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Resumen

La contribución a la desigualdad de los programas de transferencias del gobierno es usualmente determinada analizando en qué medida los beneficios pagados se focalizan en familias de bajos ingresos. Varios analistas han encontrado que los beneficiarios de algunas transferencias claves del gobierno son en su mayoría hogares de ingreso medio y alto, contribuyendo así a una mayor desigualdad. En el presente trabajo se discute el hecho de que el impacto de estos programas en la desigualdad debería ser evaluado considerando los beneficios recibidos netos de los impuestos pagados por los hogares para financiar los programas, puesto que los hogares de mayores ingresos reciben beneficios por un monto mayor pero también pagan impuestos más altos. Este enfoque es ilustrado estimando el impacto de cuatro programas de transferencias del gobierno en la desigualdad en Uruguay y demostramos que las conclusiones son diferentes dependiendo de si se utiliza beneficios brutos o netos en la estimación.

Palabras clave: Transferencias, desigualdad, redistribución.

Abstract

The contribution of government transfer programs to inequality is often assessed by analyzing to what extent the benefits paid go to lower income families. Several analysts have found that some key government transfers actually go mostly to middle and high income families and thus contribute to greater inequality. We argue in this paper that the impact of these programs on inequality should be evaluated considering the benefits received net of the taxes paid by households to finance the programs, since higher income households receive higher benefits but they also pay higher taxes. We illustrate this approach by estimating the impact of three government programs on inequality in Uruguay and show that the conclusions are different depending on whether we use gross or net benefits in the estimation.

Key words: transfers, inequality, redistribution

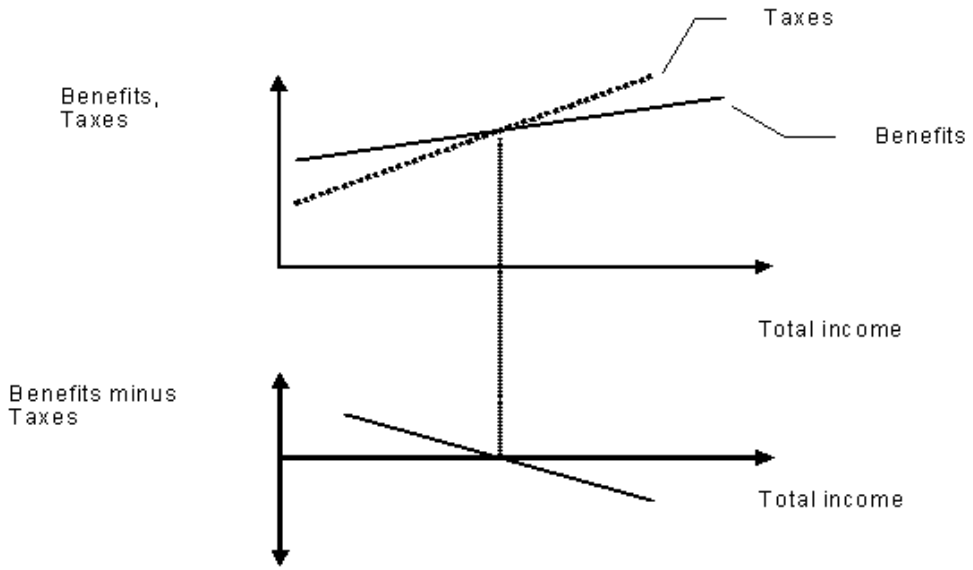
JEL Classification: D31, H55, I38

I. Introduction

It is often argued that some government transfer programs lead to greater inequality because high income families receive a disproportionately large percentage of the benefits (Feldstein 1974, Browning and Browning 1994, Mazza 1999, Perry et al. 2006, among others). This is usually the case of contributory programs like unemployment insurance and contributory pensions, because the individual benefit is linked to the contribution wage. Better paid workers are entitled to higher unemployment benefits and higher pensions. Similar results have been reported for public spending on higher education in Latin America. But analysis of the incidence of public expenditure on different groups of the population according to distribution of income tells only half of the story about the contribution of public programs to inequality. We argue that the assessment of the contribution of government programs to inequality should consider benefits paid *net of taxes collected to finance these programs*. If the same households that receive higher unemployment benefits, for example, tend to make the biggest contributions to finance the unemployment insurance program, then the program may actually contribute to reducing *disposable income* inequality even if better paid workers receive higher unemployment benefits.

This idea can be illustrated using the inequality decomposition index proposed by Shorrocks (1982a, 1982b, 1999). The contribution of the sources of income *k* to inequality is measured regressing the sources of income *k* on total income across individuals. The coefficient of total income in this regression is the contribution of the sources of income *k* to inequality. Hence, the sources of income that have a positive coefficient in these regressions contribute to increasing inequality and the sources that have a negative coefficient contribute to reducing inequality. Now consider a government transfer program that pays benefits and collects taxes that are both positively correlated to total income across households (Figure 1). If the contribution to inequality is measured considering only gross benefits, this program increases inequality. But the program represented in this figure reduces inequality if its contribution to inequality is assessed considering net benefits.

Figure 1. The Contribution of government transfer programs to inequality



Notice that the program assumed in Figure 1 is not progressive in tax collection, i.e., rich households pay a lower share of their income as taxes than poor households. Hence, the program seems to be regressive when evaluated by looking separately at either benefits or taxes. Nevertheless, this program reduces disposable income inequality.[1]

We show in this paper that Uruguay provides a real world example of the situation depicted in Figure 1. There are several studies that measure income inequality in Uruguay and some of them specifically analyze the contribution of different sources of income to inequality (Bucheli and Furtado 2000a, 2000b, 2004; Bucheli and Rossi 1994; Gónzalez and Rossi 2003; Gradin and Rossi 1999 and Vigorito 1999). However, none of these studies make the attempt to measure benefits received net of contributions paid by individuals or households to finance these programs.

After this brief introduction, the paper continues as follows. In Section II we present the methodology, including a brief discussion of some implementation issues. We leave the

[1] We assumed a non-progressive tax system in this figure only to stress the point that government programs may in principle reduce inequality even if both benefits and taxes are separately not progressive.

implementation details of the Uruguayan case to the appendix, where we provide the STATA do-file we used for our estimations. In Section III we briefly describe the Uruguayan government transfer programs considered in our estimations. We present our main results in Section IV and some concluding remarks in Section V.

II. The methodology

A. General principles

In order to empirically assess the impact of government transfer programs on inequality, we computed the inequality decomposition index proposed by Shorrocks (1982a, 1982b, 1999). We treated these programs as separate sources of income, registering benefits nets of taxes in each program.

Let y_{ik} be the income of household i $(i = 1,..., n)$ from sources of income k $(k = 1,..., K)$. The data is therefore organized in an income matrix with the rows representing households and the columns representing income sources. Total income of household i is $y_i = \sum_k y_{ik}$. The distribution of total income can be represented by $y = (y_1,..., y_n)$, i.e., the vector that results from adding the columns of the income matrix. The distribution of factor k income can be represented by $y_k = (y_{1k},..., y_{nk})$, i.e., column k in the income matrix. Let $s_k(I)$ be the proportional contribution of income k to total income inequality measured with index I, so that $\sum_k s_k(I) = 1$. Shorrocks (1982b) proposed the following rule to decompose the contribution of each and every source of income to total income inequality:

$$s_k(I) = \frac{\mathrm{cov}(y_k, y)}{Var(y)} = \rho(y_k, y)\frac{SD(y_k)}{SD(y)}, \qquad \textbf{(1)}$$

where $\mathrm{cov}(y_k, y)$ is the covariance and $\rho(y_k, y)$ is the coefficient of correlation between factor k income and total income; $Var(y)$ is the variance of total income; and $SD(y_k)$ and $SD(y)$ are the

standard deviations of factor k income and total income, respectively. Notice that the contribution of sources of income k to total inequality is just the slope coefficient of the regression of y_k on y. Shorrocks (1982b) showed that this is the only decomposition rule for any inequality measure that complies with a set of desirable properties.

Shorrocks' decomposition of inequality has the characteristic that equally distributed sources of income yield null effect on total inequality (Shorrocks, 1999). Several authors consider this is an unappealing characteristic of the decomposition because it contradicts the intuition that an equally distributed source reduces inequality (Morduch and Sicular 2002, among others). The Shapley decomposition of inequality can produce negative contributions for equally distributed income sources if the income source whose contribution to inequality is being assessed is removed rather than substituted by its mean.[2] In this sense, the Shapley decomposition is more general than the Shorrocks decomposition (Shorrocks 1999).

