UNIVERSIDAD SAN FRANCISCO DE QUITO USFQ

Colegio de Administración y Economía

The incidence of the Reallocation of the "Bono de Desarrollo Humano" on poverty and inequality. A static simulation.

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RESUMEN

Existe algún esquema de redistribución del BDH que mejore los resultados actuales en desigualdad y pobreza? Esta tesis busca explorar diversos esquemas de redistribución de los beneficios del BDH para encontrar el esquema que minimiza pobreza y desigualdad en Ecuador. Por lo tanto, usando el Índice del Registro Social (RS) identifico los hogares en donde el BDH está mal asignado. Posterior, usando simulaciones estáticas, creo esquemas de redistribución reasignando recursos a distintos hogares usando varios criterios. En consecuencia, estudio la incidencia de la extrema pobreza, pobreza y desigualdad bajo cada esquema. Los resultados muestran que el esquema de redistribución que minimiza los indicadores es el de "Completa Redistribución" bajo un 100% de cumplimiento. Este esquema de redistribución reduce extrema pobreza, pobreza y desigualdad en 1.81%, 2.88% y 0.0089, respectivamente. Sin embargo, existe evidencia de que un esquema que se concentra unicamente en beneficiar a los quintiles más podría tener un mejor desempeño.

Palabras clave: Analísis Microeconomico del Desarrollo, Políitica Pública, Gasto Público en Programas de Bienestar Social, Planeación de Políticas de Desarrolllo, Effectos de la Distribución de Programas de Bienestar, Mediciones y Analísis de Pobreza

ABSTRACT

Are any BDH allocation schemes that could improve current inequality and poverty results? This paper aims to explore different allocation schemes of BDH resources to find the one which minimizes incidences on extreme poverty, poverty and inequality. To do so, based on the Social Registry Index (SR), I identified the sources of current BDH resources misallocation. Therefore, by employing static simulations, I create reallocation schemes reassigning misallocated resources to different households following different criteria. I study incidences on poverty and inequality under each reallocation schemes. The results showed that the reallocation scheme that minimizes incidences on extreme poverty, poverty and inequality is a total reallocation scheme with 100% of compliance. This reallocation scheme reduces extreme poverty, poverty, and inequality in 1.81%, 2.88% and 0.0089, respectively. Although, the paper presents evidence that suggest that reallocating all BDH resources in the lower quintiles will be more beneficial.

Keywords: Microeconomic Analyses of Economic Development, Public Policy, Government Expenditures and Welfare Programs, Development Planning and Policy, Provision and Effects of Welfare Program, Measurement and Analysis of Poverty

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1 Introduction

Bono de Desarrollo Humano (BDH) is a conditional cash transfer (CCT) program of the Ecuadorian government. The BDH intends to reduce poverty and inequality in the country by providing poor households with a monthly transfer of \$50. In 2013, the government decided to update its database and assignment criteria of BDH receivers, leading to the exclusion of 52.97% from the original pool (Martínez et al., 2017). The rationale of this exclusion was the original misallocation of resources in households that did not meet the assignment criteria. Therefore, due to the update, several households were no longer eligible, excluding them from the pool through the "BDH Graduation Program". The high rate of exclusions suggests that BDH resources are poorly allocated among households. Hence, a correct reallocation might lead to a better reduction of poverty and inequality compared to the status quo. With this in mind, which BDH allocation schemes could improve poverty and inequality results?

In this paper I answer this question by means of static simulations. First, I identify misallocated households, wrongly receiving and not receiving the transfer, by using the Social Registry Index (SR), which is the criteria used to allocate the benefit. Then I take the amount of BDH cash allocated to non eligible households and reallocate it into eligible households following different schemes. I study the effects of reallocating the cash transfers amount in different households under three different schemes: elimination of the entire program (i.e taking back all the resources invested in the program), a partial reallocation (i.e reallocating cash using the SR and saving the wrongly missallocated cash difference, reducing the number of total receivers), and with a total reallocation of resources (i.e. keeping the amount dedicated to the cash transfer program constant by reallocating the difference of wrongly misallocated cash randomly in quintile 1 households). With this strategy, the goal is to compare these schemes with the current one as in (Gasparini et al., 2013) and calculate incidences over extreme poverty, poverty and inequality of reallocating the transfer.

I attempt to simulate the "BDH Graduation Program" and study the average sensibility of graduation under the partial and complete reallocation schemes. I use the set of misallocated households and randomly simulate their graduation by a rate of 1%. I create "Graduation Curves" by calculating extreme poverty, poverty and inequality incidences over every graduation rate and comparing the results to the current allocation scheme. Moreover, if graduation curves are non-linear, I could find the graduation scheme that minimizes poverty and inequality.

Results of the simulations show that not all reallocation schemes have a positive impact on reducing poverty and inequality. A partial reallocation scheme increases extreme poverty, poverty and inequality in 0.51%, 1.60% and 0.0006, respectively. The increase in the indicators could be deemed to the 8.6% difference between recipient and non-recipient households. Under this scheme, the government saves resources.

On the other hand, a total reallocation scheme decreases extreme poverty, poverty and inequality in 1.13%, 2.16% and 0.0048, respectively. Therefore, policies that keep constant the amount of cash dedicated to the program are preferable to the ones that save the difference of resources among misallocated households.

