time by a narrower margin of only 3.4 percentage points.

[51]The proportion of households who pay earnings taxes in the case of the UBI declines by about a third over the long run.

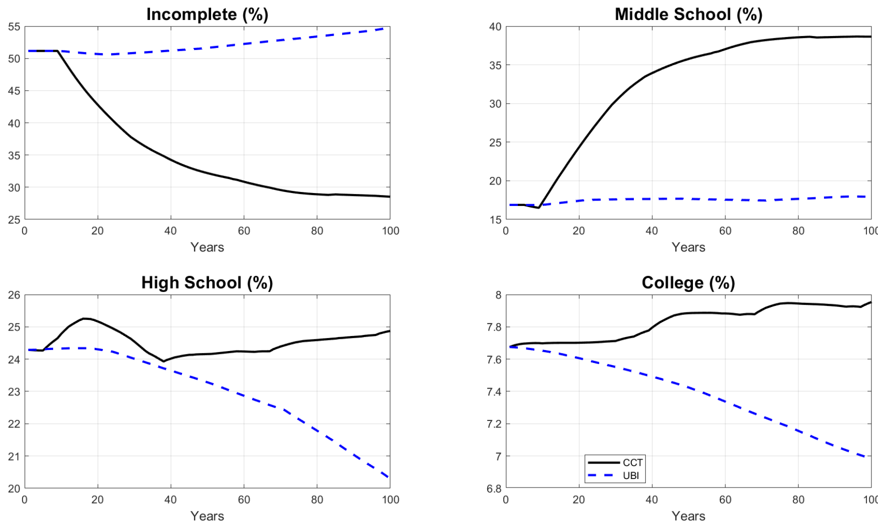

Figure E5: Dynamics of Educational Outcomes - Progressive λ

Notes: The figure illustrates the evolution of the labor force shares for each education group following the implementation of each policy. In this case, a progressive tax scheme is used to clear the government budget.

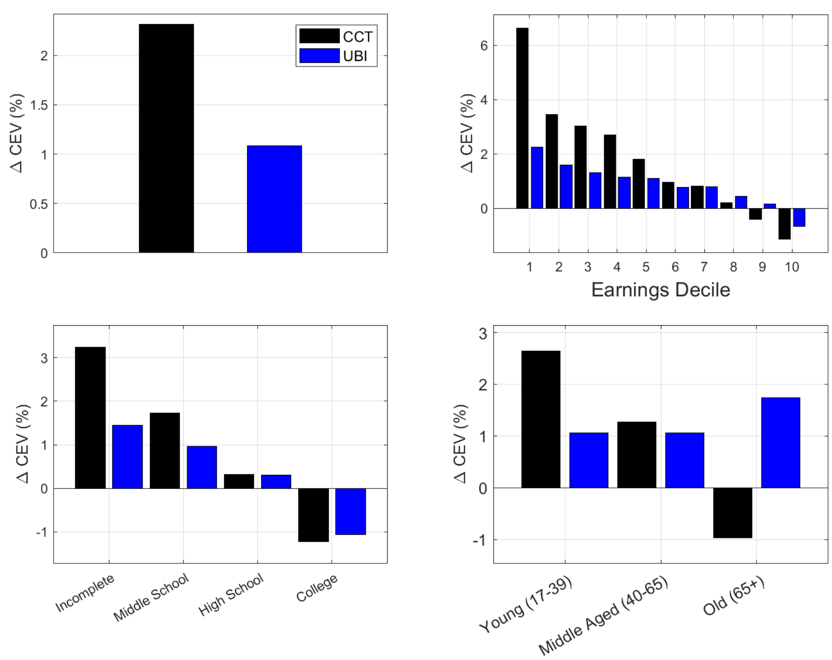

Figure E6: Consumption-Equivalent Welfare Changes for Selected Groups - Progressive λ

Notes: The figure illustrates the change in welfare for selected groups for cohorts living at the time of each policy's implementation. Welfare is measured in percent changes in permanent consumption equivalent units ($\Delta CEV\%$), computed using expression 11. This simulation uses a progressive tax scheme to clear the government budget.