Nevertheless, Sastre and Trannoy (2001) point out that there are several methodological options that have to be made to compute Shapley decomposition and there is no clear-cut theoretical guidance. Furthermore, they show that some of these options produce very different –and sometimes odd– results. They provide practical recommendations to avoid some of these unappealing results.

There is a rich and growing literature discussing the pros and cons of different inequality decomposition methods. We do not delve into the details of this literature in this paper. Our more limited goal is to show that a transfer program that pays higher benefits to higher income individuals does not necessarily raise income inequality, as assessments based on gross transfers may suggest. To make this point, we think it is enough to show that one of the better known indexes may indeed yield very different results when the transfer program is assessed using net rather than gross transfers.

[2] These variations of the Shapley decomposition have been called "zero income inequality decomposition" and "equalized income inequality decomposition", respectively (Chantreuil and Trannoy 1999).

The same point can be made using progressivity indexes. Lambert (2001) shows that the progressivity of taxes *net of benefits* (Π_N) can be written as a weighted sum of the progressivity of taxes $(\Pi_T)$and the regressivity of benefits (ρ_B):

$$\Pi_N = \frac{(1-t)\Pi_T + (1+b)\rho_B}{1-t+b}, \qquad \textbf{(2)}$$

where *t* and *b* stand for the average tax and benefit rates. Suppose now that benefits are progressive rather than regressive $(\rho_B < 0)$ so high income units would be getting larger relative benefits than low income units. Our point is just that net taxes can still be progressive $(\Pi_N > 0)$, provided that taxes are *sufficiently* progressive $(\Pi_T > ((1+b)/(1-t))\rho_B)$.

Relative to progressivity indexes, inequality decomposition indexes have the advantage of providing a direct measure of the impact of the program on inequality. Progressivity indexes do not measure the redistributive effect unless the transfer program involves no reranking of income units (Lambert 2001). For this reason, and because of its relative simplicity, we preferred to use Shorrocks index of inequality decomposition to illustrate our point.

The proposal in this paper owes much to the literature about the *net fiscal system* or *net fiscal incidence.* In his survey of this literature, Lambert (2001) introduces the topic by making a distinction between the *original* and the *final* income. The former is a pre-tax and pre-benefit income and the latter is income net of taxes and including the benefits that are attributed to each individual in cash-equivalent terms. Then the basic question is whether the inequality in well-being that is apparent in the distribution of *original* income is moderated in the transition to *final* income. The attribution of benefits to income units usually represents a significant challenge to this type of analysis. However, in the case of the cash-transfer programs we focus on, the problem is much more tractable. An even greater complication arises from indirect effects of government intervention. Unable to compute the general equilibrium effects of government intervention, the literature confines itself to the analysis of direct effects, or what

Lambert calls *formal* incidence analysis. Regarding this problem, we stand to the standard practice.

B. Implementation

The estimation is based on micro-data from the Uruguayan household survey 2005 and some aggregate information from public finance. The 2005 household survey is representative of the urban country, i.e., population residing in localities with 5,000 inhabitants or more. The urban population in Uruguay represented in 2005 84% of total population. The sample, selected in three stages, is stratified. The agency responsible for the survey, the National Institute of Statistics, interviewed 54,330 individuals in 2005, corresponding to 18,506 households.

Household surveys provide direct data on benefits received by different individuals from government programs, but they do not provide information on taxes paid by individuals to finance these programs. Because of the lack of micro-data on direct and indirect contributions, we had to make some assumptions to compute *net* transfers.

Let us say that the last income source K corresponds to the government transfer program whose contribution to inequality we want to evaluate. In this last column of the income matrix we compute the net transfer the government program pays to each and every household.[3] Since column K of the income matrix registers both benefits received and contributions and taxes paid to finance the program, the income registered in other columns must be measured *before taxes* paid to finance the transfer program.

For the transfer program to be complete, the records in column K of the income matrix must add up to zero: someone else must pay for net benefits received by any household. Formally,

$$\sum_i y_{iK} = 0 \,. \qquad \textbf{(3)}$$

[3] We talk about "the" transfer program to simplify the presentation, but it should be clear that the same principles apply to more than one transfer program.

We used micro-data from households and expenditure surveys and some aggregate data from administrative records of social security programs in Uruguay to build the matrix with elements y_{ik}. We know from the social security institutions that these programs are financed with a complex mix of payroll and general taxes. Among the latter, indirect taxes are by far the biggest factor, with value added tax accounting for a significant share of the whole package. Thus we distinguish payroll taxes a_{ik} and indirect taxes t_{ik} collected to finance the transfer program.

Labor earnings in the household survey are reported *after payroll taxes* (y_{ik}'). Therefore we added payroll taxes to get *pre*-tax labor earnings:

$$y_{ik} = y_{ik}' + a_{ik} \; ; \; k \neq K \; . \qquad \textbf{(4)}$$

Naturally, a_{ik} must be zero if the source of income *k* is non-labor income. Given that other social security revenues are mostly indirect taxes, we did not need to add other taxes to the survey's reported income to get pre-tax income. Hence, taxes satisfy the following condition:

$$t_{ik} = 0 \; \forall k \neq K; \; t_{iK} = t_i \geq 0 \, , \qquad \textbf{(5)}$$

and the transfer program column was computed as:

$$y_{iK} = b_i - t_i - a_i \; , \qquad \textbf{(6)}$$

where b_i stands for the benefit received by household *i* from the transfer program and a_i stands for total payroll taxes paid by household *i* to finance the program $\left(a_i = \sum_k a_{ik}\right)$.

Equations (4) and (6) determine the income matrix organized to assess the contribution of the transfer program to inequality, but we do not have direct data on some of the variables involved. The household survey does provide the *after payroll tax* earnings (y_{ik}') and the

benefits paid by the transfer programs (b_i), but it does not provide direct data on payroll taxes (a_{ik}) or indirect taxes paid to finance the transfer programs (t_i). We know from (3) that total taxes paid to finance the program must be equal to total benefits paid by the program, but we need information on *individual* contributions. The social security institutions provide *aggregate* information on their sources of financing which can be used to determine the shares of payroll and indirect taxes in funding the programs we are evaluating. Let α_K be the share in total spending of government transfer program *K* financed with payroll taxes. Estimated individual payroll taxes and indirect taxes should satisfy the following conditions:

$$\sum_i a_i = \alpha_K \sum_i b_i \quad ; \quad \sum_i t_i = (1-\alpha_K)\sum_i b_i \ . \tag{7}$$

In order to "distribute" these aggregates among individuals, we assumed that (i) payroll taxes are proportional to labor income up to a legal ceiling $(\bar{y})$, provided the individual does contribute to social security (assumption A1), and (ii) indirect taxes are proportional to total expenditure of the household (assumption A2). More specifically, we made the following assumptions:

(A1) Individual payroll taxes:

$$a_{ik} = \begin{cases} a.\min(y_{ik}', \bar{y}); \ a>0 \ \ if \ \ i \in C \ \ and \ \ k \in LI \\ 0 \qquad otherwise \end{cases}, \tag{8}$$

where *C* stands for the subset of workers who declared to the household survey that they do pay payroll taxes and *LI* stands for the subset of income sources that correspond to labor income. Notice that the rate of payroll taxes *a* is a weighted average of the rates paid by different categories of workers, in accordance with their answers to the household survey. Also notice that this rate multiplies *post-tax* labor income, which is not the ordinary way of presenting the rates of payroll taxes in social security legislation.[4]

[4] We chose this notation to avoid the distinction between employee and employer contributions, a distinction we are not interested in. Total payroll tax rates on post-tax labor income can be computed using ordinary legal tax

(A2) Indirect taxes:

$$t_i = t * ex_i = t * \beta_0 * \left(\sum_k y_{ik}' \right)^{\beta_1}, \qquad \textbf{(9)}$$

where ex_i stands for the total expenditure of household *i*. Because value added tax in Uruguay is high, we assumed that households pay indirect taxes in proportion *t* of their total expenditure. But there is no information on expenditure in the household survey. So we approximated household expenditure as a (possibly non-linear) function of income,[5] using information from the expenditure survey of the National Institute of Statistics.[6]

The tax rates *a* and *t* can now be computed combining equations (7) and assumptions (A1) and (A2):

$$\begin{aligned} a &= \alpha_K \sum_i b_i \Big/ \left(\sum_{i \in C} \sum_{k \in LI} \min\left(y_{ik}', \bar{y} \right) \right) \\ t &= \left(1 - \alpha_K \right) \sum_i b_i \Big/ \left(\beta_0 \sum_i \left(\sum_k y_{ik}' \right)^{\beta_1} \right) \end{aligned} \quad . \qquad \textbf{(10)}$$

Using these tax rates and assumptions (A1) and (A2), we computed individual tax payments a_{ik} and t_i. We then computed individual income y_{ik} using these estimated individual tax payments in equations (4) and (6).