The sensibility analysis of graduation curves shows schemes that minimizes either poverty or inequality. The partial reallocation scheme shows average sensibilities for extreme poverty, poverty and inequality of 0.0519%, 0.0247% and 0.00446 %, respectively, showing an increasing behaviour. In contrast, the complete reallocation scheme presents average sensibilities for each indicator of -0.0192%, -0.0001% and -0.0021%, displaying negative trends. I obtain graduation rates that minimizes the indices due to the non-linear nature of these graduation curves. Consequently, extreme poverty, poverty and inequality are minimized at 100%, 0%, and 84%, respectively. However, differences between 0% and 100% on poverty graduation rates, and 84% and 100% on inequality graduation rates are minimal. This analysis suggests that, under this scheme, it is beneficial to graduate 100% of the receivers.

This work contributes to the literature on conditional cash transfers. In particular, on how the correct allocation of resources impact on poverty and inequality, and measurment of incidence of BDH reallocation schemes following (MIES, 2014) and (Guevara, 2013). It proposes methods for evaluating incidences based on (Gasparini et al., 2013).

Nonetheless, the most important contribution is to elaborate on the analysis of consumption poverty and inequality by (Molina et al., 2016), by measuring the incidence of poverty and inequality through changes in the BDH allocation. These results might be helpful to public policy decision making by proposing alternative BDH allocations and levels of graduation to improve results in poverty and inequality.

The paper is structured as follows: in section 2, I present summary statistics for consumption, poverty, inequality and BDH assignment data. Then, in section 3, I describe the methodology used for simulations and incidence estimation. Afterwards, section 4 presents results for the simulations, by showing incidences on extreme poverty, poverty and inequality. Section 5 concludes the paper.

2 Data

The data used for this paper comes from the *Encuesta de Condiciones de Vida 2014* (ECV), which is the Ecuadorian Survey of Living Conditions. The total sample size in ECV 2014 is 109682 observations, where each one represents an individual. However, the survey shall be analyzed at a household level, since households are the information and analysis unit. Therefore, the total sample size at this level is 28968 observations. On the other hand, regarding geographical representativeness, the survey is representative at a national and provincial level according to (INEC, 2015).

The welfare measure of the ECV is consumption. This variable represents the total consumption expenditure of all household members in food and non-food. Figure 1 shows the consumption distribution for Ecuadorian households. The distribution seems highly unequal since households in quintile 5 consume the equivalent of 5 times the joint consumption of households in quintiles 1-4, implying a high inequality incidence in Ecuador. Moreover, there is a peak at $340, which is the 2014 minimum wage, suggesting that most Ecuadorian households consume the equivalent of the minimum wage. Therefore, hinting a high marginal propensity to consume, which is a reasonable inference since low-income households consume more of its income and save less of it than high-income ones.

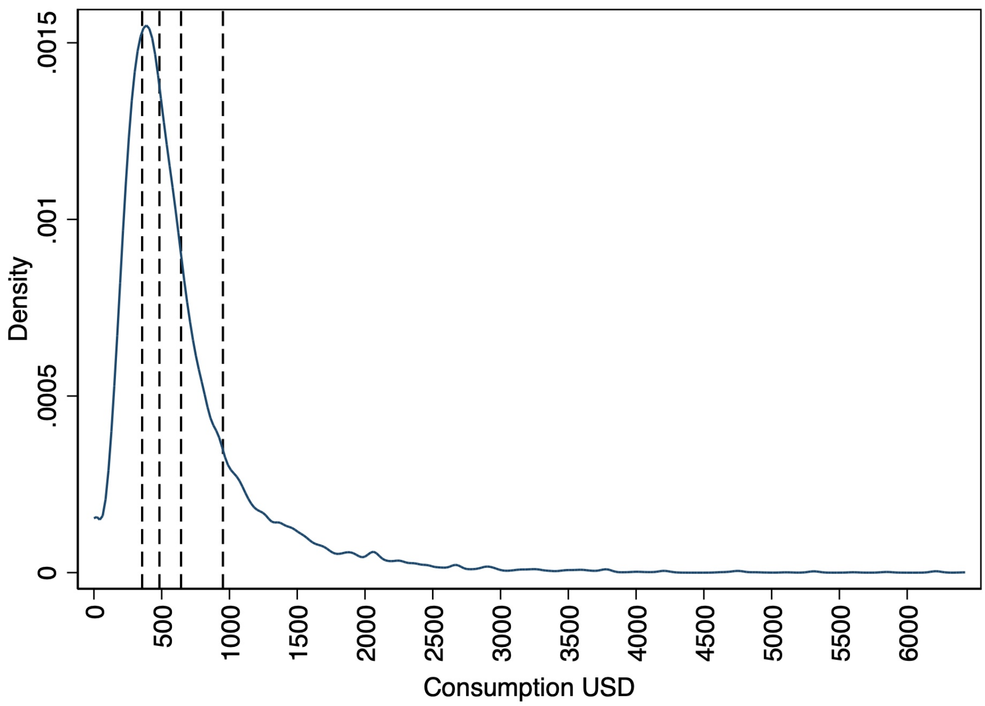

Figure 1: Consumption Distribution by Quintiles

Moreover, I measure extreme poverty and poverty incidences following two different criteria. The first criterion is the poverty line. This criterion classifies people into poverty and extreme poverty if their consumption per capita is lower than a threshold. In 2014, these thresholds were located at $47.56 and $84.40 for extreme poverty and poverty, respectively, according to (Molina et al., 2016).

The second criterion is the Social Registry Index (SR). This index is a measurement of multivariate poverty, meaning that identification not only relies on consumption or income but in several other socioeconomic variables. The SR is generated from a Principal Component Analysis of 54 socioeconomic variables, which measures living conditions on a range from 0 to 100. Like, the poverty line methodology, the SR uses thresholds to identify extreme poverty and poverty. The thresholds were 24.09 and 34.68 according to (Moreno et al., 2019) and (Pancho & Enriquez, 2018).

