

LA EVOLUCIÓN DE LA DESIGUALDAD DE INGRESOS EN URUGUAY ENTRE 1998 Y 2009

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Introduction

Uruguay is a medium income country with low poverty and inequality indexes when compared to most countries in the region. The evolution of income inequality in Uruguay has not been encompassed with that of the major part of Latin American countries. Whereas the region experienced increasing income inequality during the eighties and the early nineties, income inequality remained quite stable during that period in Uruguay. A persistent trend towards increasing inequality is detected from 1998 to 2006 in Uruguay. This trend is also at odds with the evolution of inequality followed by the largest countries in the region (Gasparini and Cruces 2010; Lopez-Calva and Lustig 2010). In the recent years (2006-2009), and for the first time in almost 15 years, inequality started to fall down although the present levels are higher than the ones prevailing during pre crisis years.

The aim of this paper is to assess the evolution of inequality in Uruguay in the last ten years and to provide insights that help to understand the forces that explain changes in inequality, especially in recent years. With this objective, the paper is organized as follows. First we provide a background for the discussion, reviewing existing empirical work about the evolution of inequality in the last three decades (section I). We then consider in depth the last ten years, analyzing the evolution of the different sources of income, based on household income surveys (section II). Finally we conduct a microsimulation exercise to disentangle the driving forces of the recent movements (section III), and present some final comments (section IV).

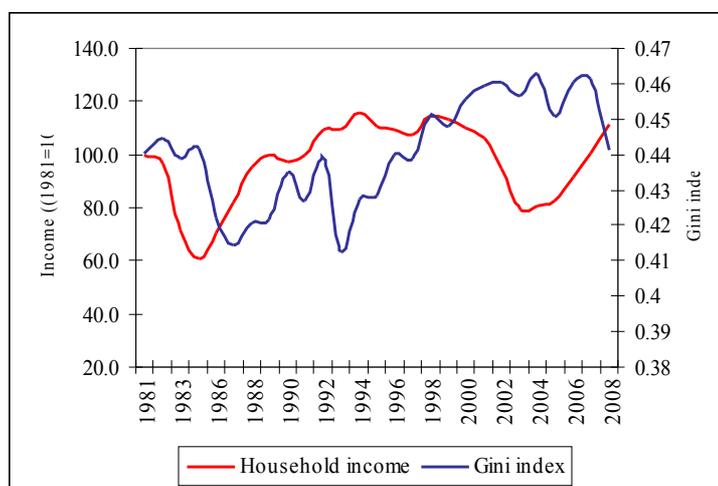
I. Inequality in Uruguay: a long run perspective (1981-2009)

During the last three decades, the Uruguayan economy went through two important economic crises, that peaked in 1982 and in 2002. Both crisis implied important changes in the exchange rate, increases in the unemployment rate and very significant decreases in household income, with big jumps in poverty incidence (see figure A.1).

Per capita household income decreased 37% between 1982 and 1984, whereas in the last economic crises its decline was 25% (2001 - 2003).

The distribution of income does not show a clear trend when we consider the period as a whole. After important oscillations between 1981 and 1995, an increasing trend is detected only after 1995. This evolution does not coincide with that of inequality in the rest of Latin American countries. In effect, many studies argue that income inequality increased in most Latin American countries during the “lost decade” of the 80s and the structural reforms of the early 90s (Lopez-Calva and Lustig 2010) . The increasing trend that began in Uruguay in the mid nineties seems to be reverted in the last three years, when inequality declines for the first time in 15 years (figure 1). This improvement in income distribution has contributed to the important decrease in poverty incidence. In fact, poverty incidence, measured with a relative poverty line, decreased from 30% to 17% between 2006 and 2009. A decomposition of this change in poverty in the growth and distribution effects shows that the latter explains 25% of the decline in poverty incidence.

Figure 1. Evolution of per capita household income and inequality. 1981-2009¹ (*)



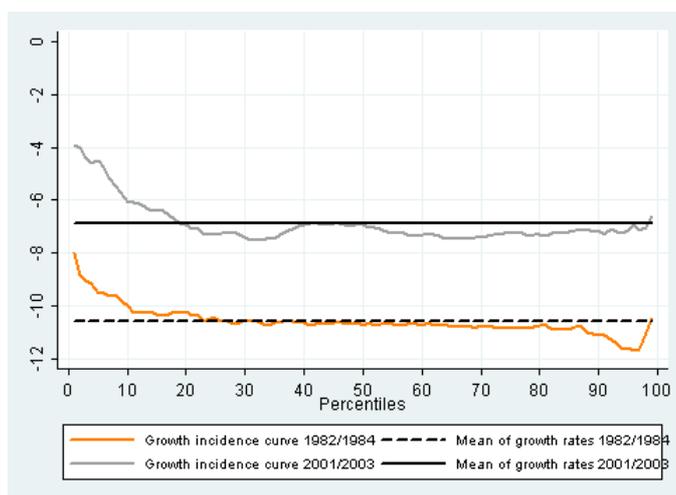
Source: based on household surveys

A detailed analysis of the two episodes of economic crisis does not allow characterizing them as unequalizing in the case of Uruguay. During both economic crises, variations of per capita household income per percentile took place all over the distribution. In the following graph (figure 2), the yellow line displays changes in household income during the first economic crisis (1984-1982), whereas the grey line shows variations during the

¹ (*) Sampling framework of household surveys: 1981-1987: 1975 Census; 1988-1997: 1985 Census, 1998-2005: 1996 Census; 2006-2009: 2004 Conteo.

second economic crisis (2003-2001). In the latter, income losses were higher, and in both cases poorer households (first decile) experienced lower income losses. Moreover, during the first crisis, households in the last decile showed higher reductions in their income.