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rates such as: (employer rate + employee rate)/(1-employee rate). The tax rate *a* is a weighted average of these transformed tax rates. We are assuming a horizontal demand of labor, i. e. the tax burden relies on employees. This is the usual assumption in long run studies in macroeconomics and social security (see for instance Gruber 1999, p 90).

[5] We estimate the following relation: $e = 4.76 \times y^{0.82}$, where *e* stands for expenditure and *y* for income.

[6] Other assumptions are of course possible and we did some sensitivity analyses, assuming for example that indirect taxes are proportional to total income rather than to total expenditure. As might have been expected, government programs look more redistributive because taxes look more progressive with this alternative assumption, but the qualitative results did not change. These results are available on request from the authors.

III. Brief description of the Uruguayan government transfer programs

Pensions[7]

Starting in 1967, the largest pension program in Uruguay has been administered by the *Banco de Previsión Social* (BPS), a public entity that is autonomous of the government. Until 1995, this pension program was defined benefits and pay-as-you-go (PAYG). Since 1996, it is based on two pillars, one administered by the BPS, defined benefits and PAYG and the other one administered by private firms, defined contributions and fully funded. The program is financed with employers and employees payroll contributions.[8] The PAYG pillar also receives transfers from the central government. Also in 1996, the BPS started keeping systematic records of contributions. Until then, the records were fragmented and incomplete; making the recognition of pension rights difficult and insecure.

As a general rule, low income workers are exclusively affiliated to the public pillar, unless they choose to deposit half of their personal contributions into individual savings accounts. Workers with higher wages are obliged to make personal contributions to both pillars up to a certain maximum over which there are no mandatory contributions.[9] Consequently, low-wage workers who did not opt for the savings accounts receive their full pension from the BPS, while other workers' pensions are financed by both the BPS and the funds accumulated in their savings accounts.

Minimum retirement age is 60 for men and women and the minimum number of years of contribution required to access an ordinary pension is 30.[10] Workers with hazardous

[7] In this section we describe the program administered by the *Banco de Previsión Social* (BPS) and private individual accounts administrators, which covers around 90 per cent of social security contributors in Uruguay (Ferreira-Coimbra and Forteza, 2004).
[8] In 1996, the contribution rates for the old age, disability and survival program (IVS, for the Spanish acronym) were set at 15 percent for employees and 12.5 percent for employers. Over the years, the government introduced exemptions to employer contributions and in 2007, in the context of a tax reform, some of the exemptions were lifted and the general employer contribution rate for the IVS social security program was reduced to 7.5 percent.
[9] Thresholds were established by law, the lower bound was set at 5,000 *pesos* of May 1995 and the upper one at 15,000 *pesos* of May 1995.
[10] In the 1996 reform the minimum number of years of contribution was raised from 30 to 35, but it was reduced again to 30 in 2008.

occupations and other special categories have a special bonus added to the count of years of contribution.

The replacement rate varies from 45 to 82.5 percent depending on retirement age and years of contribution, in order to induce longer working-lives, i.e. it was reduced for workers retiring at the minimum required age and years of contributions and raised for workers who decide to retire later. There is an extra bonus for low-income workers who choose to contribute to individual savings accounts. The average wage used in the benefit formula is related to the last 10 or the best 20 years of contribution, in order to reduce incentives to under-report earnings in most of working life and to over-report earnings in the last few years prior to retirement.

Workers who are not eligible for an ordinary pension may be eligible for an "advanced age" pension. Until 2008, workers could claim an advanced-age pension at 70 years of age and with at least 15 years of contributions, but these conditions were softened in 2008. Currently, a contributor can access to this program at 65 if he has 25 years of contributions and for every two years of contribution less than 25 the access to benefits is delayed one year.[11] Also, since 2001, workers who are 65 years or older can stop contributing to the savings accounts pillar and receive an annuity, regardless of their count of years of contribution.

Unemployment Insurance

The main unemployment insurance program is also managed by the BPS since 1981. It provides a monthly cash transfer to dependent workers in the private sector who are fired from a formal job (self-employment is not covered). The program does not have a separate well-identified funding system and it is to a large extent financed out of general taxes, but workers must have paid payroll taxes to social security in order to be eligible to receive unemployment benefits. Hence, the program excludes workers in the informal sector.[12] To be eligible, the worker must have been separated against his will and not for disciplinary reasons. Workers

[11] The minimum years of contribution required to access this program are 15 and the contributor must be 70 years or older.
[12] To be eligible, workers must have been legally registered in the labor office for at least six months in the year before the claim.

who have not been dismissed but whose working time has been reduced by 25 percent or more are also eligible for the benefit. Separation does not have to be permanent to access the program: workers who are temporarily separated (or "suspended") and continue as employees of the firm have the right to receive unemployment benefit. A significant share of the current recipients of the benefits belongs to this category.

The ordinary BPS unemployment benefit amounts to 50 percent of the average wage during the last six months. However, the benefit cannot be lower than half the national minimum wage or higher than eight times the national minimum wage.[13] The benefit paid to workers who suffered a reduction in working time is roughly proportional to this reduction. Workers who are married or support relatives receive an additional 20 percent.

As a general rule, the BPS pays unemployment benefit for six months, and the worker cannot access the benefit again until no less than twelve months have elapsed since the previous period in which he received the benefit. However, the Executive Power can mandate the BPS to extend the period of payment by up to twelve months. These extensions are selective (not universal) and by law they are left to the discretion of the Executive Power, with the only condition that the Executive should provide substantiated reasons for the extension. In several cases, the Parliament has passed laws that granted the benefit for even longer periods for specific groups of workers.

The unemployment insurance program for banking employees grants benefits to workers who have contributed to the Banking Sector Retirement Program for no less than six months before separation. The replacement rate is 50 percent, like in the BPS general program, but the maximum payment amounts to 20 (rather than 8) national minimum salaries. As a general rule, the benefit is paid for six months, but it can be extended up to a maximum of eighteen months. Unlike in the program administered by the BPS, the authorities of the Banking Sector

[13] In December 2009, the national minimum wage was 4,441 Uruguayan pesos, approximately 220 dollars per month or almost 30 percent of monthly per capita GDP. It is worth noting that the national minimum wage has been heavily increased in the past few years. In December 2005, the last year for which we provide estimations, the national minimum wage was 2,500 Uruguayan pesos, which was equivalent to 100 dollars per month and 20 percent of monthly per capita GDP.

Retirement Program decide the extensions. The unemployment program is financed with a complex mix of general taxes and payroll taxes in the banking sector.

Family allowances[14]

The family allowances program was created in 1942 to provide cash transfers to formal workers responsible for children between 0 and 18 years old. For children between 6 and 17 years old, benefits are conditioned on school attendance, although control for the compliance of this condition has been rather poor. For many years, the transfer amount was equivalent to 8 per cent of the national minimum wage.

Seeking further focalization in a constrained fiscal environment, benefits were restricted to low income formal workers and raised to 16 per cent of the national minimum salary in the 1995 social security reform. Until 1999, these means-tested benefits were exclusively paid to social security contributors. Since then, the program has been growing both on beneficiaries and amount of the benefits, making the identification of the sources of funding to this program rather obscure In 2004, the program was expanded to include all low income households upbringing children whether they contribute or not to social security. The program was expanded again in 2008, raising coverage and benefits.

IV. Results

We report the estimated decomposition of inequality in Table 1.[15] The left panel was computed using *gross* benefits and the right panel was computed using *net* benefits for the income sources corresponding to three government transfer programs: unemployment insurance, pensions and family allowances.[16]

[14] Based on Amarante et al 2009.
[15] For the sake of brevity, we only report the estimations for 2005, but we have similar results for 2001-2004.
[16] Some small government transfers are included in "other transfers" together with households' transfers.

Our estimations using gross benefits roughly reproduce the distribution of income by sources and are similar to those found in previous studies, although income categories and some methodological options are different (González and Rossi 2003, Vigorito 1999).