	Proportion	**Gini**
Poverty Line		
Extreme Poverty	6.73%	
Poverty	26.59%	
Social Registry		
Extreme Poverty	18.12%	
Poverty	39.30%	
Inequality		0.3843

Table 1: Poverty and Inequality Incidence

The incidence of extreme poverty and poverty following both criteria is different. Table 1 shows that using the poverty line criterion, 6.73% and 26.59% of households live in extreme poverty and poverty, respectively. In contrast, using the Social Registry, I obtain incidences of 8.12% and 39.30% for each indicator. The differences in magnitude are due to the multidimensional approach of the SR in measuring poverty. Regarding inequality, the 2014 Gini is 0.3483, which reflects figure 1 unequal distribution.

BDH 2014 Distribition	BDH RS 2014 Distribition		
	No BDH	BDH	Total
No BDH	65.3%	7.6%	73.0%
BDH	16.2%	10.9%	27.0%
Total	81.5%	18.5%	100.0%

Table 2: BDH Cross Frequency Table Comparison

The SR criterion determines BDH intended allocation. However, the intended allocation differs from the status quo. Table 2 compares data between this two different allocations. The data shows that currently, 27% of all households receive the transfer. In contrast, just 18.5% of all households receive the transfer in the intended allocation. Therefore, the difference between the intended and current allocation is 8.6%, implying a misallocation of resources.

I classify this misallocation of resources into two categories A and B. First, category A which is are households that were not intended to receive the transfer but do. Second, category B which are households that do not receive the transfer but should. The proportion of households in these groups are 16.2% and 7.6%, respectively. There is a difference of 8.6% among the groups, which implies that misallocated resources concentrate in category A households. This analysis proves that the current BDH allocation is poor.

3 Methodology

Simulations are useful to assess public policies by modelling microeconomic data. According to (Bourguignon & Spadaro, 2006) simulations are classified into static and dynamic. I choose static stimulation as my main methodology since I am employing cross-sectional data.

This way, a static simulation allows me to create consumption allocation schemes by reallocating BDH cash among households using the original SR allocation. Due to the difference between the two types of misallocation categories, as stated in section 2, some reallocation schemes will save cash by reducing total BDH recipients. However, others will maintain constant the program cash, by reallocating the difference in other households following different criteria. The creation of several counterfactual schemes allows me to calculate changes in poverty and inequality by comparing them with the current one, as suggested in (Gasparini et al., 2013).

I study three different consumption reallocation schemes. The first scheme does not consider the BDH program, which is eliminated by taking back all the resources invested in the program from all households. The second scheme considers only a partial reallocation of resources by saving the difference of misallocated cash and reducing the number of recipients. The third scheme considers a total reallocation of resources by keeping the amount dedicated to the cash transfer program constant and reallocating the excess of misallocated cash randomly households in quintile 1.

Static simulations allow me to simulate the BDH graduation program. I run these simulations through randomly graduating households by a rate of 1% adopting the following schemes. First, a partial reallocation scheme, as explained in the previous paragraph. Second, a complete reallocation scheme, via keeping the amount dedicated to the cash transfer program constant, by reallocating the difference of misallocated cash randomly in quintiles 1 and 2, and only taking resources from quintiles 3, 4 and 5. These simulations enable me to create "Graduation Curves" by calculating extreme poverty, poverty and inequality incidence over every graduation rate. I find the graduation scheme that minimizes either poverty or inequality.

I study the average sensibility of graduation by employing an OLS regression over the graduation curves. The regression equation follows the following form.

$$log(gr_i) = \alpha + \beta log(x_i) + \varepsilon \tag{1}$$

Where, gr_i is the graduation rate, x_i the variable of interest whether it is extreme poverty, poverty, or inequality, β the average sensibility of graduation and ε the error term.

$$\max_{\delta_i} \quad W(\delta_i) \tag{2}$$

I calculate incidences over extreme poverty, poverty and inequality as follows. First, I obtain incidences for all indicators using the 2014 poverty lines and the Gini Index. Then, I compare those incidences to the Status Quo scheme. Furthermore, I evaluate progressivity and changes in inequality compared to the status quo scheme by computing Kakwani and Reynolds-Smolensky indices as suggested in (Mcintyre & Ataguba, 2010). Kakwani Index is a measurement of progressivity calculated by the following equation.

$$k_i = g_{sq} - c_i \tag{3}$$

Where g_{sq} represents the Gini index of the status quo and and c_i the concentration index of the policy. This index shows the level of progressivity by comparing the current distribution of consumption in the status quo and the concentration of consumption under the new scheme. Positive Kakwani indices reflect progressive policies, while negatives one reflects regressive policies. On the other hand, Reynolds-Smolensky Index (R-S) measures changes in inequality. It is calculated as follows:

$$r_i = g_{sq} - gi \tag{4}$$

Where g_{sq} and g_i represents the Gini index at the status quo and and the Gini index of the policy, respectively. This index shows the change of inequality due to the policy. A positive R-S index implies a decrease in inequality, while a negative one implies an increase.

4 Results

In this section, I show the incidences over extreme poverty, poverty and inequality, of all the proposed consumption reallocation schemes. Likewise, I report results for Kakwani and Reynolds-Smolensky indices. Moreover, I present results of the BDH Graduation simulation, presenting the graduation curves and its analysis. Furthermore, I show the average sensibility analysis for each curve.

4.1 Consumption Reallocation Schemes Analysis

The consumption distributions across the different reallocation schemes differ in the proportion of households in the lower tail. The BDH elimination and partial relocation schemes show an increase in the lower tail compared to the Status Quo, implying a decrease in the consumption of households under these two schemes (see figure 2 and 3). The increase is greater in the BDH elimination scheme, which is natural since the removal of all transfers primarily affects lower consumption households.