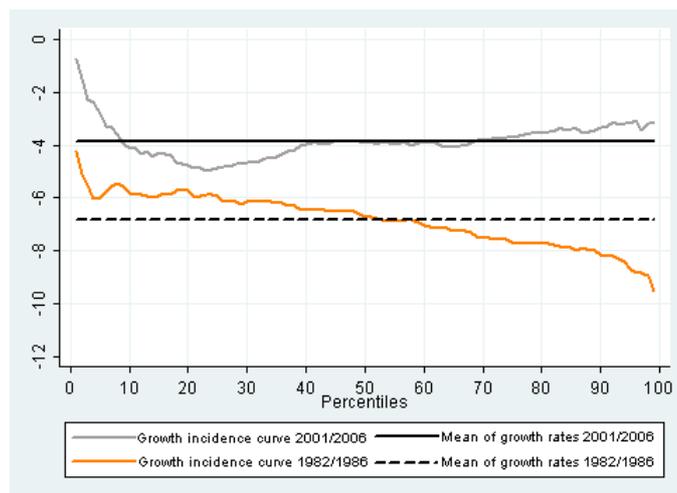
Figure 2. Changes in household income by percentile during economic crisis.



Source: Alves et al (2010)

The pattern of recovery differs between the two episodes. In 1986 household income was still lower than its pre-crisis level, and the same happened in 2006. But whereas income recovery was higher for poorer households in the first economic crisis (yellow line), during the second episode the recovery pattern is more regressive. Nevertheless, and contrary to what happened in other Latin American countries, economic crisis do not seem to have had strong unequalizing effects in the case of Uruguay. Whereas the evidence suggests that the effects of the debt crisis during the 80s were unequalizing for most Latin American countries (Lustig and López Calva, 2010), this was not the case in Uruguay, where the Gini coefficient even declined after the episode, and income recovery was higher for poorer households. During the second economic crisis the recovery was more regressive, although the Gini coefficient did not experience significant increases, and in any case remained in levels reached after five years of increasing trends. This is not at odds with what could be expected. Cross country evidence shows that crisis effects on poverty are clear in almost all cases, but inequality effects may vary depending on the country (Baldacci, de Mello, and Inchauste 2002).

Figure 3. Changes in household income by percentile after economic crisis.



Source: Alves et al (2010)

The existing studies coincide that the distribution of income was stable until the mid nineties, and a rising trend is detected from then on, as mentioned below. During the early nineties, whereas inequality was increasing in most Latin American countries, it remained stable in Uruguay. Vigorito (1999) explains the relatively stability of income distribution between 1986 and 1997 as a consequence of opposite trends between different educational groups. Although wage differentials by education increased in the period, wage dispersion within less educated workers decreases, explaining in part the stability of overall inequality. Pensioners moved to the right of the distribution, as a constitutional reform approved in 1989 set a new mechanism of pension indexation that led to a significant increase in their real value, particularly between 1991 and 1994. Increasing wage differentials in this period coexist with lower dispersion of capital incomes. Bucheli and Furtado (2000) argue that by the end of the period, inequality indexes more sensitive to the lower part of the distribution begin to show higher concentration.

The increasing trend in income inequality detected in the second half of the nineties has been linked to the relative evolution of wages and pensions (Bucheli and Furtado 2005; Arim and Zoppolo 2000). Wage inequality increased as a consequence of increasing returns to tertiary education, that took place simultaneously with the decentralization of wage bargaining. Increasing returns to skill may have been demand driven, as a consequence of trade liberalization and the introduction of skill biased technologies, as suggested by Casacuberta and Vaillant (2002).

During the last years, important policy changes were introduced in Uruguay. These policies may have had redistributive effects, although further research is needed in order

to disentangle the potential effects more clearly. On the one hand, there were important institutional changes in the labor market. The minimum wage, which had been decreasing in real terms for more than 30 years and was not binding increased 57% in real terms in January 2005. In July 2005, under the new administration, it experienced another important real increase, and from then on it began to increase every six months. The distributive effects of this change are analyzed in PNUD (2008). Based on a semi parametric decomposition approach, the research concludes that the increase in the minimum wage has contributed to lower wage and earnings inequality. Wage inequality increased between 2004 and 2006, but the increment would have been higher had the minimum wage not changed. The study also finds hints that this policy may also have had a negative effect on employment for young and low skilled workers. Another important change of the labor market refers to the return of collective bargaining. This mechanism has been abandoned in 1992, when the government retired from wage bargaining, except in some specific sectors. In 2005 collective wage bargaining was installed again. Private, public and rural wages were set in collective agreements, and unions were strengthened. According to the international evidence, this may have compressed wage inequality, at least among formal workers, although there are no impact evaluations of the effect of the return to collective wage bargaining.

Another relevant redistributive police refers to the tax reform implemented in 2008. The aim of this reform was to create a more equitable and efficient tax structure, and to promote productive investment, being broadly revenue neutral. Among other changes, the wage tax (*Impuesto a las Retribuciones Personales, IRP*) was eliminated and a dual personal income tax (*Impuesto a la Renta de las Personas Físicas, IRPF*), was implemented. The VAT rate was reduced (the maximum rate went from 23 to 22% and the minimum one from 14 to 10%) and social security financing contribution tax (COFIS, consisting of a 3% consumption tax) was eliminated. Ex ante analysis of the distributional impact of the tax reform, based on static microsimulations (Amarante *et al*, 2007) or on a general equilibrium model (Llambí *et al*. 2009), coincide to indicate that the reform had positive redistributive effects. It altered the relative neutrality of the pre reform tax system, and the progressive impact stemmed mainly from the process of replacing the IRP with the IRPF. The change in indirect taxes did not generate a substantial distributional impact, although it generated an increase in the income of all households. According to Amarante *et al* (2007), the variation in inequality indicators

due to the tax reform is in the range of 1 to 2 percentage points, a modest but significant reduction.

