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Javier Núñez Andrea Tartakowsky

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The relationship between Inequality of Outcomes and Inequality of Opportunities in a high-inequality country: The case of Chile[1]

Javier Núñez
Department of Economics
Universidad de Chile

Andrea Tartakowsky
Mideplan, Chile

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Based on the methodology developed by Bourguignon, Melendez and Ferreira (2005) we explore the extent to which income inequality in Chile is associated with inequality of observed exogenous circumstances of origin, which shape individuals "opportunities" to pursue their chosen life plans. We find that equalizing a diverse set of observed circumstances of origin across individuals such as parents' schooling and employment, household size and composition, ethnic background and features of the municipality of origin reduces the Gini coefficient in about 7-8 percentage points. About half of this effect is transmitted directly on earnings, while the remaining part through its indirect effect on the accumulation of schooling. Further results suggest that the influence of unobserved circumstances on income distribution may be limited, and hence aspects such as preferences, effort, luck, income shocks and income measurement errors may also be important factors behind income inequality, issue that awaits further research.

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I. Introduction

An old normative debate has existed around the question of what kind of economic inequality should public policies aim to reduce. While many authors have leaned towards dealing with the inequality of "outcomes" (i.e. income inequality), other traditions have instead proposed that public policies should promote "equality of opportunities" across individuals.[2] This debate has benefited from various conceptual and philosophical contributions, yet limited insights have been gained from empirical perspectives. Building upon the methodology developed by Bourguignon, Melendez and Ferreira (2005), this paper aims to contribute to this debate by empirically examining the extent to which observed income inequality is associated with the inequality of circumstances of origin that shape individuals´ opportunities.

The idea of equality of opportunities rests on the notion that individuals should be entitled to similar opportunities to pursue their desired life plans, which in turn requires that those opportunities not be determined by circumstances of origin that individuals inherit without their consent, such as, for example, parental and family background. Equal opportunities advocates have argued that differences in economic outcomes (i.e. income inequality) partly reflect differences in dimensions controlled by individuals, such as effort, responsibility, choices and so on. Accordingly, public policies should aim to equalize the exogenous circumstances that shape individuals' opportunities that constrain their choices, and then accept the resulting level of income inequality that would emerge from individuals' choices and preferences. With variations, this has somewhat become the dominant view of the notion of equity that deserves legitimate public action, as suggested, for example, by The World Banks' 2005 Report on Equity and Development:

[2] See for example Roemer (1996), (1998) and (2000) and Dworking (1981) for descriptions of the notions of equality of opportunities and of outcomes. Also, Amartya Sen's Capability approach has a resemblance with the notion of equality of opportunities, as described for example in Sen (1999) and Nussbaum and Sen (2000). See Roemer (1996) for a discussion of the main theories of distributive justice. See also Alessina, Di Tella and MacCulloch (2004) for a discussion on different attitudes between Europeans and Americans towards different notions of equality.

"By equity we mean that individuals should have equal opportunities to pursue a life of their choosing and be spared from extreme deprivation in outcomes", (p. 2)[3]

Yet, little is known about the extent to which income inequality reflects individual choices and preferences vs. the exogenous circumstances that individuals inherit. Empirical investigation of the relationship between "opportunities" and "outcomes" is relevant for various reasons. First, the practical implications of the philosophical distinction between "opportunities" and "outcomes" would be less significant if both were empirically associated. This would reinforce the interpretation of income distribution indicators as good measures of both equality of outcomes and equality of opportunities. This scenario would also suggest a more significant role for the individual circumstances of origin versus individual choices and preferences, as a means of jointly promoting equality of outcomes and of opportunities in the long run. If, on the contrary, exogenous circumstances empirically played a limited role in shaping income inequality, then this would have different implications depending on the chosen normative standpoint: advocates of equality of opportunities should expect and accept that a significant amount of income inequality would remain upon equalizing opportunities. Advocates of equality of outcomes, in turn, should realize that achieving this aim would require more than policies intended to equalize opportunities and circumstances, and that some additional, purely redistributive policies would be needed.