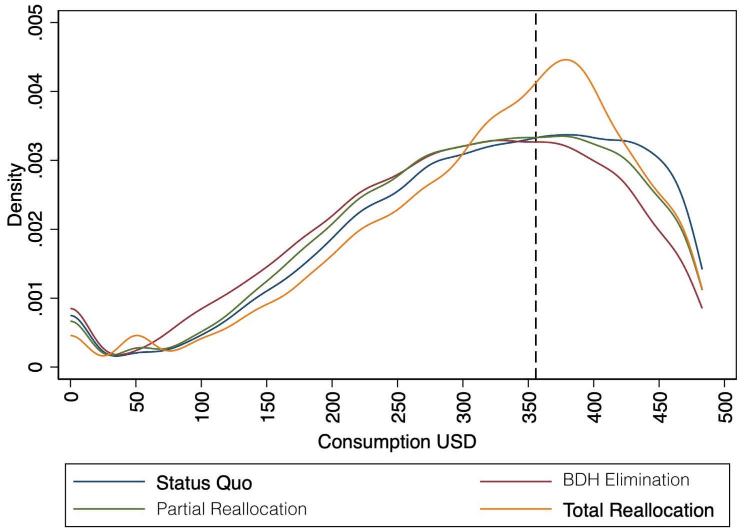

Figure 2: Q1 and Q2 Consumption Distribution: Schemes

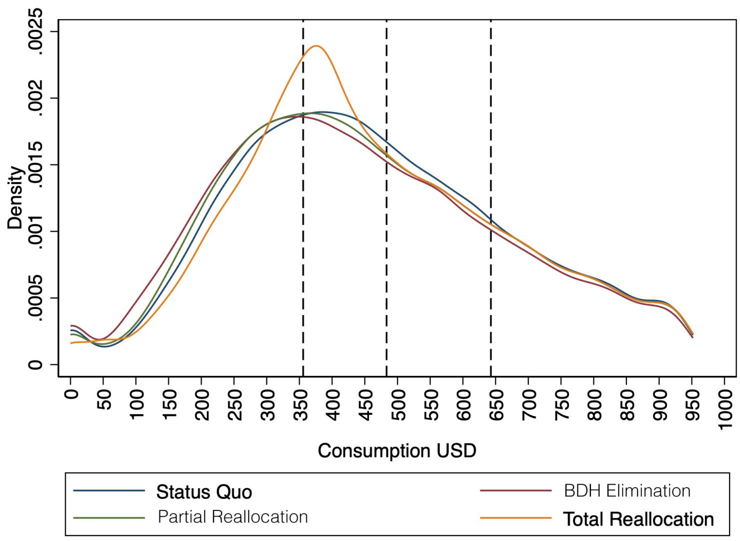

Figure 3: Q1 to Q4 Consumption Distribution: Schemes

However, having an increase in the lower tail is counter intuitive in the partial reallocation scheme. The reason for this behaviour is that partial reallocation redistributes misallocated resources following the SR criteria strictly, which means that since category A households exceed category B ones (see section 2) the total resources of the program decreases which affects lower consumption households.

On the other hand, the complete reallocation scheme shows a decrease in the lower tail compared to the Status Quo. This effect is caused by keeping constant the amount of the program resources through reallocating the spare resources randomly in quintile 1. Hence, entailing an increase of consumption for households at the lower tail.

Incidences on extreme poverty, poverty and inequality differ between each scheme. Table 3 displays results for extreme poverty, poverty and inequality for every scheme. The BDH elimination scheme shows an increase in extreme poverty and poverty of 1.43% and 5.29%, respectively, while the partial reallocation scheme also shows increases of 0.51% and 1.60%. In contrast, the Total Reallocation scheme is the only one which reduces poverty, with a drop of 1.13% and 2.16% in these indicators.

	Proportion	Difference	Gini	Kakwani	Reynolds-Smolensky
Status Quo					
Extreme Poverty	5.29%				
Poverty	22.48%				
Inequality			0.3843		
Elimination					
Extreme Poverty	6.71%	1.43%			
Poverty	27.78%	5.29%			
Inequality			0.4004	-0.0148	-0.0162
Partial Reallocation					
Extreme Poverty	5.79%	0.51%			
Poverty	24.09%	1.60%			
Inequality			0.3902	-0.0047	-0.0059
Total Reallocation					
Extreme Poverty	4.15%	-1.13%			
Poverty	20.32%	-2.16%			
Inequality			0.3795	0.0065	0.0048

Table 3: Poverty and Inequality Incidence by Schemes

Likewise, inequality indices show the same pattern. The BDH Elimination and Partial Reallocation schemes show increases of 0.0162 and 0.0059 in inequality. Moreover, they are regressive schemes displaying Kakwani indices of -0.0148 and -0.0047. On the other hand, the Total Reallocation scheme reduces inequality in 0.0048, and with a Kakwani Index of 0.0065 is a progressive policy.

Poverty and inequality changes link to variations in the proportion of households in the lower tail of the consumption distribution. The schemes that experience increases in the lower tail also experience increases in poverty and inequality and conversely. This observation suggests that the mechanism by which poverty an inequality incidences variate depends positively on changes in the proportion of households in the lower tail of the distributions. This mechanism is supported by (Gasparini et al., 2013) who states that poverty and inequality results improves when households in the lower part of the distribution increases their consumption.