Finally, in 2005 a large scale conditional cash transfer program, named PANES, was implemented and lasted for two years. When that program ended, in January 2008, an old conditional cash transfer program was redesigned (*Asignaciones Familiares*), and the amount of this transfer was significantly increased. This program is a large scale one, aiming to cover half of the population under 18 years in Uruguay. Consistently with its target population (first quintile of poor population), PANES did not affect poverty incidence, but it significantly reduced the poverty gap and the incidence of indigence. Its effects on inequality were very modest (half a point of decrease in the Gini index). Existing studies also indicate that the new *Asignaciones Familiares*, targeted towards a broader population, significantly reduced poverty and indigence incidence. This program implied a reduction of two points in the Gini index, based on arithmetic simulations (UNDP, 2008).

In the following sections, we provide a more detailed analysis of the increase in income inequality between 1998 and 2006, and the decrease that it is experimenting in the last three years.

II. The evolution of income by source. 1998-2009

Most households depend on more than one source of income, so to understand income inequality it is necessary to consider the role of the different income sources.² The most important income source is labor income, which represents on average around 60% of total household income. Its importance has decreased in the last ten years, mainly because of its loss of importance in the first two deciles (table 1). Labor income share is higher for income deciles around the median.

The other most important source of income is given by pensions, which represent around 15% of total income, and whose importance is increasing by income deciles. One important change in the relative importance of different income sources in this period refers to the role of social benefits and public transfers.³ In 1998 they represented less than 5% of per capita household income on average, whereas in 2007 this figure

² Only around 36% of households depend on an only source of income.

³ Public transfers include contributive and non contributive benefits.

was 12.5%. Their importance is considerable higher for lower income deciles: almost 42% of household income in the first decile is composed by public transfers.

Table 1. Participation of the main income sources by income decile and year. Per capita household income. 1998-2009

| Income source | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|------|------|------|------|------|------|------|------|------|------|-------|
| Labor income | | | | | | | | | | | |
| 1998 | 60.8 | 62.7 | 63.5 | 63.1 | 59.4 | 61.2 | 60.9 | 60.5 | 60.0 | 60.2 | 61.2 |
| 2001 | 52.5 | 58.9 | 61.5 | 59.9 | 59.4 | 58.4 | 57.9 | 56.5 | 57.8 | 57.6 | 58.1 |
| 2003 | 44.9 | 53.0 | 55.5 | 59.0 | 58.4 | 56.2 | 56.6 | 55.2 | 55.3 | 55.1 | 54.9 |
| 2006 | 38.2 | 51.5 | 59.2 | 60.8 | 61.0 | 60.3 | 59.4 | 58.8 | 58.9 | 57.2 | 56.7 |
| 2007 | 36.8 | 52.0 | 59.9 | 62.1 | 62.0 | 61.3 | 61.0 | 61.0 | 59.9 | 56.5 | 57.4 |
| 2008 | | | | | | | | | | | |
| 2009 | | | | | | | | | | | |
| Capital income | | | | | | | | | | | |
| 1998 | 0.3 | 0.5 | 0.6 | 0.5 | 0.8 | 0.8 | 0.9 | 2.0 | 2.8 | 6.6 | 1.6 |
| 2001 | 0.3 | 0.1 | 0.2 | 0.6 | 0.6 | 0.8 | 0.9 | 1.5 | 2.2 | 5.3 | 1.3 |
| 2003 | 0.2 | 0.2 | 0.5 | 0.4 | 0.7 | 0.6 | 0.7 | 1.5 | 1.9 | 5.0 | 1.2 |
| 2006 | 0.3 | 0.3 | 0.3 | 0.6 | 0.9 | 1.2 | 1.6 | 2.3 | 3.2 | 6.8 | 1.9 |
| 2007 | 0.1 | 0.3 | 0.6 | 0.7 | 1.0 | 1.2 | 1.7 | 2.5 | 3.5 | 8.4 | 2.1 |
| 2008 | | | | | | | | | | | |
| 2009 | | | | | | | | | | | |
| Social benefits and public transfers | | | | | | | | | | | |
| 1998 | 9.9 | 7.6 | 6.3 | 5.2 | 4.8 | 3.8 | 3.7 | 3.0 | 2.7 | 2.0 | 4.9 |
| 2001 | 16.6 | 11.9 | 8.4 | 7.0 | 6.6 | 5.4 | 5.0 | 4.5 | 4.2 | 2.5 | 16.6 |
| 2003 | 25.2 | 19.3 | 13.6 | 10.3 | 7.4 | 6.9 | 6.0 | 5.0 | 4.3 | 3.4 | 10.1 |
| 2006 | 37.5 | 23.0 | 14.0 | 10.2 | 7.6 | 6.9 | 6.1 | 5.4 | 5.0 | 3.5 | 11.5 |
| 2007 | 41.9 | 24.6 | 14.9 | 10.3 | 8.4 | 7.3 | 6.4 | 5.8 | 5.1 | 4.2 | 12.5 |
| 2008 | | | | | | | | | | | |
| 2009 | | | | | | | | | | | |
| Pensions | | | | | | | | | | | |
| 1998 | 10.7 | 12.4 | 13.0 | 14.7 | 18.0 | 17.3 | 17.5 | 18.1 | 18.0 | 17.4 | 15.7 |
| 2001 | 8.6 | 10.4 | 13.0 | 15.0 | 16.2 | 18.8 | 19.0 | 20.3 | 19.8 | 19.8 | 16.1 |
| 2003 | 9.7 | 11.4 | 13.9 | 14.7 | 17.4 | 20.7 | 21.0 | 22.9 | 23.6 | 22.5 | 17.8 |
| 2006 | 6.7 | 9.4 | 11.7 | 14.0 | 16.3 | 17.3 | 18.6 | 19.4 | 19.0 | 18.9 | 15.4 |
| 2007 | 5.5 | 8.4 | 10.4 | 13.3 | 14.8 | 16.4 | 17.0 | 16.9 | 17.2 | 16.9 | 13.8 |
| 2008 | | | | | | | | | | | |
| 2009 | | | | | | | | | | | |