For this task we follow Bourguignon et al (2005) pioneering work, which attempts to establish the effect of circumstances of origin vs. individual "effort" in the determination of income inequality in Brazil.[4] In their work, a double role is played by circumstances:

[3] On page 3 of the overview this view is reinforced in these passages: "Three considerations are important at the outset. First, while more even playing fields are likely to lead to lower observed inequalities in educational attainment, health status and incomes, the policy aim is not equality in outcomes"…." Second a concern with equality of opportunities implies that public action should focus on the distributions of assets, economic opportunities, and political voice, rather than directly on inequality in incomes. "

[4] Behrman (2006) and Ruiz Tagle (2007) also examine the role of schooling on income inequality, although employing a framework different to that developed by Bourguignon et. al., which allows establishing and separating the direct and indirect effects of observed circumstances on income inequality. However, their

they have a direct impact on earnings, and an indirect effect on "effort", that they take to be the schooling level. They define the former effect as the "partial effect" of observed circumstances on earnings, and the "total effect" to be the joint effect of the direct and indirect effects of observed circumstances on earnings. Our work differs from theirs in three respects. First, we employ a larger and diverse set of circumstances of origin, which includes parental education and employment characteristics, ethnic background, household size and composition, and features of the municipality of origin, among others. Second, our aim is more modest in the sense that we do not address the (more complex) issue of the effects of "effort on income distribution, but simply attempt to establish the effects of observed circumstances on earnings. Accordingly, we refer to the indirect effect simply as the effect of observed circumstances on the level of schooling (not effort), and also interpret the unexplained part of the income distribution simply as an unknown combination of unobserved circumstances, individual effort, sheer luck and possibly income measurement errors. Finally, we provide some circumstance-equalizing benchmarks in addition to the "partial" and "total" effects outlined above, in order to shed some light on the possible effects of unobserved circumstances on the income distribution. One benchmark consists of an extreme situation where everyone's schooling levels only reflect individuals circumstances- either observed or unobserved-, such that individual "merit" and "effort" play no role in the determination of schooling, which amounts to simply computing the income distribution after equalizing schooling levels across individuals. The second equalizing benchmark consists of guaranteeing everyone a minimum of 10 years of schooling (completed at about age 16) and employ the simulated level of schooling otherwise, to reflect the idea that a simulated value of schooling lower than 10 would almost certainly reflect unobserved circumstances. In addition, we perform other exercises to examine further the role of unobserved circumstances.

The paper is structured as follows: The next section presents the basic model and the empirical identification strategy of the four observed circumstances-equalizing benchmarks. The third section describes the data and the set of circumstances employed.

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results are similar to the results found in this work, in the sense that both studies suggest a limited role of schooling in reducing income inequality.

The fourth section presents and discusses the results in comparative perspective, and discusses the role of unobserved circumstances, and finally section five concludes.

II. The model

Following Bourguignon et al (2005) and the adaptations in Núñez and Tartakowsky (2007), it is possible to distinguish two different kinds of determinants of individual earnings: those that result from actions that people take along their lives, which allow them to expand their productivity, and those that obey to circumstances out of people's control. Bourguignon et al (2005) refer to the first set of determinants as "effort variables" and the second as "circumstances". The relationship between incomes, efforts and circumstances is described as $W_i = f(C_i, E_i)$, where circumstances C typically includes a series of variables of the individuals' socioeconomic origin and effort E reflects human capital variables.

In order to estimate the model empirically, this relationship can be expressed as a linearized model, as follows:

$$Ln(W_i) = \alpha \cdot C_i + \beta \cdot E_i + U_i \qquad (1)$$

where a and ß are coefficient vectors and $U_{i,}$ is the residual that includes the unobserved circumstance and effort variables, measurement error and variations of the individuals' measured income from their corresponding permanent income level. All these factors are supposed to be independent from the included variables in C_i and E_i, to have zero mean and to be identically and independently distributed across individuals.

However, this formulation is restrictive and debatable, as it assumes additive separability between circumstances and efforts. For example, it seems reasonable to expect that an individual's circumstances during his childhood and the characteristics of his household and his parents' human capital must have had an influence on his own human capital

accumulation and "effort". Accordingly, Bourguignon et al (2005) propose "effort" to be partly a function of circumstances:

$$E_i = B \cdot C_i + V_i \qquad (2)$$

where B is a coefficient matrix and V_i represents a non-observable effort determinant vector. As usual, V_i it is supposed to have mean zero and to be i.i.d. across individuals.