4.2 BDH Graduation Simulation: Partial Reallocation

BDH Graduation simulations show a more detailed analysis of consumption allocation schemes. In section 4.1 I analyzed allocation schemes under 100% of graduation, however here I examine how the consumption distributions changes by increases on the graduation rate. Figures 4 and 4 display the consumption distributions of several BDH graduation rates under a partial reallocation scheme. Likewise, in section 4.1 the proportion of households in the lower tail increases, but it does gradually, by increases in the graduation rate.

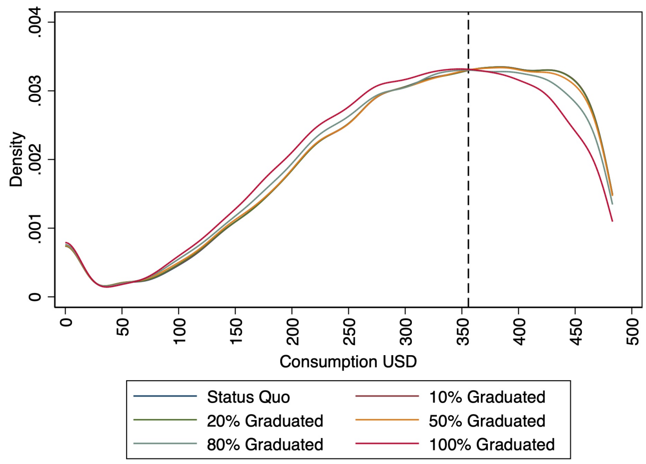

Figure 4: Q1 and Q2 Consumption Distribution: Partial Reallocation Graduation

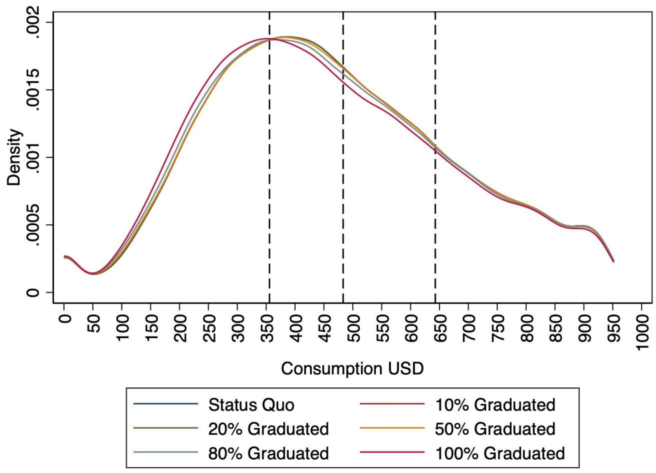

Figure 5: Q1 to Q4 Consumption Distribution: Partial Reallocation Graduation

	Proportion	Difference	Gini	Kakwani	Reynolds-Smolensky
Status Quo					
Extreme Poverty	5.29%				
Poverty	22.48%				
Inequality			0.3843		
10% Graduation					
Extreme Poverty	5.29%	0.00%			
Poverty	22.48%	0.00%			
Inequality			0.3852	-0.0008	-0.0009
20% Graduation					
Extreme Poverty	5.29%	0.01%			
Poverty	22.50%	0.01%			
Inequality			0.3860	-0.0015	-0.0017
50% Graduation					
Extreme Poverty	5.38%	0.09%			
Poverty	22.88%	0.39%			
Inequality			0.3888	-0.0040	-0.0045
80% Graduation					
Extreme Poverty	5.91%	0.63%			
Poverty	23.82%	1.34%			
Inequality			0.3915	-0.0065	-0.0072
100% Graduation					
Extreme Poverty	7.10%	1.81%			
Poverty	25.37%	2.88%			
Inequality			0.3931	-0.0080	-0.0089

Table 4: Poverty and Inequality Incidence by No Reallocation Graduation Proportion

Incidences over extreme poverty, poverty and inequality follow the same increasing pattern as the general analysis of the partial reallocation scheme. Table 4 reports incidences over poverty and inequality for key graduation rates under a partial reallocation scheme. All the simulations show an increase in extreme poverty, poverty and inequality. Regarding extreme poverty, the 10% simulation do not experiment a change, while the 20%, 50% an 80% simulations experiment slight changes of 0.01%, 0.09&, and 0.63%. The 100% simulation is the only one in which extreme poverty change is greater than 1 being 1.81%. Moreover, changes in poverty are sharper. The 10%, 20 & and 50% simulation have an increase of poverty of 0.00%,0.01% and 0.39%. On the other, hand 80% and 100% simulation have a greater increase in poverty of 1.34% and 2.88% respectively.

Inequality results show a similar pattern to the one of poverty. The 20%, 50%, 80% and 100% simulations saw an increase in inequality of 0.0009, 0.0045, 0.0072, 0.0089, respectively. All the simulations are regressive having Kakwani indices of -0.0008, -0.0015, -0.0040, -0.0065 and -0.0080. The underlying mechanism is the same as in section 4.1, more households in the lower tails of the consumption distribution cause increases in extreme poverty, poverty, inequality. However, it is noticeable that changes do not happen at the same pace, suggesting that graduation curves are not linear.

Graduation curves do not follow a linear shape, rather they display an exponential form. Figure 6 shows extreme poverty, poverty and inequality graduation curves under the partial reallocation scheme. The curves show generally a monotonically increasing behaviour, however they are not totally smooth. The non-linearity of the curves suggest that several local minima values exist according to different thresholds. However, global minima always lay on a 0% graduation rate for all curves, due their monotonicity. Hence, implying corner solutions. The lack of interior solutions and the decreasing nature of the curves reflects the underlying mechanism.