The estimated contribution of transfer programs to inequality is very different depending on whether gross or net benefits are used. Two out of three government programs would have contributed to *reducing* inequality in 2005 if their contribution were evaluated using benefits net of taxes paid to finance the programs. But only family allowances would have contributed to reducing inequality according to the gross-benefits measure. In all cases, the contribution to inequality is smaller when net rather than gross benefits are used. The pension program is the only one that would contribute to increasing inequality using both gross and net benefits. However, such contribution to inequality is five times smaller when contributions paid to finance the program are considered.

These different results are driven by different correlation coefficients of net and gross benefits to total income: the three government transfers show smaller correlation with total income when net rather than gross transfers are used in the computation (Table 1, columns 3 and 6).

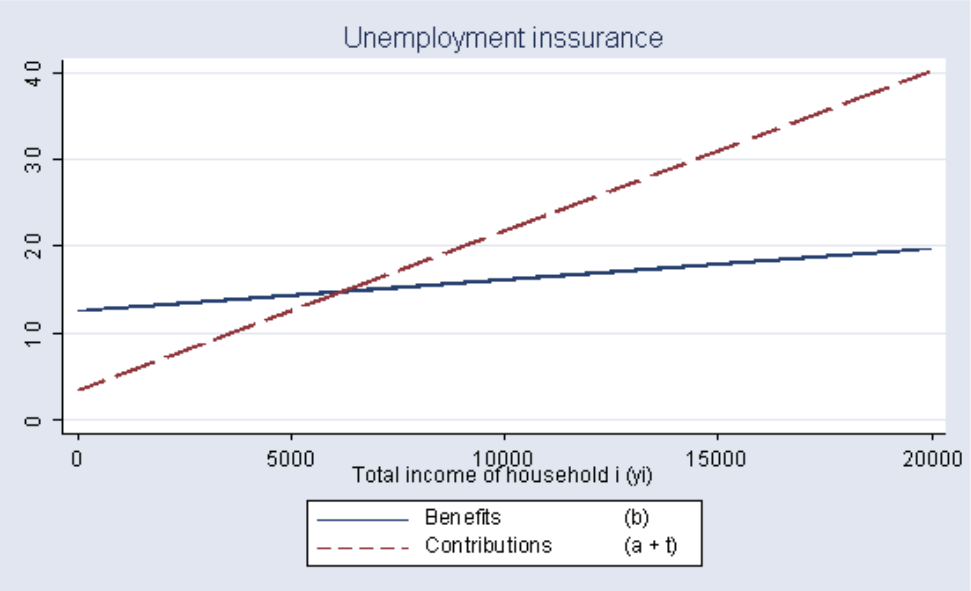
Net benefits from the unemployment insurance program are negatively correlated to total family income even when gross benefits are positively correlated, because taxes paid to finance the program are also positively correlated to income and the tax curve is steeper than the benefit curve. We exemplify in Figure 2 with the regression lines of unemployment insurance and taxes on total family per capita income.

Table 1. The contribution of several sources of income to total inequality (2005)

Sources of Income	Estimation 1: gross benefits			Estimation 2: net benefits		
	Contribution to inequality [a/] (in percent)	Correlation coefficients	Ratio of standard deviations	Contribution to inequality [a/] (in percent)	Correlation coefficients	Ratio of standard deviations
Labor income, dependent formal workers	38.65	0.56	0.69	46.61	0.53	0.88
Labor income, dependent informal workers	0.50	0.03	0.15	0.43	0.03	0.15
Labor income, formal self employed	16.81	0.41	0.41	25.28	0.48	0.52
Labor income, informal self employed	2.53	0.12	0.21	2.46	0.11	0.22
Unemployment insurance [b/]	**0.04**	**0.01**	**0.04**	**-0.15**	**-0.04**	**0.04**
Pensions [b/]	**20.52**	**0.40**	**0.51**	**4.08**	**0.07**	**0.57**
Family allowances [b/ c/]	**-0.23**	**-0.28**	**0.01**	**-0.55**	**-0.52**	**0.01**
Other transfers [d/]	1.58	0.10	0.16	1.51	0.09	0.17
Capital income [e/]	13.53	0.44	0.31	14.15	0.44	0.32
Other sources of income [f/]	6.07	0.25	0.24	6.19	0.25	0.25
Total	100.00	1.00	1.00	100.00	1.00	1.00

Notes: a/ The contribution of the income source (y_k) to total income (y) inequality is the slope in the regression of y_k on y. See Shorrocks (1982b); b/ In the net-benefits estimation, government transfers are net of taxes. i.e. benefits minus taxes paid to finance the program (see section II.B for the details); c/ Based on an estimation done by INE; d/ Donations, subsidies, scholarships, accidents compensations, divorce contributions, "hogar constituido"; e/ Interest, rents, profits; f/ Severance payments, gains, remittances from abroad, other sources of income.
Source: Own computations on the household survey

Figure 2. Benefits received from the program and taxes paid to finance the programs as functions of households' per capita total income (Uruguay 2005)



Source: authors' computations based on the Uruguayan 2005 household survey.

V. Concluding Remarks

According to these results, assessing the impact of government programs on inequality looking only at the benefits they pay could be misleading, because taxes also count and the families that receive higher benefits also tend to pay more taxes. We showed some real world government transfer programs that spend more on high than on low income individuals, and yet the programs reduced inequality when both sides of the balance were incorporated into the analysis at the same time. In all cases the conclusions are very different using one or another estimation.

The idea that government's contribution to inequality depends on both expenditure and taxes is of course not new. In the words of Perry et al. (2006, p 96): "The overall impact of the government budget depends on the combined effect of taxes and expenditure." And indeed, this point is usually well taken care of in studies that compare pre- and post-transfer income inequality (Beblo and Knaus 2001, Atkinson 2004, and Perry et al. 2006, among others). The

point is also at the core of the literature about net fiscal incidence.[17] However this same point is often overlooked in the analysis of individual government programs. The usual claim that some programs raise inequality because they spend more on high than on low income households is just one example of this practice. One possible explanation for this usual shortcut to a one-sided approach to the evaluation of individual programs is the difficulty involved in estimating how these programs are financed. But as we have shown in this paper, this shortcut can be rather misleading. We propose instead to make simple assumptions to approximate benefits net of taxes, and to use them to assess the contribution of government programs.

Lindert, Skoufias and Shapiro (2005) share with us the concern for deducting contributions made to finance social insurance programs to evaluate their redistributive impact. But their approach departs from ours in that they only net out social insurance contributions. They do not extend this reasoning to other public programs nor do they compute all sources of financing for the programs for which they estimate net benefits. In their view, the public transfers nature of social insurance stems from the fact that these programs often spend more than they collect through social security contributions, and have thus to be partially financed out of general taxes. Accordingly, these authors assess the redistributive impact of these programs looking just at "the portion of benefits that is financed by general tax revenues due to deficits in the pension system" (Lindert, Skoufias and Shapiro 2005, p 105). Such an approach is not only partial, but it also inevitably gets tangled up with the not-very-meaningful controversies about how the deficits of social security and other government programs should be computed.[18] We advocate a more comprehensive approach that takes into account *all taxes* collected to finance the programs, for the impact of a government program on inequality depends not only on the taxes that are conventionally defined to finance that specific program but on all the sources of income that the government makes use of to finance the program.

[17] Lambert (2001, chapter 10) provides a survey of this literature.

[18] One example is the claim that not all the assistance of the central government to social security should be computed as "actual" deficit in Brazil, because part of it accounts for the employer contribution that the government has to pay for public employees. The literature on social security is full of endless discussions like this. Furthermore, if the very concept of total fiscal deficit could be ill defined, as Auerbach, Kotlikoff and Leibfritz (1999) among others have argued, the definition of the deficit of one agency of the government is even more so.

Several authors have convincingly argued that fiscal policies should ideally be assessed considering life-time rather than just current income and transfers (Auerbach, Kotlikoff and Leibfritz 1999, Harding et al. 2002, Mason et al. 2006). Estimating life-time income is not an easy task though, particularly when only cross-section data is available. Using life-time income to analyze redistribution is particularly complicated for it requires performing microsimulations. Also, the dynamic estimations are sensitive to the choice of the discount rate and there is no simple rule to choose among different rates. We did not do detailed dynamic microsimulations to illustrate the importance of looking at net benefits when assessing the contribution of transfer programs to inequality, but it goes without saying that the same point illustrated here with a static example fully applies in a life-time framework. If anything, we expect this point to be more crucial in a dynamic than in a static perspective, because households that receive larger transfers in some periods of their lives tend to be the same that pay more taxes in other periods.

