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## Targeting the Poor: A Macroeconomic Analysis of Cash Transfer Programs

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TEXTO PARA DISCUSSÃO

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Targeting the Poor:  
A Macroeconomic Analysis of Cash  
Transfer Programs

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# Targeting the Poor: A Macroeconomic Analysis of Cash Transfer Programs\*

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## Abstract

This paper introduces cash transfers targeting the poor in an incomplete markets model with heterogeneous agents facing idiosyncratic risk. These transfers change the degree of insurance in the economy and affect precautionary motives asymmetrically, leading the poorest households to decrease savings proportionally more than their richer counterparts. In a model economy calibrated to Brazil, once the cash transfer program is adopted, wealth inequality and social welfare increase, poverty decreases, while employment and income inequality remain about the same. Imperfect access to financial markets is important for these results, whereas whether the program is funded with lump sum or distortive taxes is not.

Keywords: incomplete markets, cash transfer programs, precautionary savings.

JEL Classification: D31, E21, H31.

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# 1 Introduction

Cash transfer programs (CTPs) have been spreading throughout the developing world for the last years. Almost every country in Latin America and many others in Asia and Africa have a variant of such a program.<sup>1</sup> These programs, which target the poorest households, are argued to substantially expand the social insurance in the economy. The main objective of this paper is to investigate how these programs, by changing the degree of insurance in the economy, affect key macro variables such as employment, inequality, poverty and social welfare.

We pursue this objective by introducing cash transfers to the poor in a model that captures two essential elements of the developing economies where this type of programs became popular: (i) imperfect financial system; and (ii) large income inequality. A model in the tradition of Imrohoroglu [1989], Huggett [1993] and Aiyagari [1994] is flexible enough to incorporate these characteristics and still provide a framework able to answer the question of the paper. First, the presence of borrowing constraints and limited types of assets households can use to save (in our case money and bonds) makes this framework a natural benchmark to model an imperfect financial system. In addition, we assume a pecuniary cost for households to have access to the bond markets, the savings that pay interest rates in our economy. This addresses the fact that a substantial fraction of the population in developing countries has no access to savings accounts or any interest-bearing way of saving. Second, heterogeneous households in their endowment of efficient labor is a natural assumption if one wants to model substantial income inequality.

We model the cash transfer program (CTP) as a fixed amount of transfer given to any household whose income is below an established threshold. In the benchmark setup, the government funds these transfers with a fixed budget assigned exogenously every period.

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<sup>1</sup>As of 2008, the list of countries with CTPs include Argentina, Bangladesh, Bolivia, Brazil, Burkina Faso, Cambodia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, India, Indonesia, Kenya, Mexico, Nigeria, Pakistan, Panama, Peru, Philippines, Turkey, Yemen and Uruguay. See Fiszbein and Schady [2009] for a comprehensive discussion about CTPs.

Generally, transfers can be used by the government to alter the degree of insurance in the economy. In particular, CTPs provide a valuable source of insurance for those families that are at risk of being borrowing constrained and, thus, have stronger precautionary motives than wealthier families. Once the CTP is adopted, the government affects precautionary motives in an asymmetric way, leading the poorest households to adjust labor supply and savings proportionally more than the richest households. In addition, labor is a normal good; thus, the beneficiaries of the program may reduce their labor supply. Lastly, since the program threshold is on total income, which includes interests, households can change the composition of their portfolio, holding more money and less bonds, in order to be eligible for the program. Hence, it is a theoretical possibility that CTPs increase both wealth and income inequalities and poverty.

In a model economy calibrated to Brazil, we find that wealth inequality and social welfare increase,<sup>2</sup> poverty decreases, while employment and income inequality remain about the same relative to an economy in which the budget of the program is equally distributed to all households.

We choose Brazil because its CTP is large in the sense that covers 16.8 percent of the households, but the program costs only 0.69 percent of total income. Hence, if such a large but cheap program fulfills its objective to improve social insurance, it is likely that more elaborated programs will do even better. Indeed, consumption needs to increase by 3.2 percent for all households in the economy without the program in order to equalize social welfare measures across economies. Moreover, we show that the Brazilian CTP is very close to the optimal CTP, in the sense that maximizes welfare gains given a fixed budget. We also find that the program is extremely popular since 77.3 percent of the population would support it. Even those that are not covered by the program enjoy the increase in insurance, since it makes a bad realization of effective labor less painful.

Once we increase the fixed fee to access financial services, the welfare gains from adopting

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<sup>2</sup>We consider an utilitarian social welfare function in order to measure social welfare.

the program increase monotonically. Intuitively, if there is a fixed cost to access financial services, those households that are at risk of being borrowing constrained have extra motives to save but a worse mechanism – money – to transfer wealth over time. Hence, the kind of insurance and transfers provided by CTPs are more valuable when there are large imperfections in financial markets. Similarly, a higher variance of the endowment of efficient labor process implies larger welfare gains. Intuitively, targeted transfers to the poor are more valuable when there is more idiosyncratic risk and income inequality. Consequently, these findings accord with the evidence of vast implementation of these programs in developing countries.

As a robustness, we introduce distortive taxes. In particular, we show that results are similar when we let the program be funded by an increase in the marginal labor income tax rate. In this case, welfare gains increase monotonically with the tax rate, varying from 2.8 to 4.4 percent. Intuitively, the CTP becomes more valuable with higher distortive labor taxes, since increasing labor supply as a reaction to a negative productivity shock has lower returns.

We also study alternative policies that not only implement targeted transfers, but also stimulate employment. First, we add an employment requirement to the benchmark CTP. Second, we consider a minimum income program that complements income up to a certain threshold if the household works. In both cases, we keep the budget fixed. We find that employment requirements further increase welfare relative to the benchmark CTP. By providing incentives for households to work, these alternative policies narrows the coverage of the program and, thus, transfers more cash on average to less but needier households. Hence, it may improve the degree of social insurance and reduce income inequality.



## 2 Related literature

This paper relates to a vast literature studying different aspects of public policy, social insurance and savings behavior within an incomplete market framework with heterogeneous agents.<sup>3</sup>

A first strand of the literature studies the effects of fiscal policies that enhance social insurance in savings behavior. Hubbard et al. [1994] and Hubbard et al. [1995], for instance, explain the apparent puzzle that some groups of agents hold too little wealth. They do that by considering the effects of public policies, such as social security, on their precautionary motives. Within the heterogeneous agents with incomplete markets framework, Castaneda et al. [2003] argue that the low levels of wealth for old and poor individuals can be explained if policies that enhance public insurance are properly accounted for. In our paper, this mechanism is operative as the CTP is a public policy that affects precautionary savings.

Another strand of the literature focuses on the optimal level of public insurance given a trade-off between efficiency and redistribution, as in Flodén and Lindé [2001] and Alonso-Ortiz and Rogerson [2010]. This literature usually combines distortive taxes with transfers equally distributed to all households. We differ by studying a different redistribution scheme, in which transfers are targeted to the poor.

Two recent papers, developed independently from ours, also allow targeted transfers in an incomplete markets framework. First, Cespedes [2011] introduces a conditional CTP, which conditions the transfers on some degree of schooling for the children, in a overlapping generation framework calibrated to Mexico. Hence, his paper emphasizes the role of human capital to study the long-run effects of such program. In contrast, we abstract from human capital formation in order to study the more immediate effects of a CTP on social outcomes.

Second, Oh and Reis [2011] evaluate how the increase in targeted transfers during the 2007-9 great recession affected output, consumption and employment in the U.S. In particu-

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<sup>3</sup>An incomplete list includes Flodén and Lindé [2001], Castaneda et al. [2003], Domeij and Heathcote [2004], Heathcote [2005], Meh [2005], Conesa and Krueger [2006], Kitao [2008], Cagetti and Nardi [2009], Conesa et al. [2009], and Alonso-Ortiz and Rogerson [2010].

lar, their analysis takes a positive description of the dynamic effects of such transfers during the crisis. In contrast, we aim at the positive and normative implications of implementing a CTP in developing countries.

In our paper, we impose the transfer scheme we observe in practice in many developing countries. A natural question arises: What is the optimal way to target the transfers? Saez [2002], for example, studies the optimal way to design transfers, given that they are conditioned solely on earnings, when agents can adjust labor supply along the extensive and intensive margins. Although we do not focus on the optimality of the program, we study the welfare implications of some modifications of the original CTP.

Finally, there is a large empirical literature evaluating different aspects of CTPs. Closely related to this paper is Angelucci and Giorgi [2009]. They show that the CTP implemented in Mexico increases consumption of and loans to households that are not eligible for the program. Moreover, these households decrease their savings by reducing their livestock and grains. These findings are consistent with our results. By providing insurance against bad states, the CTP not only affects those that are eligible, but also those that are likely to be eligible due to a sequence of bad shocks.