Introducing equation (2) in (1) yields,

$$Ln(W_i) = (\alpha + \beta \cdot B) \cdot C_i + \beta \cdot V_i + U_i \qquad (3)$$

The formulation in (3) is more general than model (1) since it allows the circumstance variables to affect people's incomes directly, as well as indirectly through its effects on the effort variables. In particular, in model (1) the marginal effect of circumstances on earnings amounts only to a. Bourguignon et al (2005) call this effect the "Partial Effect" of observed circumstances on earnings. On the other hand, in model (3) the effect of observed circumstances on earnings is $\alpha + \beta \cdot B$. This corresponds to the "Total Effect" of observed circumstances on earnings. Note that this effect includes the partial effect of circumstances on earnings, a, but also de indirect effect of circumstances on earnings through "effort", ßB. The total effect of observed circumstances on earnings is larger than the partial effect if ßB>0, as expected.

In practice, Bourguignon et al (2005) employ schooling as their measure of "effort" E_i. However, as discussed in the introduction we believe it is both controversial and misleading to refer to schooling as an "effort" variable, at least in countries with known inequality of educational opportunities. Accordingly, we have preferred to replace effort E_i simply by individual schooling level S_i. Given this new interpretation, equation (1) would simply indicate that wages are a function of human capital (i.e. schooling), circumstances of origin, as well as term U_i, which captures unobserved circumstances, sheer luck, "effort" at work, deviations from permanent income, and possibly income

measurement errors. In addition, parameter ß would be more directly interpreted simply as the return to schooling, while parameter B would reflect the effect of observed circumstances of origin on the accumulation of schooling. For example, parameter B can capture parents' resources to invest in their son's tertiary education, the role of cognitive and non-cognitive abilities acquired during infancy and adolescence on the chances of gaining access to tertiary education. In addition, parameter a would reflect the direct effect of circumstances on earnings, for a given schooling level, or alternatively, as the effect of circumstances on the return of a given amount of schooling. For example, parameter a can capture the effect of the *quality* of education (likely to be associated with circumstances), the role of abilities acquired in the household of origin on labor productivity and earnings, access to social networks and even the possibility of "class discrimination" in the labor market.[5] In conclusion, this modified interpretation openly treats "effort" as a non observable variable, which would be captured in term V_i in equation (2).

a. Partial and Total effects of observed circumstances on income inequality

The estimation of parameters a, ß and B through an OLS estimation of equations (1) and (2) allows performing two types of simulations of the distribution of income after equalizing exogenous observed circumstances C. Let W^P denote the simulated income distribution associated with the "Partial Effect" described above, obtained after equalizing all the circumstance variables across individuals in equation (1). Accordingly, the resulting income distribution would reflect individual differences in schooling and in the residue U_i. More formally, the hypothetical distribution W^P would be derived from the simulation of the individual incomes W_i^P using the following equation, and after estimating equation (1) by OLS:

$$Ln(W_i^P) = \hat{\alpha} \cdot \overline{C} + \hat{\beta} \cdot S_i + \hat{U}_i \quad (4)$$

where $\overline{C}$ is the vector of population means of the circumstance variables.

[5] See for example Núñez and Gutiérrez (2004).

An alternative hypothetical wage distribution W^T associated with the "Total effect" of observed circumstances on earnings can be obtained by equalizing all the observed circumstance variables across individuals in equation (3), after estimating equation (1) and (2) by OLS. The income distribution W^T would thus be obtained from:

$$Ln(W_i^T) = (\hat{\alpha} + \hat{\beta} \cdot \hat{B}) \cdot \overline{C} \quad + \hat{\beta} \cdot \hat{V}_i + \hat{U}_i \quad (5)$$

where again $\overline{C}$ stands for the population means of the circumstance variables and the coefficients are obtained from OLS estimations of equations (1) and (2) .

The comparison between the actual (observed) distribution W and distribution W^P reflects the partial effect of observed circumstances on the distribution of income, while the comparison between W and W^T provides the effect of the total effect of observed circumstances on earnings, i.e. including the effect of observed circumstances on the accumulation of schooling. Both measures of income inequality allows distinguishing the part of income inequality associated with the direct influence of observed circumstances on earnings, from the part that comes from the indirect effect of the observed circumstances on the accumulation of schooling.