We did not analyze in this paper the redistributive impact of all government programs and cannot therefore make general claims about the redistributive stance of the Uruguayan government. Our computations are meant to illustrate a methodological point rather than to provide a complete assessment of the contribution of the Uruguayan government to inequality. Given this goal we confined our computations to the relatively simple case of transfer programs, but it goes without saying that the impact of the government on inequality will also depend on other government programs.

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Appendix: Stata do file

```
clear
global ruta = "C:\Proyectos\BM_PER2004\Desigualdad\Calculos\2005\"
cd $ruta

* Deflactor de valores monetarios a pesos de Dic. de 2004.
* Los valores del IPC y de la ur fueron tomados del INE.

* Notar que en las ECH se preguntan por ingresos en el mes anterior o en los últimos 12 meses
* por este motivo se generarán las variables defla1 y defla12 que serán los deflactores a pesos
* de diciembre de 2004 para los ingresos en el mes anterior a la encuesta y en los 12 meses
* anteriores a la encuesta, respectivamente.

use "C:\HL\Uru_Arg_Chil\Uruguay\MASTER_informe_enero\indicadores_uru.dta", clear
keep mes ipc ur
rename mes month
g mes=month(dofm(month))
g anio=year(dofm(month))
g aux=ipc if anio==2004 & mes==12
egen deflactor=min(aux)
drop aux month
g defla=deflactor/ipc
g defla1=defla[_n-1] if _n!=1
g defla12prom= (defla[_n-12] + defla[_n-11] + defla[_n-10] + defla[_n-9] +  defla[_n-8] + /*
*/             defla[_n-7] +  defla[_n-6] + defla[_n-5] + defla[_n-4] +  defla[_n-3] +   /*
*/             defla[_n-2] +  defla[_n-1])/12 if _n>=13
g defla12= deflactor/ipc[_n-12]  if _n>=13

label var defla "deflactor de valores monetarios a pesos de 12/2004"
label var defla1 "deflactor de valores monetarios a pesos de 12/2004 para ingresos percibidos/*
*/ en el mes anterior"
label var defla12prom "deflactor de valores monetarios a pesos de 12/2004 promedio mensual/*
/* para ingresos percibidos en los últimos 12 meses"

* Calculo la base de fictos de contribuciones (bfc) para el cálculo de aportes de
* independientes la bfc es igual a la ur y se ajusta en el momento de incremento de salarios de
* los funcionarios públicos en el período en estudio fue en los eneros.

sort anio mes
g aux=ur if mes==1
bys anio: egen bfc=min(aux)
g min_ficto=12*bfc
drop aux ur
save defla, replace

* Relación gasto/ingreso del hogar
* De acuerdo a la regresion realizada utilizando la Encuesta de Gastos e Ingresos de los
* Hogares de 1994 del INE, se obtuvo la siguiente expresion que vincula gasto e ingreso:

use "C:\EIG\1994\EIG_1994.dta", clear
reg  loggasto1 logingreso1
capture drop beta cons
g beta=_b[logingreso1]
g cons=_b[_cons]
keep beta cons
keep if _n==1
save betas_gasto, replace

* Estimaciones sin valor locativo

forvalues i=1(1)5 {
use C:\ECH\200`i'\p200`i'.dta, clear
sort anio mes
merge anio mes using defla, nokeep
drop _merge
capture drop y*

* Encointramos un outlier en el año 2004, cuyos ingresos por juegos de azar son entre diez y
```

```
* cinco veces los ingresos por el mismo concepto de los individuos en los 5 años considerados.
* lo eliminamos.

drop if g4_2_6>5000000

* Etiquetas de ocupaciones.
label var f7 "Categoría de ocupacion, ocupacion principal"
label var f13 "Categoría de ocupacion, otras ocupaciones"
label define categorias 1 empleado_obrero_privado 2 empleado_obrero_publico 3 /*
*/ miembro_cooperativa 4 patron_personal 5 cuenta_propia_sin_local 6 cuenta_propia_con_local /*
*/ 7 miembro_del_hogar_no_remunerado
label values f7 categorias
label values  f13 categorias

* Etiquetas: aproximación a la definición de formal.
label var f10_2 "derechos en el trabajo - jubilacion, ocupacion principal"
label var f16_2 "derechos en el trabajo - jubilacion, otras ocupaciones"
label define sino 1 si 2 no
label values f10_2 sino
label values f16_2 sino

* Etiquetas de componentes de ingresos por trabajo.
label var g1_1_1 "Sueldo o jornales líquidos, ocupacion principal asalariada"
label var g1_1_2 "Comisiones, incentivos, horas extras, ocupacion principal asalariada"
label var g1_1_3 "Viáticos no sujetos a rendición, ocupacion principal asalariada"
label var g1_1_4 "Propinas, ocupacion principal asalariada"
label var g1_1_5 "Aguinaldo, ocupacion principal asalariada"
label var g1_1_6 "Salario vacacional, ocupacion principal asalariada"
label var g1_1_7 "Retribuciones en especie, ocupacion principal asalariada"
label var g1_1_8 "Complemento pagado por empleador, ocupacion principal asalariada"
label var g1_2_1 "Sueldo o jornales líquidos, otras ocupaciones asalariadas"
label var g1_2_2 "Comisiones, incentivos, horas extras, otras ocupaciones asalariadas"
label var g1_2_3 "Viáticos no sujetos a rendición, otras ocupaciones asalariadas"
label var g1_2_4 "Propinas, otras ocupaciones asalariadas"
label var g1_2_5 "Aguinaldo, otras ocupaciones asalariadas"
label var g1_2_6 "Salario vacacional, otras ocupaciones asalariadas"
label var g1_2_7 "Retribuciones en especie, otras ocupaciones asalariadas"
label var g1_2_8 "Complemento pagado por empleador, otras ocupaciones asalariadas"

****************************** Ingresos del trabajo - dependientes formales

* Pediremos que sean (1)empleados u obreros públicos (2)empleados u obreros privados con
* derechos jubilatorios. Agrego la cuota mutual si la tiene por DISSE (variable monto1)

g yfor_1=0
* formal en sus dos empleos
replace yfor_1 = (g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8 + /*
*/ g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8 +        /*
*/ ((g1_1_9 + g1_2_9 + 1)* monto1))* defla1                                       /*
*/         if (f10_2==1 & f16_2==1) & (f7==1 | f7==2) & (f13==1 | f13==2)

* formal sólo en el principal
replace yfor_1 = (g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8 + /*
*/ ((g1_1_9 + 1)* monto1)) * defla1   /*
*/         if (f10_2==1 & f16_2!=1) & (f7==1 | f7==2)

* formal sólo en el secundario
replace yfor_1 = (g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8 + /*
*/  ((g1_2_9 + 1)* monto1))* defla1   /*
*/         if (f10_2!=1 & f16_2==1) & (f13==1 | f13==2)

* descontamos las asignaciones familiares si estaban computadas dentro del salario
replace yfor_1= yfor_1 - (monto2*g3_9_1*defla1) if g3_9_2==1

label var yfor_1 "Ingresos por trabajo dependientes formales"

* Hay un tope a las contribuciones a la seguridad social para salarios formales mayores
* a 15000 pesos de mayo de 1995.
g ipcmay95=78.29425
label var ipcmay95 "Ipc en mayo de 1995 con base en abril de 1996"
```

```
g max_as_comp = (15000*(ipc/ipcmay95)*defla1)*(1-0.15)
* el salario vacacional no lleva aportes
g as_comp_1 =min((yfor_1-g1_1_6),max_as_comp)
label var as_comp_1 "Asignaciones computables - trabajo formal"

g dif_yfor_1 = yfor_1 - as_comp_1

label var dif_yfor_1 "Diferencia entre salario formal y asignacion"

*************************** Ingresos del trabajo - dependientes informales.

g ynofor_1=0

* informal en ambos empleos
replace ynofor_1 = (g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8 + /*
*/  g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8)* defla1       /*
*/          if (f10_2==2 & f16_2==2) & (f7==1 | f7==2) & (f13==1 | f13==2)

* informal sólo en el principal
replace ynofor_1 = (g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8) * /*