### 3 Model

The model follows in the tradition of Imrohoroglu [1989], Huggett [1993] and Aiyagari [1994].<sup>4</sup> The aim is to study redistribution in a context of countries that recently implemented cash transfers to the poor, i.e., economies with large income inequality and imperfect financial system.

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<sup>4</sup>See Heathcote et al. [2009] for a recent survey.

## 3.1 The Private Sector

### 3.1.1 Demographics and endowments

There is a continuum with unit mass of infinitely lived, ex-ante identical households. Each household faces an uninsured idiosyncratic stochastic process that determines the value of their endowment of efficient labor units,  $\varepsilon$ . We assume that this process is independent and identically distributed across households and that it follows a finite state Markov chain with transition probabilities given by  $\Pi(\varepsilon', \varepsilon) = \Pr\{\varepsilon_{t+1} = \varepsilon' | \varepsilon_t = \varepsilon\}$ , where  $\varepsilon$  and  $\varepsilon' \in E \equiv \{\varepsilon^1, \varepsilon^2, \dots, \varepsilon^{N-1}, \varepsilon^N\}$ .

### 3.1.2 Preferences

Preferences are described by

$$E_0 \sum_{t=0}^{\infty} \beta^t [\log c_t - \theta n_t],$$

where  $\beta \in (0, 1)$  is the time discount factor,  $c_t \geq 0$  is consumption, and  $n_t \in \{0, 1\}$  is labor. We follow Chang and Kim [2007] and assume that labor is indivisible.<sup>5</sup> Hence, there is no loss of generality in assuming a linear disutility from working.

### 3.1.3 Production technology

There is a representative firm that produces with a Cobb-Douglas function,  $Y_t = K_t^\alpha H_t^{1-\alpha}$ ,  $\alpha \in (0, 1)$ , where  $K_t$  is capital and  $H_t$  is the aggregate efficient labor units.

## 3.2 Market arrangements

There are no insurance markets for the idiosyncratic shock. Hence, markets are incomplete in the sense that the only source of insurance is self-insurance by accumulating wealth through

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<sup>5</sup>As Alonso-Ortiz and Rogerson [2010] point out, “because coordination problems within organizations often restrict the ability of individuals to work significantly different hours than their coworkers, we believe that the indivisible assumption is an appropriate one in contexts that stress idiosyncratic cross-section heterogeneity.”

a limited class of assets (risk-free bonds and money) subject to a no-borrowing constraint.

In case households pay a fixed fee  $\xi$ , they can save through risk-free bonds  $b_t \geq 0$  that yield an interest rate of  $r$ . Otherwise, households are restricted to save through an inefficient technology we call money. In particular, money  $m_t \geq 0$  pays no interest rate and depreciates at an inflation rate of  $\pi$ . We broadly interpret  $\xi$  as a pecuniary cost to access financial services. Thus, this parameter regulates the degree of financial development, defined by the extent to which households have access to financial services in the economy.

In many developing countries, the poorest families have limited access to banks; thus, holding money over time is an important tool to smooth consumption for them. In contrast, the richest households usually have full access to a variety of financial services. Introducing a fixed cost to hold bonds is a shortcut to preserve this discrepancy without changing the main features of the model.<sup>6</sup>

We also assume that the economy is small, open and migration is not allowed. Thus, the interest rate,  $r$ , is exogenously determined in the international capital market, but the wage rate  $w_t$  clears the national labor market. This assumption is in accordance with the fact that CTPs have been widely implemented in developing economies, such as Brazil or Indonesia.<sup>7</sup>

Finally, we assume that the decision on how much to save  $a_t = b_t + m_t$  is taken before the shock  $\varepsilon_t$  is realized, but the decision on how to allocate wealth  $a_t$  between money  $m_t$  and bonds  $b_t$  is taken after the realization of the shock. This timing protocol reduces the state space of the economy and, thus, facilitates its computational implementation. It can be rationalized as follows:  $b_t$  is the balance in a liquid savings account held in a commercial bank and  $\xi$  is a maintenance fee needed to keep this account open during the period. Consequently, households can change their portfolio decisions in the very beginning of the period without incurring any cost.

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<sup>6</sup>In Imrohoroglu [1989], agents can hold money but not risk-free bonds; thus, money is the only way to accumulate wealth. In Erosa and Ventura [2002], since credit is costly, agents hold money to perform transactions. Both papers study the welfare cost of inflation in an incomplete markets model with heterogeneous agents.

<sup>7</sup>See footnote 1 for a list.

### 3.3 The government sector

In the benchmark case, we model the CTP as a threshold level of income  $\bar{y}$  and a fixed amount of transfer  $T$ , such that every household with total income  $rb_t + n_t\varepsilon_t w_t$  smaller than  $\bar{y}$  receives  $T$ .<sup>8</sup> Moreover, total transfers must exhaust the program's budget  $B$ , which is assigned exogenously to the government every period.

In addition,  $B$  is a costless endowment that can be: (1) used to implement the CTP above; (2) equally distributed to all households; or (3) even thrown away. This paper main concern is in contrasting (1) to (2). Importantly, we do not want to stress any efficiency-equity trade-off issues, so we do not model explicitly the tax instruments used to fund  $B$ . Since  $B$  is calibrated to be a very small fraction of total income, the distortions imposed on the economy to raise  $B$  should not be of primary importance. Nonetheless, in Section 4.4, we check robustness by funding the government budget  $B$  with changes in distortive labor taxes.

### 3.4 Equilibrium

Assume  $a_t$  takes value on a large compact set  $A \subset \mathbb{R}_+$ . The aggregate state of the economy is a measure of households  $\lambda_t$  defined over an appropriate family of subsets of  $A \times E$ . The individual states are the realization of the idiosyncratic shock  $\varepsilon_t$  and the stock of wealth  $a_t$ . We focus on the properties of a stationary equilibrium in which the measure of households remains invariant.

#### 3.4.1 Household problem

As mentioned earlier, households decide how much to save before the realization of the idiosyncratic shock and, after that, the portfolio composition between money and bonds.

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<sup>8</sup>Alternative programs are studied in Sections 4.5.2 and 4.5.3.

Let  $\mathbf{I}$  denote the indicator function. The household problem is written recursively below:

$$\begin{aligned}
V(a, \varepsilon) &= \max_{c, n, m, b, a'} \left\{ \log c - \theta n + \beta \sum_{\varepsilon' \in E} V(a', \varepsilon') \Pi(\varepsilon', \varepsilon) \right\} \\
\text{s. t.} \\
c + a' &= (1 + r)b + (1 - \pi)m + w\varepsilon n + \mathbf{I}_{\{y \leq \bar{y}\}} T - \mathbf{I}_{\{b > 0\}} \xi \\
a &= b + m \\
y &= rb + w\varepsilon n \\
c &\geq 0; n \in \{0, 1\}; b \geq 0; m \geq 0; a' \geq 0.
\end{aligned}$$

The first restriction, which is the budget constraint, incorporates the CTP through the term  $\mathbf{I}_{\{y \leq \bar{y}\}} T$  and costly access to financial services through the term  $\mathbf{I}_{\{b > 0\}} \xi$ . The second and third restrictions are, respectively, the definition of total assets and total income before transfers. The last set of restrictions implies that consumption is feasible, labor is indivisible, and households are borrowing constrained.

Notice that the allocation of wealth  $a$  can take only three forms: (1)  $b = 0$  and  $m = a$ ; (2)  $b = a$  and  $m = 0$ ; or (3)  $b = (\bar{y} - w\varepsilon n)/r$  and  $m = a - b$ . In words, if the household does not pay the fixed cost  $\xi$ , it holds only money. If it pays  $\xi$ , since bonds dominate money in returns, the household either only holds risk-free bonds or also holds enough money in order to be eligible for the program.