b. Two additional circumstance-equalizing benchmarks

However, a limitation of the methodology described above is that part of the income inequality obtained after equalizing observed circumstances may still be caused by differences in unobserved circumstances. In particular, it can be argued that unobserved circumstances can explain part of the diversity in schooling that is not associated with observed circumstances, βV_i. In this context, in addition to the circumstance-equalizing propositions of Bourguignon et. al. (2005) described above, namely the partial and total effects, we perform two additional equalizing benchmarks of the effect of circumstances on income distribution to explore the possible role of unobserved circumstances. Following Núñez and Tartakowsky (2009), assume an extreme hypothetical situation

where all schooling acquired by an individual were fully determined by his circumstances of origin, either observed or unobserved. Or to phrase it more simply, assume that there is no role for "effort" or "merit" in the accumulation of schooling. This situation would be equivalent to setting the term $V_i = 0$ (which includes unobserved effort) for all individuals. In this context, schooling would vary across individuals only due to the effect of circumstances, not effort. This is equivalent to simulating individuals' income by replacing C_i by the population mean circumstances $\overline{C}$ and $V_i = 0$ in equation (3), or equivalently, replacing C_i and S_i by $\overline{C}$ and the population mean schooling $\overline{S}$ in equation (1), respectively.[6] More formally, the simulated income distribution after equalizing observed circumstances and schooling, W^{ES}, would be derived from the simulated individual earnings from:

$$Ln(W_i^{ES}) = (\hat{\alpha} + \hat{\beta} \cdot \hat{B}) \cdot \overline{C} \; + \hat{U}_i$$

Hence, in this case the only source of variation in the simulated income distribution would arise from term U_i in equation (1).[7] [8]

The second additional exploratory equalizing benchmark that we carry out arises from the observation that individuals cannot be made responsible for their human capital accumulation in the early years of the life cycle, but they can arguably be made partly responsible for it later in their life cycle, after some age threshold. Let $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i$ denote the simulated schooling of individual I after equalizing observed circumstances in equation (2). In this context, a low level of simulated schooling level $S_i^{'}$, say dropping out of school at an early age, can be interpreted not as lack of "effort", but as the result of unobserved circumstances contained in $\hat{V}_i$. However, after some age threshold, the value of simulated schooling $S_i^{'}$ will presumably reflect a combination of effort and

[6] Note that estimating equation (2) by OLS yields $\overline{K} = B\overline{C}$.
[7] Note however, that term U_i can include the direct effect of unobserved circumstances on earnings.
[8] However, in the earnings regressions we include potential experience as an independent variable, which adds another source of variation in the simulated incomes.

unobserved circumstances. Although it may seem absurd to fix a specific age threshold after which individuals can be made partly responsible for their accumulation of schooling, it must be remembered that this happens *de facto* in other spheres such as penal responsibility, and in the gain of rights such as voting and driving, during the teen years. For simulation purposes, we implement this benchmark by guaranteeing everyone 10 years of schooling (achieved at about age 16), and employ the simulated value of schooling $S_i^{'}$ whenever it is greater than 10. More formally, the simulated income distribution after guaranteeing 10 years of schooling, W_i^{GS}, is derived from:

$$Ln(W_i^{GS}) = \hat{\alpha}\overline{C} + \hat{\beta} S_i^{''} + \hat{U}_i$$

where,

$S_i^{''} = 10$ if $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i \leq 10$, and $S_i^{''} = S_i^{'} = \hat{B}\overline{C} + \hat{V}_i$ if $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i > 10$.

Although this threshold is admittedly arbitrary, we claim that it partly addresses the shortcoming implicit in the indirect effect, namely that infants and young teenagers are assumed to be partly responsible for their schooling achievement.[9]

Finally, let ψ denote an operator that computes an income inequality coefficient from a given income distribution *W*, such as the Gini and Theil coefficients, and top-bottom ratios. Given the differences in the sources of variation in the observed and in the simulated individual incomes under each of the four circumstance-equalizing benchmarks, it can be expected that $\psi(W) > \psi(W^P) > \psi(W^T) > \psi(W^{GS}) > \psi(W^{ES})$.

III. Data

This work employs data from the 2006 National Socio-Economic Characterization Survey (CASEN) in Chile. In this survey, various questions were added to the traditional questionnaire in order to obtain measures of the individuals' circumstances of origin, in addition to the standard core of socio-economic and labor market questions. These

[9] Using alternative age thresholds in the range of 14 to 18 years of age yielded only marginally different results than those reported below for age threshold 16.

include household characteristics during infancy such as household size, if the respondent was raised in a single vs. a bi-parental household, father's and mother's schooling, ethnicity, existence of a birth handicap, municipality of origin, father and mother's participation in the labor market, frequency of father's and mother's employment, as reported by their offspring. Besides, income and urban/rural composition of the respondent's municipality of origin were computed.[10]

The sample of sons and daughters was delimited to ages in the range from 24 to 65 years both in the schooling regressions and earnings regressions in order to avoid possible selectivity problems, as individuals younger than 23 may be in tertiary education and not fully inserted in the labor market, and may not have achieved their long-run level of schooling. Unemployed individuals or those who did not report positive incomes were eliminated, as well as those who did not report sufficient information about the characteristics of their parents. Finally, we considered individuals working between 30 and 72 hours per week.