*/ defla1 if (f10_2==2 & f16_2!=2) & (f7==1 | f7==2)

* informal sólo en el secundario
replace ynofor_1 = (g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8)*  /*
*/ defla1 if (f10_2!=2 & f16_2==2) & (f13==1 | f13==2)

label var ynofor_1 "Ingresos por trabajo dependientes informales"

*************************** Ingresos del trabajo - no dependientes formales.

* Si bien no son asalariados, en la encuesta aparecen partidas de trabajadores de cooperativas
*  o patrones en los renglones de salarios. Incluimos esas partidas aquí.
* También hay algunas personas clasificadas como miembros del hogar no remunerados, pero que
* tienen partidas en los renglones de salarios. Incluimos esas partidas aquí.

* Etiquetas.
label var g2_1 "retiro de dinero el mes pasado, ingresos no dependientes"
label var g2_2 "monto mensual de retiro de productos, ingresos no dependientes"

* No dependiente formal en sus dos empleos
g ynodepfor_1 = 0
replace ynodepfor_1 = (g2_1 + g2_2  +                                                       /*
*/  g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8 + g1_2_1 +       /*
*/  g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8)* defla1                   /*
*/          if (f7>=3) & (f13>=3) & f10_2==1 & f16_2==1

* No dependiente formal sólo en su ocupación principal
replace ynodepfor_1 = (g2_1 + g2_2  +                                                       /*
*/  g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8) * defla1        /*
*/          if (f7>=3) & (f13<3) & f10_2==1 & f16_2!=1

* No dependiente formal sólo en su ocupación secundaria
replace ynodepfor_1 = (g2_1 + g2_2  +                                                       /*
*/ g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8) * defla1        /*
*/          if (f7<3) & (f13>=3) & f10_2!=1 & f16_2==1

label var ynodepfor_1 "Ingresos por trabajo no dependientes formales"

* Hay un tope a las contribuciones a la seguridad social para salarios formales mayores a 15000
* pesos de mayo de 1995.
* A su vez, los aportes de no dependientes son por el máximo entre el salario real, el salario
* del trabajador de la empresa que gane más y el equivalente a 11 o 15 bfc (dependiendo de la
* categoría). Para simplificar tomamos aquí el máximo entre 12 bfc y el salario real, y el
* minimo entre este valor y 15000 pesos de mayo de 1995 (tomando como salario real la suma de
* todos los ingresos declarados por esa actividad).

g as_comp_nodep_1 =min(ynodepfor_1,max_as_comp)
replace as_comp_nodep_1 = min_ficto if ynodepfor_1>0 & ynodepfor_1<min_ficto
label var as_comp_nodep_1 "Asignaciones computables no dependientes - trabajo formal"
```

```
* A diferencia de los dependientes, en este caso puede ser mayor la base sobre la cual aporta
* que el ingreso
g dif_ynodepfor_1 = ynodepfor_1 - as_comp_nodep_1
label var dif_ynodepfor_1 "Diferencia entre salario formal y asignacion de no dependientes"

************************** Ingresos del trabajo - no dependientes informales.

* No dependiente informal en sus dos empleos
g ynodepnofor_1 = 0
replace ynodepnofor_1 = (g2_1 + g2_2  +                                                  /*
*/g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8 + g1_2_1 + g1_2_2 /*
*/  + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8)* defla1                       /*
*/         if (f7>=3) & (f13>=3) & f10_2==2 & f16_2==2

* No dependiente informal sólo en su ocupación principal
replace ynodepnofor_1 = (g2_1 + g2_2  +                                                  /*
*/g1_1_1 + g1_1_2 + g1_1_3 + g1_1_4 + g1_1_5 + g1_1_6 + g1_1_7 + g1_1_8) * defla1       /*
*/         if (f7>=3) & (f13<3) & f10_2==2 & f16_2!=2

* No dependiente informal sólo en su ocupación secundaria
replace ynodepnofor_1 = (g2_1 + g2_2  +                                                  /*
*/  g1_2_1 + g1_2_2 + g1_2_3 + g1_2_4 + g1_2_5 + g1_2_6 + g1_2_7 + g1_2_8) * defla1     /*
*/         if (f7<3) & (f13>=3) & f10_2!=2 & f16_2==2

label var ynodepnofor_1 "Ingresos por trabajo no dependientes informales"

************************************ Ingresos por transferencias

************************************* Ingresos por jubilaciones y pensiones.

* Etiquetas.
label var g3_1 "jubilaciones"
label var g3_2 "pensiones"

g yjub_1 = (g3_1)* defla1
recode yjub_1 .=0
label var yjub_1  "Ingresos por jubilaciones"

g ypens_1 = (g3_2)* defla1
recode ypens_1 .=0
label var ypens_1  "Ingresos por pensiones"

g yjupen_1 = yjub_1 + ypens_1
label var yjupen_1 "Ingresos por jubilaciones y pensiones deflactados"

************************************** Ingresos por seguro de desempleo.

*Etiquetas.
label var g3_3 "seguro de desempleo"

g ysegd_1 = (g3_3) * defla1
recode ysegd_1 .=0
label var ysegd_1  "Ingresos por seguro de desempleo"

********************************** Ingresos por asignaciones familiares.

* Etiquetas.
label var g3_9_1 "cantidad de asignaciones familiares recibidas"
label var monto2 "valor de la asignacion familiar, si recibe y no esta declarado en el sueldo"

g yaf_1 = (monto2 * g3_9_1)* defla1
recode yaf_1 .=0
label var yaf_1 "Ingresos por asignaciones familiares no declaradas dentro del sueldo"

********************************* Ingresos por otras transferencias.

* Etiquetas.
label var g3_4 "compensaciones por accidentes"
label var g3_5 "becas, subsidios o donaciones"
label var g3_6 "contribuciones por divorcio"
```

```
label var g3_7 "ayudas familiares u otros hogares"
label var g3_8 "hogar constituido"

g yotran_1 = ( g3_4 + g3_5 + g3_6 + g3_7 + g3_8) * defla1
recode yotran_1 .=0
label var yotran_1 "Ingresos por otras transferencias"

* Otros ingresos , separando ingresos del capital de los demás

*Etiquetas
label var g2_3 "Distribucion de utilidades en los ultimos 12 meses"
label var g4_1_1 "Ingresos por alquiler en el ultimo mes"
label var g4_1_2 "Algun otro ingreso corriente en el ultimo mes"
label var g4_2_1 "Ingresos por arrendamientos de terrenos en los ultimos 12 meses"
label var g4_2_2 "Intereses de cuentas bancarias en los ultimos 12 meses"
label var g4_2_3 "Utilidades, dividendos en los ultimos 12 meses"
label var g4_2_4 "Indemnización por despido en los ultimos 12 meses"
label var g4_2_5 "Otro ingreso corriente en los ultimos 12 meses"
label var g4_2_6 "Ingreso extra (juegos de azar) en los ultimos 12 meses"
label var g5_2 "Jubilaciones del exterior"
label var g5_3 "Pensiones del exterior"
label var g5_4 "Becas, subsidios o donaciones del exterior"
label var g5_5 "Contribuciones por divorcio del exterior"
label var g5_6 "Ayudas familiares u otros hogares del exterior"
label var g5_7 "Arrendamientos de tierras o terrenos del exterior"
label var g5_8 "Alquiler de casas en el exterior"
label var g5_9 "Intereses de cuentas bancarias en el exterior"
label var g5_10 "Intereses provenientes de prestamos en el exterior"
label var g5_11 "Utilidades o dividendos de negocios en el exterior"

************************************* Ingresos por capital

g ycap_1 =  (g2_3/12)*defla12prom + g4_1_1*defla1 + (g4_2_1/12)*defla12prom + /*
*/         (g4_2_2/12)*defla12prom + (g4_2_3/12)* defla12prom + g5_7*defla1 + g5_8*defla1 + /*
*/         g5_9*defla1 + g5_10*defla1 + g5_11* defla1
recode ycap_1 .=0
label var ycap_1 "Ingresos derivados de la propiedad de capital"

************************************* Otros ingresos

g yotros_1 =   g4_1_2* defla1 + (g4_2_4/12)*defla12prom + (g4_2_5/12)*defla12prom + /*