### 3.4.2 Definition

A stationary recursive competitive equilibrium is a value function  $V : A \times E \rightarrow \mathbb{R}$ ; policies for the household  $a' : A \times E \rightarrow \mathbb{R}_+$ ,  $c : A \times E \rightarrow \mathbb{R}_+$ ,  $n : A \times E \rightarrow \{0, 1\}$ ,  $b : A \times E \rightarrow \mathbb{R}_+$  and  $m : A \times E \rightarrow \mathbb{R}_+$ ; policies for the firm  $K$  and  $H$ ; prices  $r$  and  $w$ ; government policies  $T$  and  $\bar{y}$ ; and a measure  $\lambda$  defined over an appropriate family of subsets of  $A \times E$  such that:

1. Given prices and government policies, the policies for the household solve the household problem and  $V$  is the associated value function;

2. Given prices and government policies, the policies for the firm solve the firm problem – that is,  $\max_{K,H}\{K^\alpha H^\alpha - (r + \delta)K - wH\}$ ;
3. Labor market clears – that is,  $\int_{A \times E} n(a, \varepsilon) \varepsilon d\lambda(a, \varepsilon) = H$ ;
4. Government budget balances – that is,  $T \int_{A \times E} \mathbf{I}_{\{y(a, \varepsilon) \leq \bar{y}\}} d\lambda(a, \varepsilon) = B$ ;
5.  $\lambda$  is an invariant probability measure.<sup>9</sup>

### 3.4.3 Welfare and political support

The heterogeneous agents model with incomplete markets has been widely used to evaluate the extent of welfare gains from different redistribution policies. Flodén and Lindé [2001] and Alonso-Ortiz and Rogerson [2010], for example, study the welfare implications of different tax policies needed to fund lump-sum transfers. Our approach is closely related to theirs.

For instance, we pursue two different ways to evaluate the welfare gains from adopting a CTP. First, we consider the difference in steady-state welfare in two identical economies, except for the CTP. Second, we also account for the transition dynamics of welfare gains from switching from one CTP to another.

Let an economy be characterized by a CTP  $\bar{y}$ , such that the equilibrium objects are indexed by  $\bar{y}$ .<sup>10</sup> In order to evaluate the welfare implications of the program, we specify the following utilitarian social welfare function:<sup>11</sup>

$$W(\bar{y}) = \int_{A \times E} V(a, \varepsilon; \bar{y}) d\lambda(a, \varepsilon; \bar{y}).$$

Consider two different CTPs,  $\bar{y}_1$  and  $\bar{y}_2$ . The stationary change in welfare,  $\Delta_{ss}$ , associated with a change from  $\bar{y}_1$  to  $\bar{y}_2$  is the proportional change in consumption for all households

<sup>9</sup>That is, for all  $\mathcal{A} \times \mathcal{E}$  in an appropriate family of subsets of  $A \times E$ , the invariant probability measure satisfies  $\lambda(\mathcal{A} \times \mathcal{E}) = \int_{A \times E} \sum_{\varepsilon' \in \mathcal{E}} \mathbf{I}_{\{a'(a, \varepsilon) \in \mathcal{A}\}} \Pi(\varepsilon', \varepsilon) d\lambda(a, \varepsilon)$ .

<sup>10</sup>Given that  $B$  is fixed,  $T$  is determined endogenously by the government budget constraint. Analogously, we can specify  $T$  and determine  $\bar{y}$  endogenously.

<sup>11</sup>See Kaplow [2008] for a defense of such social welfare function as a guide to evaluate and compare different redistributive policies.

that would be required to equalize the welfare measures; that is,  $\Delta_{ss}$  solves:

$$\begin{aligned} W(\bar{y}_1; \Delta_{ss}) &= \frac{1}{1-\beta} \int_{A \times E} [\log((1 + \Delta_{ss})c(a, \varepsilon; \bar{y}_1)) - \theta n(a, \varepsilon; \bar{y}_1)] d\lambda(a, \varepsilon; \bar{y}_1) = \\ &= \frac{1}{1-\beta} \int_{A \times E} [\log(c(a, \varepsilon; \bar{y}_2)) - \theta n(a, \varepsilon; \bar{y}_2)] d\lambda(a, \varepsilon; \bar{y}_2) = W(\bar{y}_2). \end{aligned}$$

Due to our small, open economy assumption and the Cobb-Douglas production function, interest rates and wages do not respond to policy changes. Therefore, once the new CTP  $\bar{y}_2$  is adopted, the new policies and value functions will be time-invariant along the transition path to the new stationary equilibrium. Hence, in order to calculate the social welfare when  $\bar{y}_2$  is adopted, one needs to integrate  $V(a, \varepsilon; \bar{y}_2)$  over the distribution of households at the time  $\lambda(a, \varepsilon; \bar{y}_1)$ . Let  $\Delta_{td}$  be the proportional change in consumption for all households that equalizes welfare measures that incorporate transition dynamics. Therefore,  $\Delta_{td}$  solves:

$$\begin{aligned} W(\bar{y}_1; \Delta_{td}) &= \frac{1}{1-\beta} \int_{A \times E} [\log((1 + \Delta_{td})c(a, \varepsilon; \bar{y}_1)) - \theta n(a, \varepsilon; \bar{y}_1)] d\lambda(a, \varepsilon; \bar{y}_1) = \\ &= \int_{A \times E} E_0 \underbrace{\left\{ \sum_{t=0}^{\infty} \beta^t [\log c_t - \theta n_t] \right\}}_{V(a, \varepsilon; \bar{y}_2)} d\lambda(a, \varepsilon; \bar{y}_1). \end{aligned}$$

Finally, we define a measure of political support  $\Gamma$  as the percentage of households that are better off right after the change in policy. Hence, since the value function is time-invariant along the transition path, the measure of households that are better off is:

$$\Gamma = \int_{A \times E} \mathbf{I}\{V(a, \varepsilon; \bar{y}_2) > V(a, \varepsilon; \bar{y}_1)\} d\lambda(a, \varepsilon; \bar{y}_1).$$

## 4 Quantitative analysis

This section assesses quantitatively the equilibrium effects of a CTP on income inequality, wealth inequality, poverty, employment and social welfare.



The algorithm used to solve numerically for the stationary recursive equilibrium is standard. We use value function iterations to solve the household problem and the algorithm suggested by Ríos-Rull [1999] to find the invariant distribution  $\lambda$ .<sup>12</sup>

## 4.1 Calibration: application to Brazil

The time horizon is one year. In particular, we calibrate the model economy to Brazil in 2006.<sup>13</sup> At that time, Brazil had implemented a CTP called *Bolsa Família*, which means family allowance.<sup>14</sup>

Brazil is a natural choice to assess whether a CTP is an effective tool to improve social insurance for two reasons. First, in 2006, the Bolsa Família covered a large fraction – 16.8 percent – of the population. Second, the program’s budget represents a tiny fraction – 0.69 percent – of total income. Hence, if such a large but cheap program fulfills its objective to improve social insurance, it suggests that CTP is an inexpensive way to improve social welfare.

We emphasize two aspects of the Bolsa Família program: its eligibility criterium and fixed budget.<sup>15</sup>

There are two criteria in order to be eligible for the program. First, if the household is below the extreme poverty line, i.e., if its monthly income per capita is less than US\$36 (adjusted by the purchasing power parity in 2006),<sup>16</sup> the household gets a fixed transfer of US\$36 and a variable transfer of US\$11 per child, up to three children. Second, if the

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<sup>12</sup>The asset space  $A$  is discretized using 1601 grids unequally distributed in  $[0, 305]$ . The invariant distribution  $\lambda$  was approximated by tracking a sample of 100,000 constructed households over time.

<sup>13</sup>We focus on the period before 2007 to rule out possible influences that the 2007-9 great recession might had on the key variables we are interested in.

<sup>14</sup>In the Appendix A, we briefly introduce the historical development of CTPs in Brazil.

<sup>15</sup>Our framework abstracts from one important aspect of the Bolsa Família program. In order to obtain the benefit, the families should comply with some schooling and health conditions for their children. These conditions are important to enhance human capital among poor people, which is another source of insurance we purposefully do not account for. Since it might take at least one generation for this channel to kick in, our analysis focuses on the shorter-term impact of the Bolsa Família. See Cespedes [2011] for a paper that emphasizes the role of conditions in a related framework.

<sup>16</sup>The purchasing power parity conversion rate is obtained at the International Monetary Fund website. All values expressed in U.S. dollars in the text use this adjustment.

household is below the poverty line, i.e., if it makes less than US\$72 per capita, the household receives US\$11 per child, up to three children. This poverty line represents 16.5 percent of the average household income per member.

In contrast with other social policies such as unemployment insurance, the budget assigned to the Bolsa Família program is fixed. Once this budget is exhausted, no more beneficiaries can be included in, even if they are eligible for the program. Hence, implementing the program requires planning in advance. In particular, if horizontal equity is a concern, the eligibility requirements and the size of the transfers should be consistent with the assigned budget, as in our model.

We set  $T$  and  $\bar{y}$  to replicate the percentage of households covered by the program and its budget as a share of total income. These figures are calculated using the *Pesquisa Nacional por Amostrá de Domicílios* (PNAD) – an annual cross-sectional household data survey – and are reported in Soares et al. [2009].