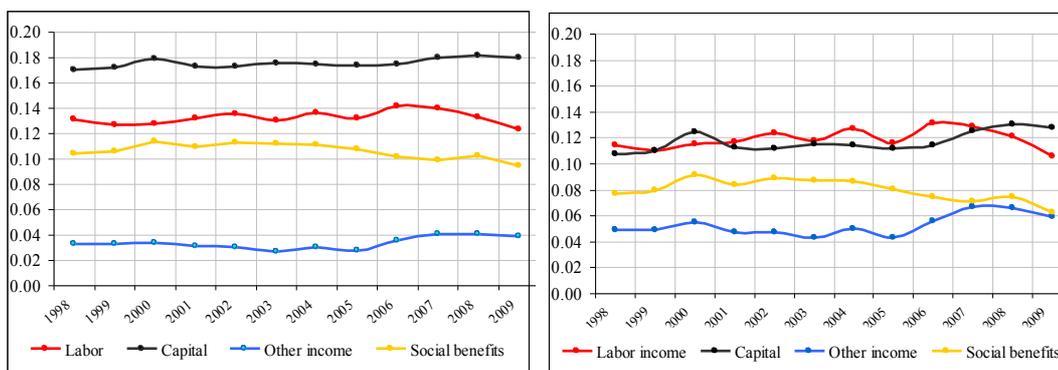
Source: based on household surveys.

As long as we did not include all the sources of income, totals by column are lower than 100

In order to disentangle the contribution of different sources of income to total inequality, we performed the decomposition technique proposed by Sastre and Trannoy (2002). Results for the Gini index indicate that capital income is the source that mainly explains inequality, followed by labor income. The effect of labor income changes in the period, it contributes to higher inequality until 2006, and to its decline afterwards. Other important factor is given by social benefits, that include social transfers and pensions, and which contributes to declining inequality from 2005 on. Decompositions for the Theil index display similar results, but the role of capital

income is lower, as more importance is given to the lower part of the distribution. Again, Theil decomposition illustrates about the equalizing role of labor income and social benefits in the recent years.

Figure 5. Contribution to inequality by income source
 a) Gini b) Theil index



Source: Alves et al (2010)

A more detailed analysis of the role of social benefits indicates that it presents two different poles in regard to their contribution to inequality: contributive pensions and the remaining non contributive transfers. Albeit their increase in recent years, most of the income transfers paid by the Uruguayan government correspond to the contributive strand. As it was previously shown, pensions are mainly situated in the median and higher parts of the income distribution. The remaining non contributive transfers clearly contribute to equalize household income (figure 6). This is particularly remarkable in recent years, when new social programs have been incepted.

Figure 6
Contribution to inequality of social transfers (Shapley decomposition results)
a) Gini b) Theil index

The above discussion suggests that labor income has had an important role in explaining inequality increase between 1998 and 2006. During the last three years, the decline experimented in inequality indexes is mainly explained by the equalizing effect of both labor income and social benefits, specifically social transfers, which have been expanded in recent years. In the following section we perform a microsimulation analysis in order to understand the reasons for the changing role of labor income, as well as the contributions of social transfers.

III. Microsimulation analysis

To single out the different effects that operated on the evolution of inequality, we carried out parametric microsimulations following the framework presented by Bourguignon and Ferreira (2004). The specification of the model closely follows Bourguignon, Fournier and Gurgand (2001), Gasparini, Marchionni and Sosa Escudero (2004), Cruces and Gasparini (2010) and Jaramillo and Saavedra (2010). As it has been widely acknowledged this type of analysis is partial and does not consider general equilibrium effects that can yield to changes in returns to education, labor participation, etc.

Microsimulation exercises have been previously done in Uruguay to assess changes in the income distribution. Previous work carried out for the years 1990-2005 shows the predominant role of returns to education in the increasing inequality pattern the country has shown till 2007 (Amarante et al, 2001; Marroig and Oreiro, 2007). Amarante (2009) carries out a microsimulation exercise to assess the role of fertility and household size on the evolution of inequality, showing that the evolution of reproductive behavior and household formation patterns by income strata and educational achievement yielded to increasing inequality in 1986-2006.

In what follows we concentrate on the effects of prices, participation in labor market participation, education and residual effects. Our aim is to disentangle the driving forces explaining the increase in inequality and its recent decrease.

III.1 Methodology

Household income can be expressed as the sum of labor and non labor income:

$$Y_{it} = Y_{Lit} + Y_{NLit}$$

Labor income can be modeled on the basis of two equations: one for hourly earnings and other for hours of work. Whereas Bourguignon, Fournier and Gurgand model labor supply and choice of sector of occupation as a joint decision, we chose a formulation similar to that of Gasparini *et al* (2004), assessing hours of work instead.

$$Y_{Lit} = w_{it} L_{it}$$

$$w_{it}^* = \sum_k \beta_k X_{1i} + \varepsilon_{Lit}$$

$$L_{it}^* = \sum_k \lambda_k X_{2i} + \varepsilon_{2it}$$

$$\text{with: } w_{it} = w_{it}^* L_{it}^*, L_{it}^* > 0 \text{ and } L_{it} = L_{it}^*, L_{it}^* > 0 \\ w_{it} = 0, L_{it}^* \leq 0 \quad L_{it} = 0, L_{it}^* \leq 0$$

w_{it} corresponds to observed hourly labor earnings, w_{it}^* is the reserve wage; L_{it} are observed hours of work, L_{it}^* is the optimal choice of hours given preferences and market conditions; X are individual characteristics; β are prices and λ reflects labor market participation parameters. The hourly earnings equation is estimated following the Heckman procedure to correct for sample selection, indicating whether the individual works or not:

$$\text{Log}(w_{it}) = \alpha + \sum_k \gamma_k X_i + \varepsilon_i$$

w_{it} corresponds to hourly labor earnings, X represents individual characteristics including sex, a parable in age, region of residence and a set of dummy variables reflecting five levels of schooling (6 years or less; 7-9 years; 10-12 years; 13-15 years and 16 years or more) and ε are normally behaved residuals. In the selection equation we also included a variable reflecting whether the person was cohabiting with a partner and another one reflecting the presence of children aged 5 years old or less.