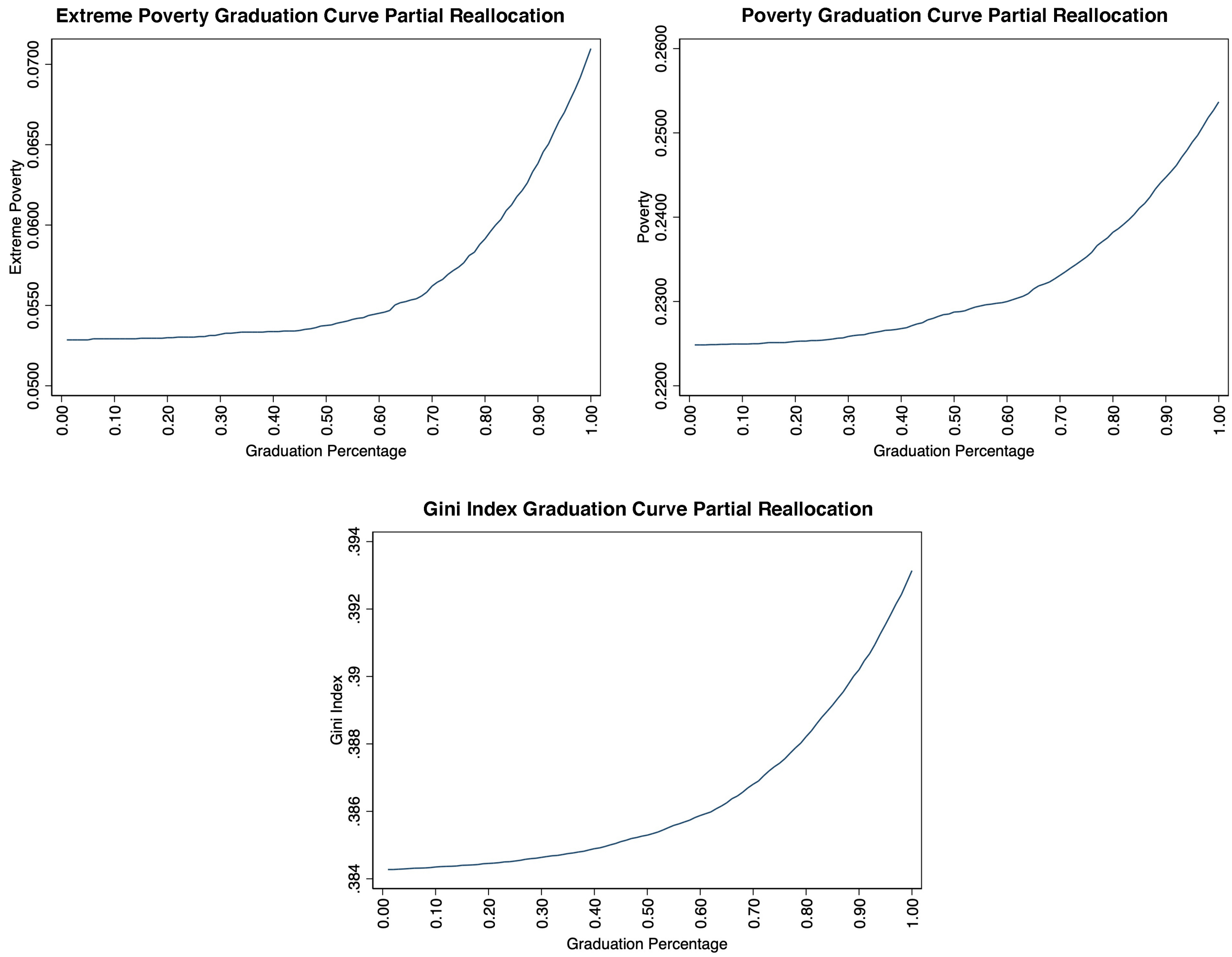

Figure 6: Graduation Curves Partial Reallocation

The average sensibility analysis captures the effect of a 1% increase over the indices. Table 5 shows this analysis for extreme poverty, poverty and inequality, following the modelo proposed in 1. All sensibilities are positive meaning that increasing graduation rates always in average increases the indices. Therefore, the partial reallocation scheme is not a good reallocation scheme, since it does not decrease poverty incidence. Moreover, since it does not completely redistributive (lower quintiles are not targeted) Gini does not minimize.

	Average sensibility
Extreme Poverty	0.0519***
	(-7.66)
Poverty	0.0247***
	(-9.3)
Inequality	0.00446***
	(-9.04)
N	100

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5: Graduation Curves Average Sensibility Partial Reallocation Scheme

4.3 BDH Graduation Simulation: Complete Reallocation

The complete reallocation scheme intends to be a redistributive policy. Different to other schemes, this takes out misallocated resources only in households within higher quintiles and reallocate them in quintile 1. Therefore, decreasing the proportion of households in the lower tail of the distribution, as shown in figures 7 and 8. The reason of this effect lays on the fact that under this scheme households in lower tail are receiving the transfer.