IV. Results

a. Schooling and earnings regressions

Tables 1 and 2 provide the results of OLS regressions of schooling determinants for men and women, respectively, as in equation (2) of the model.[11] Tables 1 and 2 indicate that various observed circumstances of origin have a significant effect on the accumulation of schooling in both men and women. In particular, parental education has a strong effect on the offspring schooling, up to approximately 6 to 7 extra years for the offspring of university-educated parents vs. parents with incomplete primary schooling. Tables 1 and 2 also indicate that household size, being raised in a single parent household, or in poorer and rural Municipalities decrease schooling. In conclusion, Tables 1 and 2 indicate that a

[10] These variables were obtained from the 1994 CASEN Survey, which is the oldest with an important number of municipalities having a representative sample.
[11] We performed regressions with robust standard errors for both the schooling and earnings regressions, but yielded similar result to the ones reported here.

diverse set of observed circumstances of origin have a significant effect in reproducing inequality through their impacts on the accumulation of human capital in Chile. We employ specification 2 of Tables 1 and 2 to carry out the income simulations associated with the circumstance-equalizing benchmarks described above.

[Insert Tables 1 and 2 about here]

Tables 3 and 4 show the results of OLS wage equations for men and women, including the labor market participation equation for women to address the standard selection bias. All specifications show the standard effects of schooling and potential experience on earnings. In addition, Tables 3 and 4 indicate that parental schooling has a significant effect on earnings, of about 50 to 60 per cent for offspring of university-educated parents, relative to offspring of parents with incomplete primary schooling.[12] In addition, Tables 3 and 4 show that Amerindian ancestry is associated with about 10 to 15 per cent lower wages. Municipality characteristics do not have a robust effect once other circumstance variables are included. We employ specification 3 of Tables 3 and 4 for the simulation of individual incomes based on the four circumstance-equalizing benchmarks described above.

[Insert Tables 3 and 4 about here]

b. Simulated income distribution coefficients

Using the results of specifications 2 in Tables 1 and 2 and of specifications 3 in Tables 3 and 4, we performed the four circumstance-equalizing benchmarks described above in order to compute the simulated income distribution coefficients. Tables 5 to 7 report the

[12] This is consistent with the finding reported by Bravo, Contreras and Medrano (1999), who report statistically significant coefficients of about 0.02 and 0.01 for the father's and the mother's schooling on their sons' earnings, respectively.

results for the Gini coefficient and the top/bottom quintiles ratios, including bootstrap-generated 95 per cent confidence intervals for each inequality measure.[13]

Tables 5-7 report Gini coefficients for the actual (observed) inequality of 0.54, 0.5 for women and 0.53 for men, women and total population, respectively, consistent with the known values for Chile.[14] They also indicates that the Gini coefficient for the younger cohorts is lower, which may be a consequence of earnings profiles being less heterogeneous early in the life cycle.

[Insert Tables 5, 6 and 7 about here]

Tables 5-7 indicate that the Partial Effect associated with a wide and diverse set of observed circumstances explain about 4 and 5 points of the Gini coefficients for men and women, respectively, which represent drops of about 8 to 10 per cent. The Total Effect, in turn, yields a drop of about 7-8 points of the Gini coefficient, about 14-16 percent drop for men and women. These results indicate that part of the observed income inequality in Chile is associated with inequalities in the set of circumstances of origin employed in this work. However, these results also suggest that, after equalizing this wide and diverse set of observed circumstances, a significant amount of income inequality remains, in fact about 85 per cent of it. Another significant feature of the results in Table 1 is that the Partial and the Total effects of observed circumstances yield rather similar changes in income inequality, suggesting that the direct effect of circumstances on earnings and the indirect effect of them on schooling are of a similar order of magnitude in their effect on the income distribution.