Equation of hours uses a standard censored regression Tobit model. We estimated separate equations for household heads, spouses and the remaining household members.

$$H_{it} = \alpha_\tau + \sum_k \gamma_{kt} X_{2it} + \varepsilon_{2it}$$

The equation included sex, schooling, age, regional and non labor income in the case of the household head and it also added the income of the household head in the spouse and other family members equation.

Labor income then becomes:

$$Y_{Lit}=F(X_{it}, \varepsilon_{it}, \beta_t, \lambda)$$

To estimate labor income for those individuals that do not actually work we followed the procedure proposed by Bourguignon, Ferreira and Leite (2003) and draw the residuals randomly sampling from the existing ones. When choices in the baseline were inconsistent with actual behavior we resampled till the results were consistent.

Finally, to estimate counterfactuals for education structure and unobserved factors there are many options. One, followed by Jaramillo and Saavedra (2010) and Legovini *et al* (2004) consists in clustering observations by location, gender and age. The other procedure is the estimation of an education equation, considering the years of schooling as the dependent variable:

$$E_{it} = f(\text{constant}, \text{age}_{it}, \text{age2}_{it}, \text{sex}_{it}, \text{region}_{it}, \varepsilon_{it})$$

As stated by Bourguignon, Ferreira and Lustig (2004) this is a purely statistical form to allow for the microsimulation and it does not aim at explaining educational behavior.

Substituting the corresponding parameters we were able to distinguish the following effects on total inequality: returns to education, returns to experience, changes in the gender gap, returns to residing in Montevideo versus the rest of the country, hours worked, educational structure of the labor force and returns to unobservable factors.

We simulate the counterfactuals by replacing the actual including the residuals but replacing the coefficients of interest by the ones corresponding to the year of comparison. Next, we multiply by the actual hours worked. After that, household income is added up and the counterfactual equation is obtained. As decompositions are path dependent, we report both of them and analyze the differences.

In regard to the data, we used the household surveys 1999, 2003, 2006 y 2009. We used total household income and for labor income we report the cash and in kind income and excluded health insurance transfers. These transfers are usually included by the Statistical Office (INE) when computing total income. The results are robust to the income aggregate.

III.2 Main results

In the period under analysis labor income inequality followed an inverted U pattern, growing during the crisis till 2006 and following thereafter. This trend is observed both

in terms of total and hourly wages. The 2009 fall is remarkable and situates labor income inequality below the pre crisis levels (table 2).

| | 1999 | 2003 | 2006 | 2007 | 2008 | 2009 |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| <i>Monthly labor earnings</i> | | | | | | |
| Gini index | 0.472 | 0.493 | 0.493 | 0.491 | 0.481 | 0.457 |
| Theil index | 0.413 | 0.460 | 0.449 | 0.439 | 0.422 | 0.382 |
| <i>Hourly labor earnings</i> | | | | | | |
| Gini index | 0.446 | 0.460 | 0.483 | 0.464 | 0.459 | 0.437 |
| Theil index | 0.377 | 0.407 | 0.512 | 0.426 | 0.423 | 0.368 |

Source: based on household surveys

When analyzing the evolution of inequality by educational group, we see a different pattern before and after 2006. Until that year, inequality increased mainly among low skilled workers, whereas more skilled workers showed higher levels of inequality. But in 2007 inequality increased among low skilled workers and fell down in the rest. In 2009 the fall in inequality is remarkable among all educational groups and the distances in terms of inequality levels were reduced. The increase in employment, the increase in minimum wages and the restoration of wage councils are potential explanations for these results. Additionally, the inception of income taxes can explain the reduction of inequality among skilled workers which are the ones mainly affected by the tax reform.

| | 1999 | 2003 | 2006 | 2007 | 2008 | 2009 |
|-------------------------|-------|-------|-------|-------|-------|-------|
| <i>6 years or less</i> | | | | | | |
| Gini | 0.407 | 0.432 | 0.452 | 0.465 | 0.448 | 0.439 |
| Theil | 0.286 | 0.319 | 0.350 | 0.372 | 0.340 | 0.326 |
| <i>7-9 years</i> | | | | | | |
| Gini | 0.415 | 0.437 | 0.437 | 0.434 | 0.425 | 0.408 |
| Theil | 0.304 | 0.341 | 0.339 | 0.324 | 0.312 | 0.286 |
| <i>10-12 years</i> | | | | | | |
| Gini | 0.436 | 0.434 | 0.438 | 0.440 | 0.427 | 0.400 |
| Theil | 0.339 | 0.341 | 0.337 | 0.342 | 0.322 | 0.284 |
| <i>13-15 years</i> | | | | | | |
| Gini | 0.441 | 0.451 | 0.442 | 0.429 | 0.417 | 0.392 |
| Theil | 0.350 | 0.373 | 0.353 | 0.330 | 0.310 | 0.276 |
| <i>16 years or more</i> | | | | | | |
| Gini | 0.451 | 0.456 | 0.442 | 0.429 | 0.430 | 0.410 |
| Theil | 0.352 | 0.377 | 0.345 | 0.322 | 0.329 | 0.314 |

Source: based on household surveys

In regard to labor market participation, employment and the composition of the labor force, the recent years have witnessed relevant changes. Participation rates increased throughout economic recovery for almost all educational groups. Employment rates

increased significantly and unemployment rates reached their historical minimum and considerably decreased for lower and medium skilled workers.