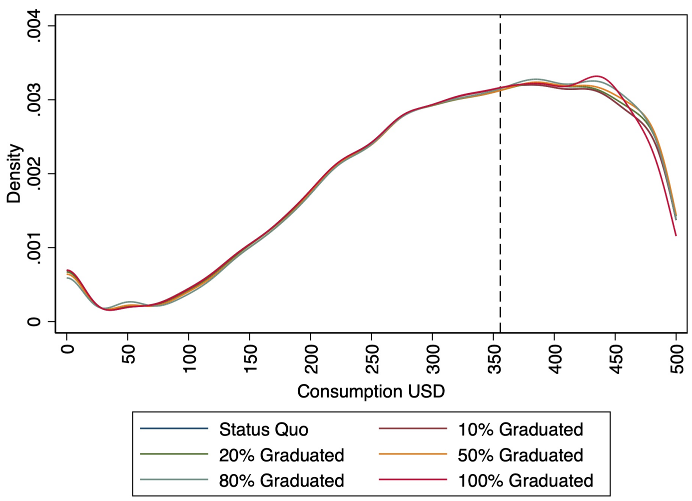

Figure 7: Q1 to Q4 Consumption Distribution: Complete Reallocation Graduation

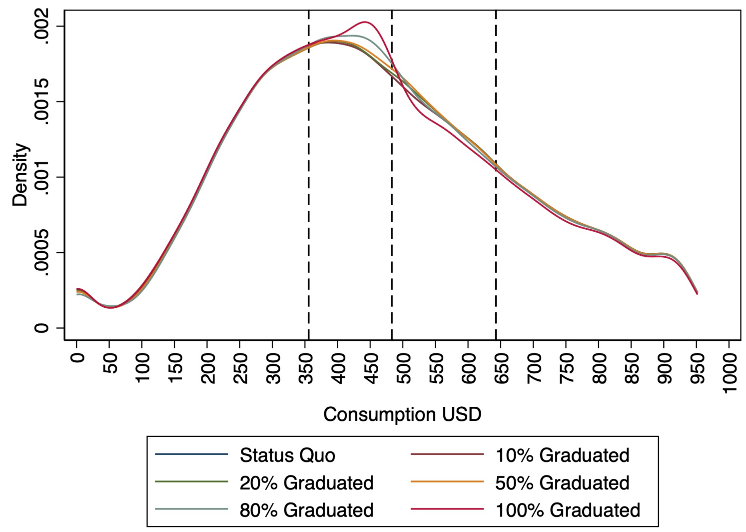

Figure 8: Q1 and Q2 Consumption Distribution: Complete Reallocation Graduation

Incidences over extreme poverty, poverty and inequality under this scheme reflects the effect of the decrease in the proportion of households in the lower tail of the consumption distribution. Table 6 displays incidences over poverty and inequality for some graduation rates under a complete reallocation scheme. The results of the simulations show a decrease in the rate of extreme poverty, poverty and inequality. Extreme poverty exhibits a reduction of 0.05%, 0.007%, 0.18%, 0.29%, and 0.35%, for graduation rates of 20%, 50%, 80% and 100%, respectively. In contrast, poverty manifests an increase of 0.24%, 0.37%, 0.37%, 0.22%, and 0.01 % for each graduation rate.

In the same way, inequality results display similar behaviour to the ones of extreme poverty. The 20%, 50%, 80% and 100% simulations experiment a decrease in inequality of 0.0006, 0.0011, 0.0022, 0.0027, 0.0026, respectively. Most of the simulations are progressive, having Kakwani indices of 0.0004, 0.0006, 0.0015,0.0025. The mechanism proposed in section 4.1 seems to apply for extreme poverty and inequality, however it does not comply for poverty results. Unlike the decreasing behaviour of extreme poverty and inequality, poverty increases when the proportion of households in the lower tail decreases. Nonetheless, the increase in poverty is small, suggesting that this scheme may not have a significant effect over poverty.

	Proportion	Difference	Gini	Kakwani	Reynolds-Smolensky
Status Quo					
Extreme Poverty	5.29%				
Poverty	22.48%				
Inequality			0.3843		
10% Graduation					
Extreme Poverty	5.24%	-0.05%			
Poverty	22.72%	0.24%			
Inequality			0.3837	0.0000	0.0006
20% Graduation					
Extreme Poverty	5.22%	-0.07%			
Poverty	22.85%	0.37%			
Inequality			0.3832	0.0004	0.0011
50% Graduation					
Extreme Poverty	5.11%	-0.18%			
Poverty	22.85%	0.37%			
Inequality			0.3821	0.0006	0.0022
80% Graduation					
Extreme Poverty	5.00%	-0.29%			
Poverty	22.70%	0.22%			
Inequality			0.3816	0.0015	0.0027
100% Graduation					
Extreme Poverty	4.94%	-0.35%			
Poverty	22.49%	0.01%			
Inequality			0.3817	0.0025	0.0026

Table 6: Poverty and Inequality Incidence by Reallocation Graduation Proportion

Graduation curves are not linear and are less smooth (see figure 9) than the ones in the previous section. The reason for this effect lays on the redistributive approach of the complete reallocation scheme. According to (Gasparini et al., 2013) redistributive policies, tend to show volatile results in poverty measurements. The benefit of these results is that the existence of local critical values increases for any threshold.

Regarding the minimization problem presented in equation 2 graduation curves show corner and interior solutions. The extreme poverty and poverty graduation curves have corner solutions at 100% and 0% graduation rates, respectively. In contrast, the Gini graduation curve has an interior solution at an 84% graduation rate. The lack of consensus regarding the minimal graduation rates reflects the volatility in results of redistributive policies. However, results of a 100% graduation rate for poverty and Gini curves do not differ significantly from their minimum values, which suggest that this graduation scheme might be preferred.