Regarding the two additional circumstance-equalizing benchmarks described above, Tables 5 to 7 indicate that guaranteeing 10 years of schooling would yield similar income inequality to the Total effect, a fall of about 7-9 points in the Gini coefficient. Finally, the

[13] Confidence intervals were computed using a bootstrap method. We generated 200 estimates for each inequality coefficient. The reported value of the inequality coefficient is the average of the sampling distribution, and the confidence intervals were built from the values between percentile 2.5 and 97.5 of the distribution.
[14] See for example Ferranti, Perry, Ferreira and Walton (2003).

rather extreme situation of equalizing schooling at complete secondary education for everyone (close to Chile's average schooling of 10.5 years for adults in 23-65 age range) reduces the Gini coefficient in about 11-13 points that is, about a 22-25 per cent fall. Even though this equalizing exercise may seem extreme, it reinforces the idea that still a significant amount of income inequality would persist even under these circumstances.

We report the results also for the Theil coefficient for men and women in Table 8. In this case the Partial and Total Effects explain about 9 and 15 points of the Theil coefficient, respectively, representing falls of about 16 and 26 per cent. Table 8 also report that 10 years of schooling guaranteed yields a drop of about 6 points of the Theil coefficient, equivalent to a 28 per cent fall. Equalizing schooling at complete secondary education reduces the Theil coefficient in about 23 points, implying almost a 40 per cent fall. Hence, as noted in other studies, the influence of observed circumstances seems to have a larger relative effect on the Theil coefficient than on the Gini coefficient.

[Insert Tables 8 about here]

It is interesting to note that the results reported in Tables 5-8 are similar to the results obtained by Bourguignon et. al. (2005) for Brazil, who employ parental schooling and race as circumstances of origin. In their study, the Partial and Total effects for adult men and women are approximately 5 and 10 points of the Gini coefficient, which amount to falls of about 9 and 18 per cent. In addition, the results of Table 5 (for men) are also similar to the results in Núñez and Tartakowsky (2007) study conducted only on adult men in Greater Santiago, Chile's capital city. In that study, which also employs parental schooling and household size and composition as circumstances of origin, the Partial and Total effects are 7 and 8 points of the Gini coefficient, respectively. These comparisons suggest that the larger set of circumstance variables employed here do not seem to yield higher orders of magnitude of the Partial and Total effects.

In order to explore this issue further, Table 9 presents the effects on income inequality of equalizing parental education only vs. equalizing all observed circumstances, including

ethnicity, income and urban-rural composition of the respondents' municipality of origin, size and composition (mono-parental vs. bi-parental) of the household of origin, parental employment features, all in addition to parental education. The purpose of this exercise is to compare the effects of equalizing a larger and more diverse set of circumstances of origin with those of equalizing parental education only, as if all the circumstances other that parental education remained "unobserved". This exercise informs us about the marginal effect on income distribution of equalizing all the circumstances other than parental education, once this latter dimension has been already equalized.

Columns 2 and 4 of Table 9 presents the effects on income inequality of equalizing all circumstances for men and women, respectively, as in column 5 of Tables 5 and 6. Columns 3 and 5 of Table 9, in turn, report the results of equalizing parental education only for men and women, respectively.

[Insert Table 9 about here]

Table 9 shows that, as expected, the simulated inequality derived from equalizing parental education only is indeed higher that equalizing all the circumstance variables (including parental education) for all four circumstance-equalizing benchmarks. This indicates that all circumstances other than parental education contribute to income inequality, in addition to the effect associated with parental education, pattern that is observed for both men and women. Yet, the additional effect on the simulated income inequality associated with the circumstances other than parental schooling is small, about half a point of the Gini coefficient for the total effect, which represents a small fraction of what equalizing parental education achieves on its own. Moreover, note that the values of the simulated inequality indicators derived from equalizing parental education only always falls within the confidence interval of the inequality coefficients obtained from equalizing all observed circumstances. This indicates that the differences of the simulated inequality values for all four equalizing benchmarks are low and statistically similar.

These results reinforce the idea that the effect of unobserved circumstances on inequality may be limited. Indeed, the evidence in Table 9 suggests that, adding to parental education a larger and more diverse set of circumstances such as the ones considered here ("as if" they were initially unobserved), adds little in explaining income inequality. Of course, it is certainly possible that other key circumstances may not be included in this set of circumstances, but considering the relevance and diversity of these circumstances, these results are nevertheless suggestive.[15]