| Table 4. Labor market indicators by educational attainment. Population aged 14 years and more | | | | | | |
|---|------|------|------|------|------|------|
| | 1999 | 2003 | 2006 | 2007 | 2008 | 2009 |
| <i>Participation rates</i> | | | | | | |
| Total | 58.2 | 58.1 | 60.9 | 62.7 | 62.6 | 63.3 |
| 6 years or less | 43.2 | 43.4 | 46.0 | 48.4 | 48.2 | 48.5 |
| 7-9 years | 64.8 | 64.3 | 64.1 | 66.2 | 63.3 | 62.7 |
| 10-12 years | 66.8 | 62.5 | 67.0 | 68.3 | 67.0 | 68.2 |
| 13-15 years | 74.0 | 71.7 | 72.5 | 72.1 | 75.3 | 76.4 |
| 16 more | 79.3 | 77.8 | 80.3 | 81.7 | 81.5 | 81.5 |
| <i>Employment rates</i> | | | | | | |
| Total | 51.6 | 48.3 | 53.9 | 56.7 | 57.7 | 58.4 |
| 6 years or less | 38.4 | 36.1 | 40.4 | 43.3 | 44.3 | 44.6 |
| 7-9 years | 55.5 | 51.6 | 55.6 | 58.9 | 56.6 | 56.3 |
| 10-12 years | 59.1 | 51.5 | 58.6 | 61.4 | 61.2 | 62.1 |
| 13-15 years | 66.1 | 60.0 | 64.8 | 65.7 | 70.4 | 71.6 |
| 16 more | 76.7 | 71.7 | 76.7 | 78.6 | 78.9 | 79.1 |
| <i>Average hours of work per week</i> | | | | | | |
| Total | 43.2 | 40.9 | 41.4 | 41.2 | 41.0 | 41.1 |
| 6 years or less | 42.7 | 40.0 | 40.0 | 39.3 | 39.1 | 39.3 |
| 7-9 years | 44.0 | 41.2 | 42.5 | 42.5 | 41.8 | 41.9 |
| 10-12 years | 44.1 | 41.9 | 42.9 | 42.5 | 42.1 | 42.0 |
| 13-15 years | 42.4 | 41.1 | 40.6 | 40.6 | 41.1 | 41.4 |
| 16 or more | 42.1 | 40.9 | 41.3 | 41.4 | 41.5 | 41.7 |
| <i>Unemployment rates</i> | | | | | | |
| Total | 11.3 | 16.9 | 11.4 | 9.6 | 7.9 | 7.7 |
| 6 years or less | 11.2 | 16.9 | 12.1 | 10.6 | 8.0 | 8.0 |
| 7-9 years | 14.4 | 19.7 | 13.2 | 11.1 | 10.5 | 10.2 |
| 10-12 years | 11.6 | 17.6 | 12.4 | 10.1 | 8.6 | 9.0 |
| 13-15 years | 10.7 | 16.3 | 10.6 | 8.9 | 6.4 | 6.3 |
| 16 more | 3.2 | 7.7 | 4.5 | 3.9 | 3.3 | 2.9 |

Source: based on household surveys

Changes in terms of the structure of the labor force by level of education have been modest (table 5). This is at odds with most Latin American countries, where a substantial increase in the educational attainment of the population and of the labor force is observed in recent years. The main explanation for this slow progress in terms of educational achievement relies in the endemic drop out rates affecting the secondary school system (see, for example, UNDP, 2009).

Table 5. Distribution of the employed population by educational attainment.

| | 1999 | 2003 | 2006 | 2007 | 2008 | 2009 |
|-----------------|------|------|------|------|------|------|
| 6 years or less | 31,2 | 28,3 | 25,8 | 25,7 | 25,3 | 24,2 |
| 7-9 years | 25,1 | 28,3 | 28,1 | 28,7 | 25,4 | 24,9 |
| 10-12 years | 16,8 | 15,0 | 16,3 | 16,4 | 15,0 | 15,2 |
| 13-15 years | 17,3 | 17,4 | 18,4 | 17,7 | 23,0 | 23,7 |
| 16 or more | 9,6 | 10,9 | 11,4 | 11,5 | 11,4 | 11,9 |

Source: base don household surveys

Table 6 depicts the results of Mincer equations estimated for microsimulation purposes using Heckman's correction. The coefficients of interest show significant movements along the period under analysis. The gender gap falls during the crisis and then it starts to rise through the recovery period. We run the estimations for 2007 and 2008 to check the evolution during 2006-2009.

The regional gap (favorable to Montevideo) falls throughout the whole period. It is quite probable that the increase in minimum wages and the restatement of the wage councils have played a role in this evolution.

Meanwhile, returns to education show a fall down during the crisis and then they started to increase again during 2006 and 2007. In 2008 the trend reverses, probably due to the inception of the income tax but they are still above the pre crisis level and 2006 values. At the end of the table we depict the coefficients corresponding to the estimation of a specification that uses years of schooling instead of levels. The results convey to exactly the same evolution.

The hours equation estimates (Table 7) show the expected signs.

Table 6. Estimation results. Wage equations (maximum likelihood estimation)

| | 1999 | selection eq. | 2003 | selection eq. | 2006 | selection eq. | 2007 | selection eq. |
|--------------|------------------------|-------------------------|------------------------|---------------------------|------------------------|---------------------------|-------------------------|---------------------------|
| sex | -0.204*** (0.0123) | -0.924*** (0.0195) | -0.1602*** (0.0136) | -0.535*** (0.0131) | -0.102*** (0.00742) | -0.542*** (0.00741) | -0.1723*** (0.00851) | -0.560*** (0.00887) |
| age | 0.0597*** (0.00201) | 0.0165*** (0.000627) | 0.0575*** (0.00227) | -0.00602*** (0.000427) | 0.0591*** (0.00119) | -0.00736*** (0.000228) | 0.0529*** (0.00138) | -0.00768*** (0.000266) |
| region | 0.319*** (0.00930) | 0.138*** (0.0181) | 0.263*** (0.0106) | 0.0272** (0.0132) | 0.186*** (0.00586) | 0.0250*** (0.00741) | 0.167*** (0.00717) | 0.0503*** (0.00885) |
| children 0-5 | | 0.166*** (0.0244) | | 0.0275 (0.0171) | | 0.0605*** (0.00986) | | 0.0180 (0.0113) |
| educ2 | 0.233*** (0.0127) | 0.189*** (0.0241) | 0.186*** (0.0144) | 0.201*** (0.0175) | 0.203*** (0.00819) | 0.203*** (0.00985) | 0.228*** (0.00993) | 0.215*** (0.0117) |
| educ3 | 0.414*** (0.0142) | 0.386*** (0.0273) | 0.322*** (0.0172) | 0.244*** (0.0209) | 0.359*** (0.00961) | 0.333*** (0.0116) | 0.382*** (0.0116) | 0.321*** (0.0138) |
| educ4 | 0.678*** (0.0149) | 0.713*** (0.0293) | 0.606*** (0.0177) | 0.544*** (0.0211) | 0.637*** (0.00989) | 0.586*** (0.0117) | 0.692*** (0.0118) | 0.538*** (0.0139) |
| educ5 | 1.104*** (0.0189) | 1.447*** (0.0547) | 0.972*** (0.0224) | 0.961*** (0.0278) | 1.056*** (0.0123) | 0.993*** (0.0156) | 1.055*** (0.0144) | 0.965*** (0.0185) |
| married | | 0.761*** | | 0.494*** | | 0.525*** | | 0.504*** |