The Markov process  $\Pi(\varepsilon', \varepsilon)$  follows from an approximation of an AR(1) process in logs:<sup>17</sup>

$$\log(\varepsilon') = \rho \log(\varepsilon) + u, \text{ where } u \sim N(0, \sigma^2).$$

In Brazil, due to the lack of a household panel data survey, such as the Panel Study of Income Dynamics in the U.S., we cannot estimate  $\rho$  and  $\sigma^2$  properly. As an alternative strategy, we fix  $\rho = 0.96$  based on evidence for the U.S. economy,<sup>18</sup> but adjust  $\sigma^2$  to match the Gini coefficient in Brazil. This coefficient is calculated using the 2006 PNAD.<sup>19</sup> We find  $\sigma^2 = 0.083$ , which is higher than the figures commonly used in the literature for the

<sup>17</sup>In particular, we apply Tauchen [1986]’s algorithm with 21 grids.

<sup>18</sup>The literature estimates this process to be very persistent. Flodén and Lindé [2001], for example, estimate  $\rho = 0.91$ , whereas French [2005] estimates  $\rho = 0.98$ .

<sup>19</sup>In order to make model and data comparable, we measure household income as income per members of the family. Moreover, we consider all families with positive income and all sources of income. We do not believe that the sample or sources of income should be restricted in order to make model and data comparable. The model is rich enough to allow multiple interpretations. Retirement, for example, can be interpreted as a bad idiosyncratic shock. Hence, moving from a bad shock to a good one can be thought of a new generation substituting the old retired one and bequeathing its assets. Along these lines, since social security systems tend to crowd out private savings, not accounting for these sources of income might introduce a discrepancy between the model and the data.

U.S. economy. Intuitively, more variability is necessary to match a higher degree of income inequality in Brazil.

We set  $\alpha$  to generate the share of capital income calculated by Pereira and Ferreira [2010]. Moreover,  $\beta$  and  $\delta$  are set to generate the capital to output ratio and the consumption to output ratio observed in the data. We consider output net of government consumption to generate these figures, which are calculated using the national accounts. Finally, we calibrate  $\theta$  to replicate the participation rate of families in the labor market, which is calculated using the 2006 PNAD.<sup>20</sup>

Consider the financial sector. We set  $r$  to 3.87 percent which is the 1997-2006 annual average of the rate of return to savings in savings account deposits. The inflation rate  $\pi$  is set to 4.5 percent which is the official target by the Brazilian Central Bank in 2006. We calibrate  $\xi$  to generate the fraction of households connected to the financial sector. We proxy this figure by the number of people that hold at least one savings account deposit divided by the adult population in 2006.<sup>21</sup> This figure can be biased as one household can have multiple accounts or even a more sophisticated time, instead of savings, account deposit. We do not have enough data to inspect the sign and the size of the bias. We do instead, by varying the value of  $\xi$ , an extensive analysis on the effect of financial development in our numerical results.

Table 1 summarizes this information.

## 4.2 External validation

Since we are investigating the interactions between cash transfer programs, poverty and inequality, it is desirable that the benchmark calibration replicates other dimensions of poverty and inequality in Brazil.

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<sup>20</sup>We assume that a household is participating in the labor market if its head or the head's spouse is employed.

<sup>21</sup>The number of people that hold at least one savings account deposit is obtained at the Brazilian Central Bank website. Also, the adult population is the number of people that are more than 15 years old.

| parameter          | target                    | model  | data   |
|--------------------|---------------------------|--------|--------|
| $\rho = 0.96$      | persistence of shocks     | 0.96   | 0.96   |
| $\sigma^2 = 0.083$ | Gini coefficient          | 0.560  | 0.560  |
| $\alpha = 0.43$    | capital share             | 0.43   | 0.43   |
| $\delta = 0.072$   | capital/(GDP-G)           | 3.87   | 3.87   |
| $\beta = 0.947$    | consumption/(GDP-G)       | 0.79   | 0.78   |
| $\theta = 0.53$    | % households employed     | 0.80   | 0.79   |
| $\xi = 0.125$      | % households connected    | 0.54   | 0.55   |
| $r = 0.039$        | rate savings              | 0.039  | 0.039  |
| $\pi = 0.045$      | inflation target          | 0.045  | 0.045  |
| $T = 0.141$        | program budget (% income) | 0.0069 | 0.0069 |
| $\bar{y} = 0.57$   | program coverage          | 0.168  | 0.168  |

Table 1: Calibration.

Table 2 reports the share of labor income across quintile in the model under the benchmark calibration and the ones calculated in the data using the 2006 PNAD. Since we target the Gini coefficient for total income, it is not clear whether the model would be able to replicate the degree of earnings inequality in the data. Nonetheless, the model performs reasonably well in matching it.

| earnings quintile | earnings share data (PNAD) | earnings share model |
|-------------------|----------------------------|----------------------|
| First             | 0.0%                       | 0.0%                 |
| Second            | 4.7%                       | 3.9 %                |
| Third             | 9.6%                       | 10.4 %               |
| Fourth            | 18.2%                      | 21.6 %               |
| Fifth             | 66.6%                      | 64.8 %               |
| Gini              | 0.645                      | 0.633                |

Table 2: Earnings distribution across quintile.

Brazil lacks a household survey that properly accounts for wealth measurement, such as the Survey of Consumer Finances in the U.S. However, using information from other countries and regression methods, Davies et al. [2008] input for Brazil a Gini coefficient for wealth of 0.78 in 2000. The model does a reasonable job in matching this number. Indeed,

under the benchmark calibration, the equilibrium Gini coefficient for wealth – measured by  $a$  – is 0.75.<sup>22</sup>

For the sake of completeness, Table 3 reports the share of earnings and wealth across wealth quintile, although we cannot validate them due to the lack of data. Nonetheless, it provides an educated guess on the actual wealth distribution in Brazil.

| wealth quintile | wealth share model | earnings share model |
|-----------------|--------------------|----------------------|
| First           | 0.0%               | 8.8%                 |
| Second          | 0.0%               | 8.9%                 |
| Third           | 3.9%               | 18.0%                |
| Fourth          | 19.7%              | 24.5%                |
| Fifth           | 76.5%              | 39.8%                |

Table 3: Wealth and earnings distribution across wealth quintile.

It has been noted in the literature that this class of models does not perform well in accounting for the shares of earnings and wealth in both tails of the corresponding distributions.<sup>23</sup> However, from the perspective of understanding the role of transfers targeting the poor, we do not believe that explaining the very wealthy is of primary importance.

Table 4 shows the percentage of households living in both extreme poverty and poverty. Notice that  $\bar{y} = 0.57$  (or US\$72 a month) is the poverty line that separates those that are in the program from those that are not, so 0.285 (or US\$36 a month) is the extreme poverty line. We use these numbers to calculate the poverty rates reported in Table 4. The model does a good job in matching the poverty rate, but underestimates the extreme poverty rate.

The average income, including transfers, is 3.46 (in a year) in the model economy and approximately US\$435 (in a month) in the data according to the 2006 PNAD. Hence, the threshold level of income represents 16.5 percent of the average income in both the model economy and the data. In the actual economy, the budget per family in the program was

<sup>22</sup>To be precise, in 2000, cash transfers targeting the poor in Brazil were not so widespread as it has been recently. As the next section shows, if the program were abolished, the Gini coefficient for wealth would fall to 0.73.

<sup>23</sup>See, for example, Castaneda et al. [2003], who improves the explanation of inequality at the top by introducing a very high realization of earnings which occurs with a very small probability.

US\$492 in 2006.<sup>24</sup> In the model economy,  $T = 0.141$  is equivalent to US\$195 in a year. Hence, the model economy would be consistent with the actual one if families have on average 2.5 members, but this figure is actually 3.2 according to the 2006 PNAD.

|                                                   | model | data  |
|---------------------------------------------------|-------|-------|
| households in extreme poverty                     | 2.3%  | 3.4%  |
| households in poverty                             | 11.0% | 10.9% |
| threshold of the program<br>(as % of avg. income) | 16.5% | 16.5% |

Table 4: Poverty rates.

Despite the model overlooks some characteristics of the Bolsa Família program, such as multiple thresholds, it does a good job in replicating key dimensions of the distribution of income and poverty in the data. Hence, we believe that this framework provides a good guidance to study the impact of CTPs on income inequality, wealth inequality, poverty, employment and social welfare.

Finally, we report some properties of the model. Those households in the program hold 1.6 percent of total assets in the economy. Moreover, their participation rate is 68.8 percent. The cost of access to the financial sector  $\xi$  is equivalent to US\$15 per month, which implies that 28 percent of the households in the program are connected to the financial sector. Only 0.1 percent of total assets are money, while 0.9% of the assets of those in the program are money. Hence, despite the presence of segmented financial markets, money is not being widely used as a source of insurance.