The idea that unobserved circumstances have a limited role in shaping income inequality is coherent with evidence in the related literature. For example, Behrman and Rosenzweig (2004) suggest that the influence of unobserved circumstances (fixed family background) on the offspring's performance is indeed important, indicating that a part of the income inequality obtained after equalizing observed circumstances may indeed be associated with unobserved circumstances. However, in an earlier related study, Behrman and Rosenzweig (2002) also suggest that maternal schooling seems to proxy some important unobserved factors associated with family background. This evidence, consistent with the evidence in Table 9, would suggest that the observed circumstances employed in this work are likely to capture the effect of important unobserved circumstances associated with family background. In fact, Núñez and Tartakowsky (2007) employ data for Greater Santiago to show that parental schooling is highly associated with other circumstances of origin, namely parents' involvement in their offspring´s progress at school, attendance to a private vs. a public school, access to sanitation during infancy, parent's reading and writing skills, growing in an urban vs. a rural environment, parents' ethnicity (amerindian vs. non-amerindian), and access to pre-school education during infancy. This reinforces the idea that parental schooling and possibly the other circumstances of origin employed in this work are likely to capture the effects of a variety of relevant unobserved circumstances of origin than may have an

[15] This result also suggests a promising perspective for studying "equality of opportunities" and the influence of circumstances of origin on observed inequality from a comparative perspective employing a restricted set of common circumstances that includes parental education as an essential single one.

impact on income distribution, at least many of those that can be affected by public action.

V. Conclusions

This paper has examined the extent to which income inequality is associated to inequalities in a large and diverse set of observed circumstances of origin, including parental schooling, ethnic background, household size and composition (single vs. a bi-parental), parental occupations, income and urban/rural composition of the Municipality of origin. We find that after equalizing individual circumstances to the mean values of the population, the resulting standard income distribution indicators become more egalitarian, indicating that a part of income inequality does indeed reflect inequalities of circumstances of origin. Yet, a large amount of income inequality is not associated with inequality in these observed circumstances. In particular, after equalizing observed circumstances, the Gini coefficient decreases in about 7-8 percentage points, representing approximately a fall of 15 per cent. About half of this variation is associated with the direct effect of observed circumstances of origin on earnings, while the remaining part is associated with its indirect effect on earnings through the accumulation of schooling. These results are similar to those obtained by Bourguignon et al (2005) for Brazil and Núñez and Tartakowsky (2007) in Chile, despite the wider the set of observed circumstances employed here.

This paper also finds that a significant amount of income inequality persists even after equalizing individuals' schooling to the population mean, to reflect an hypothetical extreme situation where all schooling is tacitly assumed to depend on circumstances-either observed or unobserved. Likewise, guaranteeing all individuals 10 years of schooling to account for adverse unobserved circumstances of those who achieve less than 10 years of schooling, yield similar results to the total effect. Further on the influence of unobserved circumstances on inequality, we find that adding a large set of circumstances to parental schooling adds little to the effect on income inequality that

parental schooling achieves on its own. These results jointly suggest a limited influence of unobserved circumstances on income distribution.

These results suggest that, as long as the exercise of equalizing observed circumstances is an accepted approximation of the notion of "equality of opportunities", then income inequality indicators may not necessarily reflect adequately a country's degree of equality of opportunities, as income inequality may be also reflecting aspects such as individual "effort", preferences, choices, sheer luck and possibly transitory shocks in income and income measurement errors. This, in turn, suggests implications for public policy, depending on the preferred moral standpoint in the equality-of-outcomes vs. equality-of-opportunities debate: Promoting equality of outcomes would require more than trying to equalize circumstances and "opportunities" across individuals, and in consequence additional redistributive policies are likely to be needed. On the other hand, advocates of equality of opportunities must be ready to accept that promoting equal opportunities is likely to yield a significant amount of income inequality. However, a challenging agenda remains ahead to distinguish more precisely the roles of unobserved circumstances and the consequences of individual choices and preferences, as well as other sources of variation in measured incomes.