| | | | | | | | | |
|---|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
| | | (0.0199) | | (0.0138) | | (0.00778) | | (0.00904) |
| non labor inc. | | -0.0461*** | | -0.0732*** | | -0.0578*** | | -0.0538*** |
| | | (0.00252) | | (0.00179) | | (0.000925) | | (0.00113) |
| Age 2 | -0.000562*** | | -0.000500*** | | -0.000511*** | | -0.000435*** | |
| | (2.36e-05) | | (2.69e-05) | | (1.40e-05) | | (1.60e-05) | |
| Constant | 2.103*** | 0.0506 | 1.917*** | 0.245*** | 1.975*** | 0.385*** | 2.127*** | 0.476*** |
| | (0.0440) | (0.0314) | (0.0512) | (0.0241) | (0.0271) | (0.0135) | (0.0304) | (0.0161) |
| Years of schooling | 0.0664*** | 0.0664*** | 0.0346*** | 0.0346*** | 0.0313*** | 0.0313*** | 0.0426*** | 0.0426*** |
| Observations | 39887 | 39887 | 43152 | 43152 | 134771 | 134771 | 93885 | 93885 |
| Standard errors in parentheses / *** p<0.01, ** p<0.05, * p<0.1 | | | | | | | | |
| Source: based on household surveys | | | | | | | | |

Table 7. Hours equations estimates (Tobit models)

| | Household heads | | | | Spouse | | | | Other household members | | | |
|------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|
| | 1999 | 2003 | 2006 | 2009 | 1999 | 2003 | 2006 | 2009 | 1999 | 2003 | 2006 | 2009 |
| Region | -0.518 (0.445) | -1.300*** (0.465) | -0.425* (0.246) | -0.0620 (0.268) | 0.856 (0.770) | 1.915** (0.797) | 0.886** (0.419) | 1.416*** (0.461) | -1.272* (0.657) | -1.367* (0.734) | -1.785*** (0.410) | 1.416*** (0.461) |
| Sex | -14.40*** (0.681) | -12.68*** (0.679) | -13.92*** (0.347) | -13.96*** (0.338) | -31.11*** -1470 | -25.84*** -1560 | -27.70*** (0.742) | -13.31*** (0.471) | -15.07*** (0.665) | -12.72*** (0.744) | -14.76*** (0.419) | -13.31*** (0.471) |
| Educ2 | 2.671*** (0.598) | 3.864*** (0.600) | 4.103*** (0.319) | 2.521*** (0.363) | 4.692*** -1066 | 6.643*** -1072 | 7.496*** (0.577) | 5.647*** (0.681) | 3.788*** (0.903) | 3.778*** -1011 | 8.453*** (0.585) | 5.647*** (0.681) |
| Educ3 | 4.882*** (0.679) | 3.580*** (0.739) | 6.753*** (0.387) | 3.925*** (0.445) | 11.43*** -1183 | 9.606*** -1281 | 14.02*** (0.661) | 8.826*** (0.759) | 4.881*** -1013 | 4.695*** -1167 | 10.83*** (0.661) | 8.826*** (0.759) |
| Educ4 | 6.283*** (0.700) | 6.448*** (0.734) | 6.376*** (0.381) | 4.803*** (0.387) | 16.07*** -1166 | 15.75*** -1213 | 19.15*** (0.634) | 8.834*** (0.755) | 3.572*** -1077 | 3.344*** -1201 | 9.986*** (0.683) | 8.834*** (0.755) |
| Educ5 | 6.993*** (0.839) | 9.018*** (0.840) | 9.377*** (0.438) | 8.423*** (0.471) | 27.03*** -1387 | 24.42*** -1391 | 26.87*** (0.722) | 13.17*** -1137 | 6.895*** -1629 | 7.928*** -1786 | 13.51*** -1023 | 13.17*** -1137 |
| Non labor income | -2.270*** (0.0682) | -1.910*** (0.0665) | -1.142*** (0.0297) | -1.307*** (0.0414) | -0.897*** (0.122) | -0.509*** (0.124) | -0.170*** (0.0516) | -0.821*** (0.0798) | -0.523*** (0.0983) | -0.481*** (0.109) | -0.350*** (0.0547) | -0.821*** (0.0798) |
| Hh head income | | | | | -1.773*** (0.223) | -6.000*** -1025 | -7.026*** (0.544) | -0.913*** (0.151) | -0.696*** (0.180) | 4.951*** (0.991) | 1.564*** (0.570) | -0.913*** (0.151) |
| Children 0-5 | 0.931 (0.597) | 4.248*** (0.110) | 3.937*** (0.0563) | -0.812** (0.373) | -6.830*** (0.996) | 5.165*** (0.209) | 4.249*** (0.106) | 3.607*** (0.641) | 1.311 (0.907) | 8.484*** (0.163) | 7.846*** (0.0859) | 3.607*** (0.641) |
| Age | 3.888*** (0.105) | -0.0524*** (0.00112) | -0.0497*** (0.000568) | 3.619*** (0.0588) | 4.688*** (0.199) | -0.0641*** (0.00228) | -0.0542*** (0.00115) | 7.451*** (0.0965) | 8.054*** (0.145) | -0.102*** (0.00213) | -0.0934*** (0.00113) | 7.451*** (0.0965) |
| Age 2 | -0.0490*** (0.00107) | 2.874*** (0.645) | 2.066*** (0.335) | -0.0454*** (0.000590) | -0.0594*** (0.00220) | 0 0 | 0 0 | -0.0883*** (0.00125) | -0.0996*** (0.00192) | 2.982*** -1124 | 5.706*** (0.690) | -0.0883*** (0.00125) |
| Married | 1.812*** (0.647) | 0 0 | 0 0 | 1.995*** (0.333) | -11.24 -7508 | -1.001*** (0.177) | -1.114*** (0.110) | 6.954*** (0.783) | 2.408** -1027 | -0.770*** (0.169) | -0.857*** (0.106) | 6.954*** (0.783) |
| Constant | -27.82*** -2602 | -41.96*** -2714 | -31.41*** -1400 | -22.36*** -1475 | -26.49*** -8653 | -63.48*** -5031 | -37.96*** -2604 | -107.0*** -1977 | -110.4*** -2747 | -132.8*** -3012 | -119.4*** -1641 | -107.0*** -1977 |
| Observations | 18309 | 18338 | 58573 | 41088 | 11521 | 10908 | 34486 | 28123 | 15476 | 15005 | 45143 | 28123 |