*/ (g4_2_6/12)*defla12prom + g5_2*defla1 + g5_3*defla1 + g5_4*defla1 + g5_5*defla1 + /*
*/  g5_6* defla1
recode yotros_1 .=0
label var yotros_1 "Otros ingresos"

************************************* Ingresos totales.

g ytotd_1 = yfor_1 + ynofor_1 + ynodepfor_1 + ynodepnofor_1 +  ysegd_1 + yjupen_1 + yaf_1 /*
*/ +yotran_1 + ycap_1 + yotros_1
label var ytotd_1 "Ingresos totales de la persona deflactados"
capture rename correl correlativ
capture rename correlat correlativ
label var correlativ "identificador de hogar"
sort correlativ
save desigualdad_ECH_p200`i'_20091214, replace

use c:\ECH\200`i'\h200`i'.dta
capture rename correl correlativ
capture rename correlat correlativ
label var correlativ "identificador de hogar"
sort correlativ
save c:\ECH\200`i'\h200`i'.dta, replace

use desigualdad_ECH_p200`i'_20091214
sort correlativ
merge correlativ using c:\ECH\200`i'\h200`i'.dta
drop _merge

************************************* Suma de los ingresos del hogar.
```

```
capture drop yfor_2 ynofor_2 ynodep_2 ysegd_2 yjupen_2 yaf_2 yotran_2 ycap_2 yotros_2 as_comp_2
dif_yfor_2
sort correlativ
by correlativ: egen yfor_2 = sum(yfor_1)
by correlativ: egen ynofor_2 = sum(ynofor_1)
by correlativ: egen ynodepfor_2 = sum(ynodepfor_1)
by correlativ: egen ynodepnofor_2 = sum(ynodepnofor_1)
by correlativ: egen ysegd_2 = sum(ysegd_1)
by correlativ: egen yjupen_2 = sum(yjupen_1)
by correlativ: egen yaf_2 = sum(yaf_1)
by correlativ: egen yotran_2 = sum(yotran_1)
by correlativ: egen ycap_2 = sum(ycap_1)
by correlativ: egen yotros_2 = sum(yotros_1)
by correlativ: egen as_comp_2 = sum(as_comp_1)
by correlativ: egen dif_yfor_2 =sum(dif_yfor_1)
by correlativ: egen as_comp_nodep_2 = sum(as_comp_nodep_1)
by correlativ: egen dif_ynodepfor_2 =sum(dif_ynodepfor_1)

label var yfor_2 "Ingresos totales por trabajo formal dependientes del hogar"
label var ynofor_2 "Ingresos totales por trabajo informal dependientes del hogar"
label var ynodepfor_2 "Ingresos totales por trabajo no dependientes formales del hogar"
label var ynodepnofor_2 "Ingresos totales por trabajo no dependientes informales del hogar"
label var ysegd_2 "Ingresos totales por seguro de desempleo del hogar"
label var yjupen_2 "Ingresos totales por jubilaciones y pensiones del hogar"
label var yaf_2 "Ingresos totales por asignaciones familiares del hogar"
label var yotran_2 "Ingresos totales por otras transferencias del hogar"
label var ycap_2 "Ingresos del hogar derivados de la propiedad de capital"
label var yotros_2 "Otros ingresos del hogar"
label var as_comp_2 "Asignaciones computables del hogar"
label var dif_yfor_2 "Diferencia entre salario formal y asignaciones computables del hogar"
label var as_comp_nodep_2 "Asignaciones computables del hogar por trabajo no dependiente"
label var dif_ynodepfor_2 "Diferencia entre salario formal y asignaciones computables de no /*
*/  dependientes del hogar"

save desigualdad_ECH_p200`i'_20091214, replace

* Análisis de desigualdad utilizando ingreso per cápita - ingresos brutos.

use desigualdad_ECH_p200`i'_20091214

* Etiquetas.
label var d16 "Total de personas en el hogar"
capture drop yfor ynofor ynodep yotran ysegd yjupen yaf ycap yotros as_comp dif_yfor

g yfor       = (yfor_2)/(d16^1)
g ynofor     = (ynofor_2)/(d16^1)
g ynodepfor   = (ynodepfor_2)/(d16^1)
g ynodepnofor = (ynodepnofor_2)/(d16^1)
g yotran     = (yotran_2)/(d16^1)
g ysegd      = (ysegd_2)/(d16^1)
g yjupen     = (yjupen_2)/(d16^1)
g yaf        = (yaf_2) / (d16^1)
g ycap       = (ycap_2)/(d16^1)
g yotros     = (yotros_2)/(d16^1)
g as_comp    = (as_comp_2)/(d16^1)
g dif_yfor   = (dif_yfor_2)/(d16^1)
g as_compnodep= (as_comp_nodep_2)/(d16^1)
g dif_ynodepfor= (dif_ynodepfor_2)/(d16^1)

label var yfor    "Ingreso per capita del hogar por trabajo de formales dependientes"
label var ynofor  "Ingreso per capita del hogar por trabajo de informales dependientes"
label var ynodepfor  "Ingreso per capita del hogar por trabajo no dependientes formales"
label var ynodepnofor  "Ingreso per capita del hogar por trabajo no dependientes informales"
label var ysegd   "Ingreso per capita del hogar por seguro de desempleo"
label var yjupen  "Ingreso per capita del hogar por jubilaciones y pensiones"
label var yaf     "Ingreso per capita del hogar por asignaciones familiares"
label var yotran  "Ingreso per capita del hogar por otras transferencias"
label var ycap "Ingreso per capita del hogar por ingresos derivados de la propiedad de capital"
label var yotros "Ingreso per capita del hogar por otros ingresos"
label var as_comp "Asignaciones computables per capita del hogar"
```

```
label var dif_yfor "Diferencia entre salario formal y asignaciones computables per capita /*
*/ del hogar"
label var as_compnodep "Asignaciones computables no dependientes per capita del hogar"
label var dif_ynodepfor "Diferencia entre salario formal y asignaciones computables no /*
*/  dependientes per capita del hogar"

log using inefac`i'_bruto20091214, text replace
* Shorrocks con ingresos brutos
ineqfac yfor ynofor ynodepfor ynodepnofor ysegd yjupen yaf yotran ycap yotros /*
*/ [fweight=pesoan], stats
log close

* Análisis de desigualdad utilizando ingreso per cápita
* Transferencias netas - impuestos proporcionales al gasto

egen sumas_comp =sum((as_comp+ as_compnodep)*pesoan)
label var sumas_comp "Suma de las asignaciones computables per capita de todos los hogares"

g ytot = yfor + ynofor + ynodepfor + ynodepnofor + yotran + ysegd + yjupen + yaf + ycap + /*
*/ yotros
egen sumytot=sum(ytot*pesoan)

label var ytot "Ingreso per capita total del hogar"
label var sumytot "Suma de los ingresos totales per capita de todos los hogares"

g benef = ysegd + yjupen + yaf
recode benef .=0
egen sumbenef=sum(benef*pesoan)

label var benef "Suma de las transferencias per capita recibidas por el hogar"
label var sumbenef "Suma de las transferencias per capita de todos los hogares"

* De acuerdo a datos agrupados de la Seguridad Social, un 55% de las transferencias del
* gobierno a los hogares se financia con aportes realizados por los hogares directamente y un
* 45% se financia con impuestos.

g apor= 0.55 * (sumbenef/sumas_comp)
g totapor= apor * sumas_comp
recode totapor .=0
label var totapor "Aportes totales realizados por los trabajadores formales que financian /*
*/ las transferencias"

* De acuerdo a la regresion realizada utilizando la Encuesta de Gastos e Ingresos de los
* Hogares de 1994 del INE, se obtuvo la siguiente expresion que vincula gasto e ingreso:

merge using betas_gasto
drop _merge
replace beta=beta[_n-1] if _n!=1
replace cons=cons[_n-1] if _n!=1

g gastot = exp(cons)* (ytot^beta)
egen sumgastot = sum (gastot*pesoan)

label var gastot "Gasto del hogar"
label var sumgastot "Suma del gasto de los hogares"

g impues=0.45 * (sumbenef/sumgastot)
g totimpues = impues * sumgastot
recode totimpues .=0
label var totimpues "Impuestos totales pagados por los hogares que financian las /*
*/  transferencias"

* REGLA GENERAL: la contribución total es igual al beneficio total.

g totcontrib= totimpues + totapor
label var totcontrib "Contribucion total al financiamiento de la transferencia"

* Chequeo.
g cerogas = totcontrib - sumbenef
sum cerogas
```

```
* Cálculo de las transferencias netas suponiendo impuestos proporcionales al gasto.

* Seguro de desempleo.

egen sumysd=sum(ysegd*pesoan)
label var sumysd "Suma de beneficios por seguro de desempleo per capita de los hogares"