### 4.3 Results

In contrast with complete market economies, the key economic mechanism present in this class of models is precautionary motives as a consumption smoothing mechanism. Pijoan-

<sup>24</sup>This figure is calculated dividing the budget of the program by the number of families in the program, both obtained at the *Matriz de Informação Social* website at <http://aplicacoes.mds.gov.br/sagi/mi2007/home/index.php>.

Mas [2006] shows that if the idiosyncratic risk cannot be fully insured, aggregate wealth and labor supply are higher for self-insurance reasons than their complete market counterparts. Transfers that target the poor change the degree of insurance available in the economy. In particular, they weaken precautionary motives that are stronger for those households that are at risk of being borrowing constrained. As a consequence, they adjust savings and labor supply for precautionary motives proportionally more than richer and wealthier households. This asymmetric response of savings and labor supply across households is one of the driving forces behind the following results. However, there are other forces behind these results as we explain below.

|                                 | benchmark | no program | no program |
|---------------------------------|-----------|------------|------------|
| coverage                        | 16.8%     | 100%       | 0%         |
| % households employed           | 79.5%     | 79.4%      | 79.4%      |
| % households connected          | 53.7%     | 56.2%      | 57.2%      |
| Gini coefficient                | 0.56      | 0.56       | 0.56       |
| Gini coefficient for wealth     | 0.75      | 0.73       | 0.72       |
| % households in extreme poverty | 2.3%      | 5.5%       | 5.6%       |
| % households in poverty         | 11.0%     | 14.7%      | 14.7%      |
| Welfare $\Delta_{ss}$           |           | 0.3%       | 1.6%       |
| Welfare $\Delta_{td}$           |           | 3.2%       | 5.2%       |
| Political support $\Gamma$      |           | 77.3%      | 100%       |

Table 5: Results.

Table 5 provides the main results in this paper. In particular, it shows the effects of abolishing the program (third and fourth columns) in contrast with the benchmark case (second column). We consider two counterfactual experiments. The third column eliminates the program by distributing the budget  $B$  lump-sum to all households, whereas the fourth eliminates the program by throwing the budget  $B$  away.

In the next subsections, we discuss these results. We are interested in the following questions: (1) Does it decrease inequality and poverty?; (2) Does it decrease employment?; (3) Does it increase social welfare and political support?; (4) Does it increase social welfare and political support?

### 4.3.1 Does the CTP decrease inequality and poverty?

There are three theoretical reasons in this model that rationalize CTPs increasing income inequality and poverty. First, leisure is a normal good and, thus, the poorest households reduce labor supply once in the program. Second, households can reduce labor supply or allocate savings to money in order to become eligible for the program. Third, due to precautionary motives, once the CTP is introduced, the poorest households adjust savings and labor supply proportionally more. In addition, indivisibilities of labor supply and savings may amplify the three effects mentioned before. In contrast, by targeting cash transfers directly to the poor, CTPs may alleviate poverty and reduce inequality.

If the program were abolished and its budget were either distributed lump-sum to all households (Table 5, third column) or thrown away (Table 5, fourth column), the Gini coefficient would remain about the same. These results contrast with the empirical literature that stresses the role of the program in reducing inequality. Soares et al. [2009], for instance, documents that the Bolsa Família program accounts for 20 percent of the fall in the Gini coefficient from 2004 to 2006.<sup>25</sup> Many of the studies in Barros et al. [2007b] corroborates this finding to some extent. Barros et al. [2007a], for example, reports that CTPs account for 12 percent of the decrease in the Gini coefficient from 2001 to 2005.<sup>26</sup> However, most of these results are based on accounting exercises that ignore the endogenous response of labor and financial income to the program.

Targeting the transfers to the poor is very effective in reducing poverty. Once the CTP is introduced, the overall poverty rate decreases by 3.7 percentage points and the extreme poverty rate decreases by 3.2 percentage points (Table 5, second and third column). This finding is consistent with many studies for Latin America,<sup>27</sup> despite some of them ignore the endogenous response of labor and financial income to the program. In contrast, Ravallion [2009] argues that targeting poor households was not effective to reduce poverty in China.

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<sup>25</sup>The Gini coefficient had fallen from 0.569 in 2004 to 0.560 in 2006.

<sup>26</sup>The Gini coefficient had fallen from 0.593 in 2001 to 0.566 in 2005.

<sup>27</sup>See, for example, Fiszbein and Schady [2009] for Latin America and Soares et al. [2006] for Brazil.



What about wealth concentration? In order to be eligible for the program, poor households may reduce their savings. Moreover, CTPs weaken precautionary motives proportionally more for poor households. Hence, once the CTP is abolished, the poor households save proportionally more than rich households. Indeed, the Gini coefficient for wealth decreases in both scenarios without the program.

Consider distributing the budget  $B$  lump-sum to all households (Table 5, third column). Hence, the coefficient would fall by two points. Notice that under the CTP, households in the first and second wealth quintile do not hold savings (Table 3 in Section 4.2). In fact, once the program is adopted, the increase in wealth concentration follows from the third and fourth quintile holding a smaller share of wealth, whereas the fifth holds a larger share.<sup>28</sup>

Figure 1 shows how wealth inequality responds to the CTP as financial development, measured by the percentage of households connected to the financial system, evolves.<sup>29</sup> Notice that smaller values of  $\xi$ , i.e., higher financial development, amplify the response of wealth inequality.

We claim that this pattern corroborates the idea that precautionary motives, rather than reduction in savings in order to be eligible to the program, are the key mechanism behind the increase in wealth concentration due to the program. Intuitively, the cheaper the access to the financial system, more savings are accumulated. Hence, once the CTP is introduced, there is scope for greater adjustment of wealth for precautionary reasons. Since the strength of these motives is asymmetric across households, poor households that are at risk of being borrowing constrained reduce savings proportionally more than rich households, leading to a stronger impact on the Gini coefficient for wealth. In contrast, reduction in savings due to eligibility concerns is smaller for lower values of  $\xi$ .

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<sup>28</sup>Distributing  $B$  lump-sum to all households implies that the third, fourth and fifth quintile hold 5.1 percent, 21.0 percent and 73.8 percent of total wealth, respectively.

<sup>29</sup>In order to generate this figure, we vary the degree of financial development by experimenting different values for  $\xi$ . Since we maintain the threshold  $\bar{y}$  and transfers  $T$  of the CTP, different values of  $\xi$  implies different budgets  $B$ . In order to make economies comparable, we use lump-sum taxes to fund the budget; thus, the quantitative implications of the CTP are slightly different from the benchmark case.

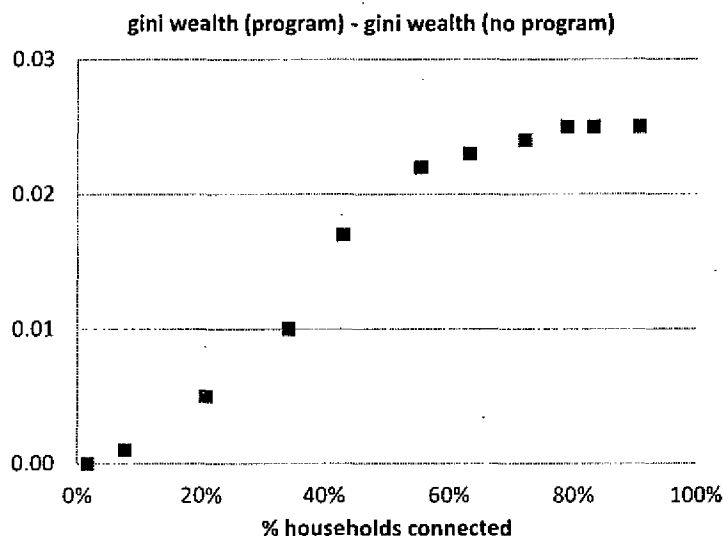


Figure 1: The role of  $\xi$ . Changes in wealth concentration.

It is possible that precautionary motives are stronger in the model than in the data,<sup>30</sup> which mitigates the effects of the program on wealth concentration. Nonetheless, these results call for a better empirical understanding of the response of income derived from financial assets to the Bolsa Família program. They also highlight effects not fully understood or discussed during the implementation of such programs.

#### 4.3.2 Does the CTP decrease employment?

In Table 5, once the CTP is adopted, the participation rate increases by 0.1 percentage point. This result, despite being quantitatively small, is at first in contradiction to the idea that the program should decrease employment. Indeed, income effect, eligibility concerns, and precautionary motives suggest that aggregate labor supply should decrease.

The intuition behind this result is as follows. Once the CTP is implemented, some households decrease their bonds savings to zero in order to avoid paying the fixed cost to access the financial system. This sharp response of savings implies that some households can increase labor supply and be eligible for the program as long as  $\varepsilon w < \bar{y}$ . Indeed, Table

<sup>30</sup>See Carroll and Kimball [2008] for a survey on precautionary wealth. The authors conclude that “establishing the intensity of the precautionary saving motive and the magnitude of precautionary wealth remain lively areas of debate.”