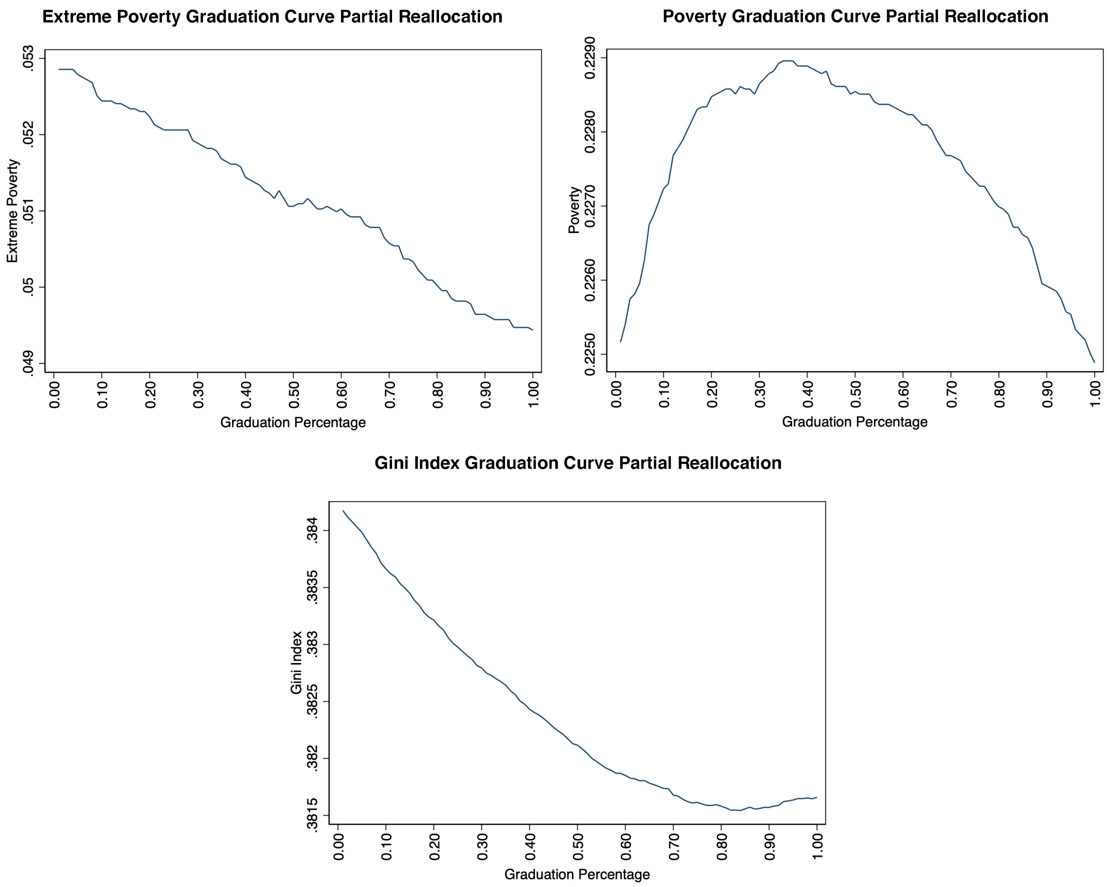

Figure 9: Graduation Curves Complete Reallocation

The average sensibilities for this set of curves correctly match their behaviour. As expected, the average sensibility of the poverty curve is positive but non-significant, implying a null effect of this reallocation scheme over poverty. On the other hand, results for extreme poverty and Gini curves show a decreasing average sensibility. These results suggest that the mechanism proposed in section 4.1 still holds and that increasing consumption in lower tail households has a decreasing effect on poverty and inequality incidences. It is important to notice that the reinforcement of this mechanism advocate for BDH reallocations that concentrate exclusively on benefitting lower consumption households rather than allocating resources by a multivariate poverty approach.

	Average sensibility
Extreme Poverty	-0.0192***
	(-18.54)
Poverty	0.0000709
	(-0.13)
Inequality	-0.00217***
	(-33.60)
N	100

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 7: Graduation Curves Average Sensibility Complete Reallocation Scheme

5 Conclusion

Are there any BDH allocation schemes that could improve current inequality and poverty results? The 2014 BDH distribution misallocated the program resources in households that should not be recipients while some eligible recipients did not receive the transfer. This poor allocation suggested that poverty and inequality incidences might improve under the correct scheme. I found that the allocation scheme that minimized the incidences is one of total reallocation of resources at a 100% graduation rate. However, there is evidence that focusing exclusively in the lower quintiles will get the best results.

I answered the research question by utilizing static simulations over different reallocation schemes of resources. I found that not all reallocation schemes reduced poverty and inequality incidences. The partial reallocation scheme showed an increase in extreme poverty, poverty and inequality of 0.51%, 1.60% and 0.0059, respectively. On the other hand, the total reallocation scheme displayed a decrease in all indicators of 1.13%, 2.16% and 0.0048. The difference in the direction of the incidences between reallocation schemes came from the fact that partial reallocation does not reassign all the cash, saving the difference of resources between misallocated households causes a decline in the indicators.

Moreover, a sensibility analysis of graduation curves showed schemes which minimize poverty and inequality. The complete reallocation scheme presented average sensibilities of -0.0192%, 0.00001% and -0.00217% on extreme poverty, poverty and inequality. I obtained optimal graduation points due to the non-linear nature of these graduation curves. Consequently, extreme poverty, poverty and inequality are minimized at 100%, 0%, and 84%, respectively. However, differences between 0% and 100% on poverty graduation rates, and 84% and 100% on inequality graduation rates are minimal. This analysis suggests that, under this scheme, it is beneficial to graduate 100% of the receivers being this the optimal reallocation scheme.

The main limitation of my paper is that this simulation was static. Therefore, ignoring changes in the dynamics of poverty. Moreover, as stated in (Gasparini et al., 2013) there was an assumption that the behaviour of all households towards consumption is the same. Consequently, just assigning the whole BDH to its holders is unrealistic. Nonetheless, the results of this paper can have an impact on public policy decision showing how much the reallocation of the BDH affects poverty and inequality.

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