g asd = 0.55 * (sumysd/sumas_comp)
recode asd .=0
g aportsd = asd * as_comp
recode aportsd .=0
label var aportsd "Aportes directos que financian el programa de seguro por desempleo"

g tsd = 0.45 * (sumysd/sumgastot)
recode tsd .=0
g impuestsd = tsd * gastot
recode impuestsd .=0
label var impuestsd "Impuestos que financian el seguro por desempleo"

g totcontribsd = (asd * sumas_comp) + (tsd * sumgastot)
label var totcontribsd "Contribucion total al financiamiento del seguro por desempleo"

*Chequeo.
g cerosd = totcontribsd - sumysd
sum cerosd

g contribsd = (aportsd + impuestsd)
recode contribsd .=0
g ysdneto = ysegd - contribsd
recode ysdneto .=0

label var contribsd "Contribuciones totales al financiamiento del seguro por desempleo"
label var ysdneto "Transferencias netas por seguro de desempleo"

* Jubilaciones y pensiones.

egen sumyjp = sum(yjupen*pesoan)
label var sumyjp "suma de jubilaciones y pensiones per capita de los hogares"

g ajp = 0.55 * (sumyjp/sumas_comp)
recode ajp .=0
g aportjp = ajp * as_comp
recode aportjp .=0
label var aportjp "Contribuciones directas al financiamiento de las jubilaciones y pensiones"

g tjp = 0.45 * (sumyjp/sumgastot)
recode tjp .=0
g impuestjp = tjp * gastot
recode impuestjp .=0
label var impuestjp "Impuestos que financian el programa de jubilaciones y pensiones"

g totcontribjp = (ajp * sumas_comp) + (tjp * sumgastot)
label var totcontribjp "Contribuciones totales al financiamiento de las jubilaciones y /*
*/ pensiones"

g cerojp = totcontribjp - sumyjp
sum cerojp

g contribjp = (aportjp + impuestjp)
recode contribjp .=0
g yjpneto = yjupen - contribjp
recode yjpneto .=0
label var yjpneto "Transferencias por jubilaciones y pensiones netas"

* Asignaciones Familiares.

egen sumyaf =sum (yaf *pesoan)
label var sumyaf "Suma de los beneficios por asignaciones familiares per capita que reciben /*
*/ los hogares"
```

```
g aaf = 0.55 * (sumyaf / sumas_comp)
recode aaf .=0
g aportaf = aaf * as_comp
recode aportaf .=0
label var aportaf "Contribuciones directas al financiamiento de las asignaciones familiares"

g taf = 0.45 * (sumyaf/sumgastot)
recode taf .=0
g impuestaf = taf * gastot
recode impuestaf .=0
label var impuestaf "Impuestos que financian las asignaciones familiares"

g totcontribaf = (aaf * sumas_comp) + (taf * sumgastot)
label var totcontribaf "Contribuciones totales al financiamiento de las asignaciones /*
*/ familiares"

g ceroaf = totcontribaf - sumyaf
sum ceroaf

g contribaf = (aportaf + impuestaf)
recode contribaf .=0
g yafneto = yaf - contribaf
recode yafneto .=0
label var yafneto "Transferencias netas por asignaciones familiares"

* Cálculo ingreso por trabajo dependientes formales nominal.

g yfor_nom = (as_comp * (1 + asd + ajp + aaf )) + dif_yfor
label var yfor_nom "Ingreso formal nominal per capita del hogar"

g ynodepfor_nom = (as_compnodep * (1 + asd + ajp + aaf )) + dif_ynodepfor
label var ynodepfor_nom "Ingreso formal nominal no dependientes per capita del hogar"

log using inefac`i'_neto20091210, text replace

* Descomposición de la desigualdad (Shorrocks):
ineqfac yfor_nom ynofor ynodepfor_nom ynodepnofor ysdneto yjpneto yafneto yotran ycap yotros /*
*/ [fweight=pesoan],stats
log close

****** con impuestos proporcionales al ingreso

g impues_y = 0.45 * (sumbenef/sumytot)
g totimpues_y = impues_y * sumytot
recode totimpues_y .=0
label var totimpues_y "Impuestos totales pagados por los hogares que financian las /*
*/ transferencias"

* REGLA GENERAL: la contribución total es igual al beneficio total.

g totcontrib_y= totimpues_y + totapor
label var totcontrib_y "Contribucion total al financiamiento de la transferencia"

* Chequeo.
g cerogas_y = totcontrib_y - sumbenef
sum cerogas_y

* Cálculo de las transferencias netas suponiendo impuestos proporcionales al ingreso.

* Seguro de desempleo.

g tsd_y = 0.45 * (sumysd/sumytot)
recode tsd_y .=0
g impuestsd_y = tsd_y * ytot
recode impuestsd_y .=0
label var impuestsd_y "Impuestos que financian el seguro por desempleo"

g totcontribsd_y = (asd * sumas_comp) + (tsd_y * sumytot)
label var totcontribsd_y "Contribucion total al financiamiento del seguro por desempleo"
```

```
*Chequeo.
g cerosd_y = totcontribsd_y - sumysd
sum cerosd_y

g contribsd_y = (aportsd + impuestsd_y)
recode contribsd_y .=0
g ysdneto_y = ysegd - contribsd_y
recode ysdneto_y .=0

label var contribsd_y "Contribuciones totales al financiamiento del seguro por desempleo"
label var ysdneto_y "Transferencias netas por seguro de desempleo"

* Jubilaciones y pensiones.

g tjp_y = 0.45 * (sumyjp/sumytot)
recode tjp_y .=0
g impuestjp_y = tjp_y * ytot
recode impuestjp_y .=0
label var impuestjp_y "Impuestos que financian el programa de jubilaciones y pensiones"

g totcontribjp_y = (ajp * sumas_comp) + (tjp_y * sumytot)
label var totcontribjp_y "Contribuciones totales al financiamiento de las jubilaciones y /*
*/  pensiones"

g cerojp_y = totcontribjp_y - sumyjp
sum cerojp_y

g contribjp_y = (aportjp + impuestjp_y)
recode contribjp_y .=0
g yjpneto_y = yjupen - contribjp_y
recode yjpneto_y .=0
label var yjpneto_y "Transferencias por jubilaciones y pensiones netas"

* Asignaciones Familiares.

g taf_y = 0.45 * (sumyaf/sumytot)
recode taf_y .=0
g impuestaf_y = taf_y * ytot
recode impuestaf_y .=0
label var impuestaf_y "Impuestos que financian las asignaciones familiares"

g totcontribaf_y = (aaf * sumas_comp) + (taf_y * sumytot)
label var totcontribaf_y "Contribuciones totales al financiamiento de las asignaciones /*
*/  familiares"

g ceroaf_y = totcontribaf_y - sumyaf
sum ceroaf_y

g contribaf_y = (aportaf + impuestaf_y)
recode contribaf_y .=0
g yafneto_y = yaf - contribaf_y
recode yafneto_y .=0
label var yafneto_y "Transferencias netas por asignaciones familiares"

log using inefac`i'_neto_ingreso20091214, text replace

* Descomposición de la desigualdad (Shorrocks):
ineqfac yfor_nom ynofor ynodepfor_nom ynodepnofor ysdneto_y yjpneto_y yafneto_y yotran ycap /*
*/ yotros [fweight=pesoan],stats
log close

save desigualdad_ECH_p200`i'_20091214, replace

}

************* Gráficas
clear
use desigualdad_ECH_p2005_20091214
```

```
reg yjupen ytot
predict xbjp
reg contribjp ytot
predict xbconjp

label var ytot "Total income of household i (yi)"
label var xbjp "Benefits"
label var xbconjp "Contributions"

twoway line xbjp xbconjp ytot if ytot<20000, legend(order(1 - "(b)" 2 - "(a + t)"))/*
*/ title("Pensions") ytitle("")  clpattern(solid dash) clwidth(medium medium) /*
*/ mcolor(green red) /*
*/saving("C:\Proyectos\BM_PER2004\Desigualdad\Calculos\2005\PENSIONS_JAE20091214.gph", replace)

reg yaf ytot
predict xbaf
label var xbaf "Benefits"
reg contribaf ytot
predict xbconaf
label var xbconaf "Contributions"

twoway line xbaf xbconaf ytot if ytot<20000, legend(order(1 - "(b)" 2 - "(a + t)"))/*
*/ title("Family allowances") ytitle("")  clpattern(solid dash) clwidth(medium medium) /*
*/ mcolor(green red) /*
*/ saving("C:\Proyectos\BM_PER2004\Desigualdad\Calculos\2005\FA_JAE20091214.gph", replace)

reg ysegd ytot
predict xbsd
label var xbsd "Benefits"
reg contribsd ytot
predict xbconsd
label var xbconsd "Contributions"

twoway line xbsd xbconsd ytot if ytot<20000, legend(order(1 - "(b)" 2 - "(a + t)"))/*
*/ title("Unemployment inssurance") ytitle("")  clpattern(solid dash) clwidth(medium medium) /*
*/ mcolor(green red) /*
*/ saving("C:\Proyectos\BM_PER2004\Desigualdad\Calculos\2005\UI_JAE20091214.gph", replace)
```