6 reports that the number of employed households that are not connected to the financial sector increases significantly after the CTP (in contrast with the economy in which  $B$  is equally distributed to all households).

| Before the CTP | employed | unemployed |
|----------------|----------|------------|
| connected      | 35.8%    | 20.5%      |
| not connected  | 43.7%    | 0.0%       |

| After the CTP | employed | unemployed |
|---------------|----------|------------|
| connected     | 33.8%    | 19.9%      |
| not connected | 45.7%    | 0.6%       |

Table 6: Employment and connection before and after the CTP.

Figure 2 shows how the CTP affects employment as financial development, measured by the percentage of households connected to the financial system, evolves.<sup>31</sup> Notice that this mechanism is weak for sufficiently high or low levels of  $\xi$ . Intuitively, in these cases, few households decide to stop paying the fixed cost to access the financial system when the CTP is implemented.

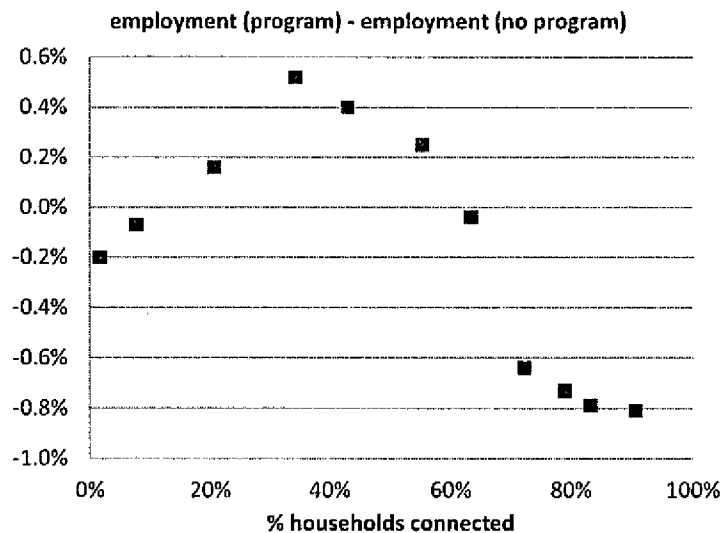


Figure 2: The role of  $\xi$ . Changes in the participation rate.

<sup>31</sup>Same disclaimer in footnote 29 applies.

Most empirical studies on developing countries do not find that CTPs reduce significantly the participation rate.<sup>32</sup> A tiny decrease or increase in the participation rate is statically consistent with some of these studies.

#### 4.3.3 Does the CTP increase social welfare and political support?

In the two measures of welfare constructed, the CTP has a positive impact. In the first measure, which compares two identical (except for the CTP) economies in steady-state, the welfare gains are equivalent to a proportional increase in consumption of 0.3 percent for all households in the economy in which the budget is equally distributed to all households. In steady state, from an utilitarian perspective, the program affects welfare for three reasons: (1) it redistributes income from rich to poor households; (2) it improves the degree of social insurance in the economy; (3) it reduces the amount of savings in steady state and, thus, the level of consumption. This welfare gain reflects that the positive effects of (1) and (2) surpass the negative effect of (3).

In the second measure, which also computes the gains and losses from the transition path, the welfare gains of the CTP are more significant. Indeed, in order to equalize welfare measures across economies, consumption has to increase by 3.2 percent for all households in the economy in which the budget is equally distributed. What can explain such a large welfare gains? Before the CTP is implemented, households that are at risk of being borrowing constrained have strong precautionary motives. Once these precautionary motives weaken due to the CTP, households decrease savings leading to a boom in consumption along the transition path to the new steady-state.<sup>33</sup> Hence, accounting for the transition dynamics has strong welfare implications.

We also show that the CTP is supported by 77.3 percent of the households, despite

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<sup>32</sup>See Fiszbein and Schady [2009] and the references therein. For studies considering the Bolsa Família program, see Foguel and Barros [2010] and Ribas and Soares [2010]. Ribas and Soares [2010], for instance, find a significant reduction in labor supply in metropolitan areas.

<sup>33</sup>This mechanism is the open economy counterpart of Guerrieri and Lorenzoni [2011], in which a tightening in the borrowing limit leads to a deleverage process that strongly reduces consumption.

that only 16.8 percent are covered by the CTP.<sup>34</sup> This evidence corroborates the idea that CTPs increase welfare through a better insurance arrangement. Indeed, the social insurance provided by the CTP is valued not only by those in the program but also by those that are likely to fall below the poverty line due to a sequence of bad shocks.<sup>35</sup> This result helps explain why there is a general political support for CTPs in developing countries<sup>36</sup> and, thus, why these programs tend to be long-lived.<sup>37</sup>

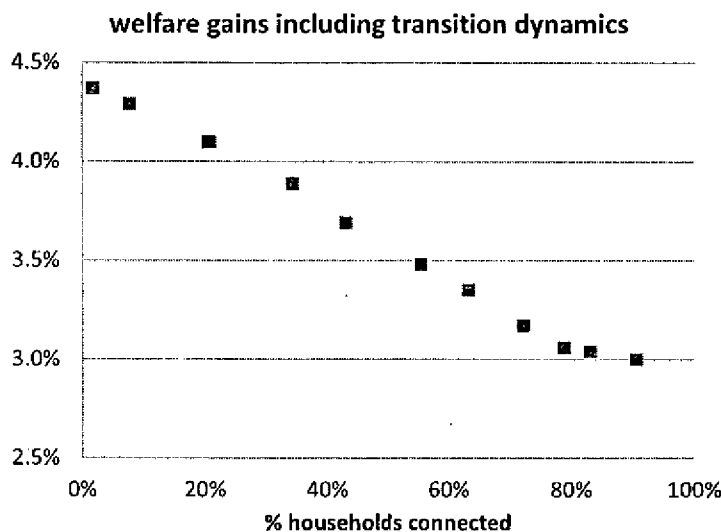


Figure 3: The role of  $\xi$ . Welfare gains.

Since CTPs are widely spread in developing countries characterized by high inequality and low financial development, we calibrate the fixed cost  $\xi$  and the variance of the idiosyncratic shock  $\sigma^2$  to capture these characteristics. Figures 3 and 4 show that even in countries with low inequality or high financial development, the welfare gains (including transition dynamics) from adopting the CTP are large. Figure 3 shows how welfare gains from adopting the program change as financial development, measured by the percentage of households

<sup>34</sup>If in order to support the program, the household welfare gains must be at least equivalent to a 1 percent increase in its consumption in the economy without the program, 51.4 percent of the households would support the CTP.

<sup>35</sup>The political support measure does not capture welfare gains due to inequality reduction since it is constructed by comparing welfare gains at the individual level.

<sup>36</sup>Manacorda et al. [forthcoming] and Zucco [2011] show that beneficiaries from CTPs in Uruguay and Brazil, respectively, are more likely to favor the incumbent government.

<sup>37</sup>We are not aware of any large-scale CTP that were discontinued.

connected to the financial system, evolves. Figure 4 shows how welfare gains from adopting the program change as the Gini coefficient changes.<sup>38</sup>

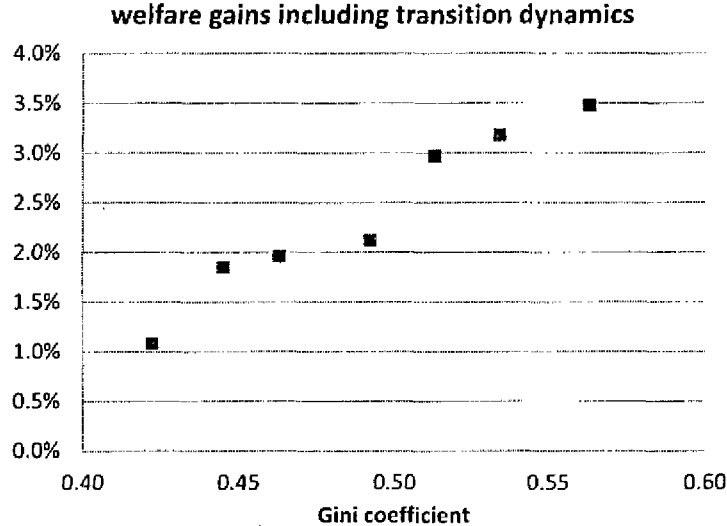


Figure 4: The role of  $\sigma$ . Welfare gains.

The welfare gains range from 3% to 4.4% for different degrees of financial development. Moreover, if  $\sigma$  is low enough to generate a Gini coefficient of 0.42, consumption has to increase by 1.1 percent for all households in the economy without the CTP in order to equalize welfare measures across economies.