Standard errors in parentheses / *** p<0.01, ** p<0.05, * p<0.1

The main results of our microsimulation exercise are depicted in table 7, where we present the actual value of the Gini index (both for labor market earnings and for per capita household income) for the beginning of each period and the simulated values.

These figures suggest that the leading forces in the evolution of both labor income inequality and per capita household income inequality were the returns to education, labor market participation and the residual factors.

Considering 1999 and 2009, Gini index is almost the same (0.437 and 0.436) and the returns to education are also very similar. In this period, the leading force in promoting inequality was the gender gap. Meanwhile, the reduction of the regional gap promoted equality. The reduction of regional disparities can be thought as a possible result of the increase in minimum wages, which were probably binding in the more deprived areas outside Montevideo and the presence of wage councils.

In regard to the increase in inequality during the crisis (1999-2003), the microsimulation results suggest this evolution was mainly connected to the reduction of hours of work, probably mainly due to the high unemployment rates observed in this period.

| Table 7. Actual and counterfactual Gini indexes. 1999-2009 and sub- periods | | |
|---|-------------------------|-----------------------------|
| Effect and period | Individual labor income | Per capita household income |
| 1999-2009 | | |
| Actual | 0.472 | 0,436 |
| returns to education | 0,474 | 0,435 |
| gender gap | 0,475 | 0,439 |
| returns to living in Montevideo | 0,469 | 0,428 |
| returns to experience | 0,471 | 0,435 |
| Hours of work | 0,467 | 0,427 |
| Educational attainment | 0,469 | 0,434 |
| Residual factors | 0,461 | 0,429 |
| 1999-2003 | | |
| Actual | 0.472 | 0,436 |
| returns to education | 0,465 | 0,424 |
| gender gap | 0,469 | 0,438 |
| returns to living in Montevideo | 0,469 | 0,432 |
| returns to experience | 0,471 | 0,435 |
| Hours of work | 0,481 | 0,441 |
| Educational attainment | 0,47 | 0,435 |
| Residual factors | 0,478 | 0,442 |
| 2003-2006 | | |
| Actual | 0.493 | 0,442 |
| returns to education | 0,498 | 0,446 |
| gender gap | 0,496 | 0,443 |
| returns to living in Montevideo | 0,489 | 0,439 |
| returns to experience | 0,494 | 0,442 |
| Hours of work | 0,486 | 0,438 |
| Educational attainment | 0,491 | 0,441 |

| | | |
|---------------------------------|-------|-------|
| Residual factors | 0,489 | 0,449 |
| 2006-2009 | | |
| Actual | 0.493 | 0,456 |
| returns to education | 0,501 | 0,459 |
| gender gap | 0,497 | 0,458 |
| returns to living in Montevideo | 0,484 | 0,451 |
| returns to experience | 0,49 | 0,453 |
| Hours of work | 0,486 | 0,452 |
| Educational attainment | 0,492 | 0,455 |
| Residual factors | 0,479 | 0,448 |

The first stage of the economic recovery (2003-2006) came with increasing inequality mainly due to increasing returns to education and the gender gap. Meanwhile, hours of work, the Montevideo-rest of the country gap and the residual factors exhibited an equalizing trend. The last can be probably connected to the new policies incepted in 2005 already mentioned (wage councils and social transfers).

In 2006 -2009 inequality grew but, still, returns to education had an inequalizing effect that was mitigated by the factors already mentioned. This evolution presents a different pattern in regard to the evolution of other Latin American countries, as Brazil, where the fall in income inequality was partly caused by the reduction in returns to education.

IV. Final comments

The long period analyzed in this paper shows that Uruguay presents movements in inequality that are milder than what it is observed in the region. In spite of this, increasing inequality is the main feature of most of the years covered in this study.

The severe 1999-2003 economic crisis and the fast economic recovery were accompanied of increasing inequality. This trend was reverted in 2008, when for the first time in almost 15 years, inequality started to fall down.

Hours of work and increasing returns to education were the driving forces in the increase in inequality. In this way, labor market forces were the main explanations for the increase in inequality in the last years. The causes underlying the evolution of returns to education need to be further studied. The stagnant drop out rates at secondary school probably can partly explain this outcome, in a context of rapid economic grow and increasing demand of skilled workers.

This is particularly important considering the fact that the skill premium grew even after the introduction of the income tax and the restoration of wage councils. The recent fall (2008-2009) in labor income inequality can be partly reflecting these results. The

introduction of a non contributory strand in public transfers targeted towards the first income quintile also played a key role in the recent reduction of inequality.

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