#### 4.4 Robustness: Distortive taxes

In the benchmark economy, we assume that the budget of the program  $B$  is assigned exogenously to the government. In this section, we check robustness by funding this budget with a marginal tax rate  $\tau$  on labor income. Government uses tax proceeds to fund the budget of the program  $B$  and its own consumption  $G$ . Hence, the government budget constraint reads

$$B + G = \tau wH.$$

<sup>38</sup>In order to generate this figure, we vary the variance of the idiosyncratic shock by experimenting different values for  $\sigma$ . Same disclaimer in footnote 29 applies for both figures.

We assume that  $G$  is wasted resources in the sense that does not enhance utility or productivity.

We set  $\tau = 0.11$ , as in Pereira and Ferreira [2010], and then, recalibrate the economy to match the targets in Table 1. We discuss two experiments. Once the program is abolished, i.e., the budget  $B$  is set to zero, the government either reduces the marginal tax rate  $\tau$  or increases its own consumption  $G$  in order to satisfy its budget constraint. Table 7 shows the results.

|                                 | benchmark | no program            | no program       |
|---------------------------------|-----------|-----------------------|------------------|
| coverage                        | 18.7%     | 0%, $\tau \downarrow$ | 0%, $G \uparrow$ |
| % households employed           | 79.6%     | 79.9%                 | 80.0%            |
| % households connected          | 53.7%     | 55.5%                 | 55.3%            |
| Gini coefficient                | 0.56      | 0.56                  | 0.56             |
| Gini coefficient for wealth     | 0.76      | 0.75                  | 0.75             |
| % households in extreme poverty | 2.1%      | 4.6%                  | 4.7%             |
| % households in poverty         | 12.7%     | 16.8%                 | 16.9%            |
| Welfare $\Delta_{ss}$           |           | 1.4%                  | 2.9%             |
| Welfare $\Delta_{td}$           |           | 3.8%                  | 5.0%             |
| Political support $\Gamma$      |           | 84.7%                 | 100%             |

Table 7: Robustness. Distortive taxation.

In comparison with the benchmark results in Table 5, results are qualitatively similar. Except for employment that reduces once the program is implemented, all qualitative effects go in the same direction. Quantitatively, the magnitude of the changes varies a bit but not substantially.

Finally, Figure 5 plots the welfare gains accounting for the transition dynamics (left-axis) and political support (right-axis) against the marginal tax rate (bottom-axis). Squares represent the welfare gains while lozenges represent the political support. In order to generate this figure, we assume that the government adjusts  $\tau$  rather than  $G$  when the CTP is abolished.

Notice that high values of  $\tau$  are associated with high welfare gains due to the CTP but

low political support. Intuitively, a higher  $\tau$  decreases the marginal benefit of working for all households. For the poorest households, once the program is introduced, the overall benefit of leaving the workforce is higher. Hence, the program allows for a better outcome for them, enhancing the overall insurance and welfare gains in the economy. Political support reduces because the benefit of reducing  $\tau$  is larger when  $\tau$  is higher. Hence, rich households, which are unlikely to benefit from the program, might withdraw their support as  $\tau$  gets higher.

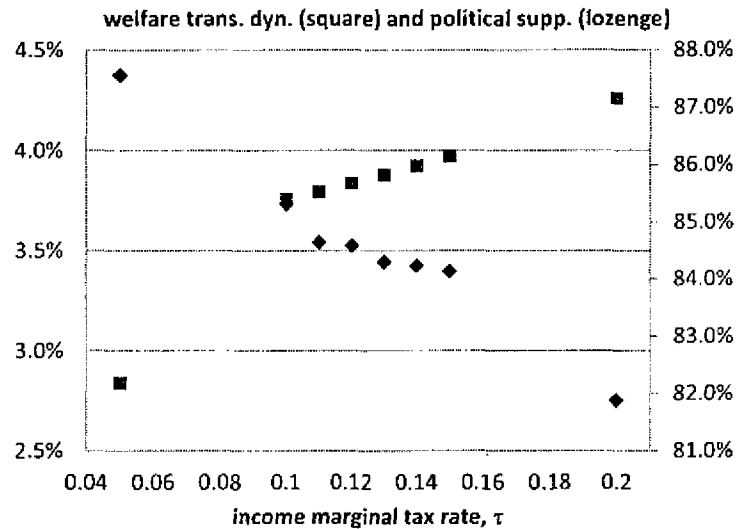


Figure 5: The role of  $\tau$ . Changes in welfare gains and political support.

## 4.5 Alternative policies

Provided that the budget  $B$  is fixed, in this section we compare the CTP with other programs. In particular, we consider the following questions: (i) What is the optimal CTP, in the sense that maximizes either welfare or political support?; (ii) By adding employment requirements, can the CTP be improved?; (iii) Is a minimum income program better than a CTP?

### 4.5.1 Optimal CTP

In this section we look for the combination of the threshold  $\bar{y}$  and transfers  $T$  that maximizes welfare and political support for a given budget  $B$ . Results are presented in Figure 6, which



plots the welfare gains accounting for the transition dynamics (left-axis) and political support (right-axis) against the program coverage (bottom-axis). Squares represent the welfare gains while lozenges represent the political support.

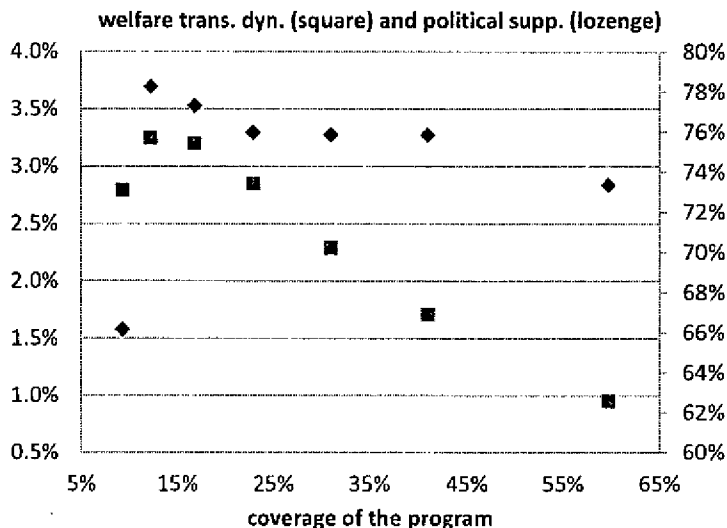


Figure 6: Optimal CTP.

Both political support and welfare are maximized when the program covers around 15 percent of the households. Hence, within this class of CTPs with fixed budget, the Brazilian experience is very close to the optimal. However, the optimality of the implemented CTP is not robust to a wider class of programs, as we discuss in Section 4.5.2 and 4.5.3.

#### 4.5.2 Employment requirement

In this section, we introduce an employment requirement in order to be eligible for the CTP. Since labor  $n$  is indivisible, households do not have the option to reduce labor in order to be in the program. Hence, given that we maintain the same income threshold  $\bar{y}$  and budget  $B$  as before, there will be fewer beneficiaries receiving larger transfers  $T$ . Alternatively, we could fix transfers  $T$  and increase the income threshold  $\bar{y}$ . We opt for the first option mainly because it channels more funds for those with very low endowment of efficient labor units.

In principle, it is not clear how this employment requirement affects welfare. On one hand, incentives to work increase labor supply and, thus, has a direct negative effect on

utility. On the other hand, it potentially improves the insurance arrangement and reduces inequality in the economy, enhancing welfare. Table 8 compares the alternative program with employment requirement against the benchmark program.

|                                 | benchmark<br>program | alternative<br>program |
|---------------------------------|----------------------|------------------------|
| coverage:                       | 16.8%                | 12.4%                  |
| % households employed           | 79.5%                | 81.4%                  |
| Gini coefficient                | 0.56                 | 0.56                   |
| Gini coefficient for wealth     | 0.75                 | 0.75                   |
| % households in extreme poverty | 2.3%                 | 1.4%                   |
| % households in poverty         | 11.0%                | 10.8%                  |

Table 8: Employment requirement.

The alternative program shows inequality statistics close to the benchmark ones. However, it reduces the number of households in extreme poverty by 0.9 percentage point.

The welfare gains in steady-state from adopting the alternative program is equivalent to an increase of 0.5 percent in consumption for all households in the benchmark economy. If we account for the transition dynamics, this figure increases to 0.8 percent. Finally, 50.5 percent of the population would support this alternative program, so it might not be politically feasible.

#### 4.5.3 Minimum income program

In this section, we evaluate a welfare program that in addition to stimulate labor supply, it also establishes a minimum level of income.<sup>39</sup>

This alternative policy is implemented as follows. If the household works and its total income is less than an established threshold  $\bar{y}$ , its income is complemented up to  $\bar{y}$ . If the household does not work, it is not eligible for the program. Hence, the household budget

<sup>39</sup>We are partially inspired by the design of the Earned Income Tax Credit program in the U.S., in which a special attention is devoted to work incentive effects. See Moffitt [2002] for a survey on the relationship between welfare programs in the U.S. and labor supply.

constraint is rewritten as

$$c + a' = b + (1 - \pi)m + \max \{rb + w\varepsilon n, n\bar{y}\} - \mathbf{I}_{\{b>0\}}\xi.$$

We choose  $\bar{y}$  such that total transfers is equal to the budget  $B$  previously assigned to the CTP. Mathematically,

$$\int_{A \times E} n(a, \varepsilon) \max \{ \bar{y} - rb(a, \varepsilon) - w\varepsilon, 0 \} d\lambda(a, \varepsilon) = B.$$

Figure 7 compares the design of this program with the benchmark CTP. It plots disposable income against income. The left plot represents the benchmark CTP, whereas the right plot represents the alternative minimum income program.

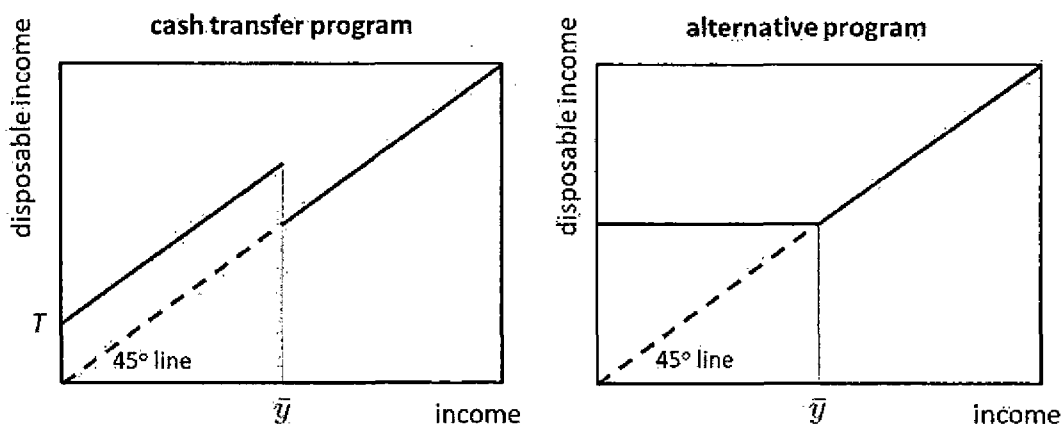


Figure 7: Cash transfer program vs. alternative program

Table 9 compares the results of the benchmark CTP (second column), against the alternative policy with minimum income but no employment requirement (third column), and against the alternative policy with minimum income and employment requirement (forth column). In comparison with the benchmark CTP, we show that employment requirement is important to reduce extreme poverty, while the minimum income program itself has a very limited role. However, the CTP is more effective to reduce poverty.

The minimum income program with labor requirement furthers increase welfare. The

welfare gains in steady-state from adopting this program is equivalent to an increase of 1.0 percent in consumption for all households in the benchmark economy.<sup>40</sup> If we account for the transition dynamics, this figure increases to 1.2 percent. Finally, 49.8 percent of the population would support this alternative program.<sup>41</sup>

|                                 | program benchmark | alt. program without emp. req. | alt. program with emp. req. |
|---------------------------------|-------------------|--------------------------------|-----------------------------|
| coverage:                       | 16.8%             | 9.9%                           | 12.4%                       |
| % households employed           | 79.5%             | 72.3%                          | 81.4%                       |
| Gini coefficient                | 0.56              | 0.58                           | 0.56                        |
| Gini coefficient for wealth     | 0.75              | 0.74                           | 0.75                        |
| % households in extreme poverty | 2.3%              | 10.1%                          | 1.2%                        |
| % households in poverty         | 11.0%             | 16.0%                          | 15.3%                       |

Table 9: Minimum income program.

We conclude that if labor requirement is a feasible option, the minimum income program dominates the CTP in terms of welfare. If labor requirement is not a feasible option, the CTP dominates the minimum income program.

## 5 Conclusion

In this paper, we show that CTPs have important implications that have not been thoroughly discussed in the literature. First, it can increase wealth inequality, by affecting asymmetrically precautionary motives in the economy. Second, even low-budget CTPs can have large welfare effects, since the decrease in precautionary motives leads to a boom in consumption when the program is adopted. Third, it can achieve high levels of political support, even though few households are covered, since many appreciate the insurance provided. Forth, it has no clear effect on income inequality, since savings and labor supply are affected.

<sup>40</sup>This figure counterpart for the minimum income program without labor requirement is 0.2%. If we consider the transition dynamics, this figure falls to -0.2%.

<sup>41</sup>The political support for the minimum income program without labor requirement is 5.7%.

Moreover, we argue that this channels are particularly important in developing economies, where there are large income inequality and low financial development. This prediction accords with the evidence of vast implementation of these programs in developing countries. We also argued that relatively modest results would come if such a program were implemented in developed countries.

Normatively, we claim that CTPs that combine transfers with employment requirements are more effective in reducing poverty and increasing welfare.

## Appendix

### A Cash transfer programs in Brazil

The *Bolsa Família* (family allowance) program is a large scale conditional cash transfer program (CCTP) in Brazil.<sup>42</sup> Its origin dates back to 1996, when the national government developed a CCTP for families whose children are likely to work in risky occupations. Before 2003, many CCTPs had been developed at the national and local levels. The most important was the *Bolsa Escola* (school allowance) program, created in 2001 to transfer cash to families whose income per capita is below an established threshold provided that their children receive a minimal level of schooling.

In 2003, the *Bolsa Família* program was created to unify four national CCTPs, including the *Bolsa Escola* program. Previously, different programs were implemented by different government agencies with little coordination among them. The coverage was not national and it varied with the program. Hence, similar families receive different benefits. The creation of a unified program aimed to correct for these discrepancies.

In 2006, the *Bolsa Família* program reached 11 million families and its budget was 0.35 percent of the GDP.<sup>43</sup> These figures did not change much up to 2009.

In contrast with other social policies, such as unemployment insurance, the budget assigned to the *Bolsa Família* program is fixed. Once this budget is exhausted, no more beneficiaries can be included in even if they are eligible for the program. Soares and Sátyro [2009] report that in 2006, 8.3 percent of all families is not eligible for the program but receives the benefits, whereas 6.6 percent is eligible but does not receive the benefits.

A family is eligible to be in the program if the household income per capita is below one of two poverty lines. If income per capita is below the extreme poverty line, the family receives a fixed transfer plus a variable amount depending on the number of children. If

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<sup>42</sup>The description of the program is based on Soares and Sátyro [2009].

<sup>43</sup>Using the 2006 PNAD, Soares and Sátyro [2009] estimate that 16.8 percent of all families were in the program, and its budget represented only 0.69 percent of the total income of all families.

income per capita is above the extreme poverty line but below the other poverty line, the family only receives a variable amount depending on the number of children. The rules and benefits have changed for the last few years. In 2006, for instance, families get a variable amount per children – up to three of them – that are below 14 years old. After 2008, the families may also get extra payments if composed by teenagers that are between 15 and 18 years old.

In order to obtain the benefit, the families should comply with some schooling and health conditions for their children. The monitoring of compliance with these conditions has been a controversial point of the program.

On one hand, it has been argued that the conditions are more important than the transfers. According to this view, the Bolsa Família program is an important tool to enhance human capital formation among poor children. On the other hand, another view claims that the Bolsa Família program should be concerned in improving the social safety net and, thus, the scope of transfers should be the primary focus. If the conditions are excessive, for instance, the most vulnerable families are not able to comply with them.

In comparison with the international experience, the Bolsa Família program stands in between these views.<sup>44</sup> At the same time that the monitoring of compliance with the conditions has been improving since 2006, the penalties imposed for violations are light. Fiszbein and Schady [2009] argue that the Bolsa Família program, in contrast with the Mexican CCTP, “puts a shade more emphasis on redistribution than on human capital formation”.

Finally, the Bolsa Família program has been criticized on two grounds. First, the program may induce people to quit their jobs in order to be eligible for the program or to enjoy more leisure time. Second, the program influences in a perverse way the political process – a dimension that warrants special attention in Latin America given its populist tradition. Many political scientists argue that the Bolsa Família program fits into a patron-client political machine used to guarantee that those supported by the patron are elected.

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<sup>44</sup>See Fiszbein and Schady [2009] for a comparison of CCTPs across countries.

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