VI. References

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Table 1. Schooling Determinants; Men[1)]		
Variable	**Specifications[2)]**	
	1	**2[3)]**
Personal characteristics		
Age	-0.0551***	-0.0544***
	[0.0030]	[0.0030]
Birth handicap = 1 dummy	-1.0665***	-1.2412***
	[0.3639]	[0.3496]
Amerindian ethnic group=1 dummy	-0.6554***	-0.6337***
	[0.1706]	[0.1696]
Parental schooling		
father's primary education = 1 dummy	1.1927***	1.1560***
	[0.1260]	[0.1249]
father's secondary schooling =1 dummy	2.5465***	2.5443***
	[0.1408]	[0.1397]
father's technical education=1 dummy	4.1030***	4.0781***
	[0.1884]	[0.1874]
father's university education=1 dummy	4.8102***	4.8245***
	[0.1801]	[0.1788]
mother's primary education=1 dummy	0.8596***	0.8778***
	[0.1212]	[0.1203]
mother's secondary education = 1 dummy	1.9119***	1.9330*
	[0.1382]	[0.1374]
mother's technical education = 1 dummy	1.8882***	1.9410***
	[0.2154]	[0.2135]
mother's university education = 1 dummy	2.0429***	2.0634***
	[0.1855]	[0.1839]
Childhood household attributes		
Household size	-0.1244***	-0.1218***
	[0.0108]	[0.0107]
Biparental household = 1 dummy	0.6122***	0.6333***
	[0.0899]	[0.0860]
Father employer dummy	0.1219	
	[0.1483]	
Mother employer = 1 dummy	1.1680***	1.2447***
	[0.2572]	[0.2365]
Childhood household location characteristics		
Income of municipality of origin	0.0000***	
	[0.0000]	
Rural population in municipality of origin	-1.6350***	-1.6118***
	[0.1642]	[0.1619]
Constant	11.4796***	11.4108***
	[0.1851]	[0.1814]
Sample size	10.737	10.988
R-squared	0,3743	0,3746
Adjusted R-squared	0,3733	0,3737

1) Dependent variable is years of schooling.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 2. Schooling Determinants; Women[1)]		
Variable	**Specifications [2)]**	
	1	**2[3)]**
Personal charasteristics		
Age	-0.0782***	-0.0780***
	[0.0026]	[0.0025]
Birth handicap = 1 dummy	-1.3973***	-1.3746***
	[0.2268]	[0.2204]
Amerindian ethnic group=1 dummy	-0.3775***	-0.3547**
	[0.1447]	[0.1424]
Parental schooling		
father's primary education = 1 dummy	0.6966***	0.7109***
	[0.0988]	[0.0968]
father's secondary schooling =1 dummy	1.8407***	1.8726***
	[0.1123]	[0.1099]
father's technical education=1 dummy	2.7614***	2.7864***
	[0.1557]	[0.1536]
father's university education=1 dummy	3.2474***	3.3033***
	[0.1462]	[0.1437]
mother's primary education=1 dummy	1.1225***	1.1259***
	[0.0966]	[0.0946]
mother's secondary education = 1 dummy	2.3641***	2.3450***
	[0.1118]	[0.1095]
mother's technical education = 1 dummy	2.5997***	2.6091***
	[0.1776]	[0.1749]
mother's university education = 1 dummy	3.0483***	3.0465***
	[0.1556]	[0.1530]
Childhood household attributes		
Household size	-0.1114***	-0.1111***
	[0.0090]	[0.0089]
Biparental household = 1 dummy	0.9123***	0.9458***
	[0.0766]	[0.0731]
Father employer dummy	-0.0652	
	[0.1229]	
Mother employer = 1 dummy	0.9167***	0.7660***
	[0.2235]	[0.2104]
Childhood household location characteristics		
Income of municipality of origin	0.0000***	
	[0.0000]	
Rural population in municipality of origin	-1.1733***	-1.2006***
	[0.1375]	[0.1351]
Constant	11.7688***	11.7163***
	[0.1549]	[0.1509]
Sample size	14.27	14.653
R-squared	0,3588	0,3611
Adjusted R-squared	0,3580	0,3604

1) Dependent variable is years of schooling.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 3. Wage Equations; Men[1)]			
Variable	**Specifications[2)]**		
	1	**2**	**3[3)]**
Schooling return			
Primary education	0.0391***	0.0396***	0.0422***
	[0.0080]	[0.0080]	[0.0039]
Secondary education	0.0390***	0.0403***	0.0486***
	[0.0120]	[0.0120]	[0.0060]
Tertiary education	0.1148***	0.1166***	0.1001***
	[0.0087]	[0.0087]	[0.0048]
Experience variables			
Potential experience	0.0339***	0.0344***	0.0311***
	[0.0028]	[0.0028]	[0.0015]
Potential experience - squared	-0.0004***	-0.0004***	-0.0003***
	[0.0001]	[0.0001]	[0.0000]
Personal charasteristics			
Birth handicap = 1 dummy	-0.1633*	-0.1694*	-0.2468***
	[0.0935]	[0.0937]	[0.0477]
Amerindian ethnic group=1 dummy	-0.1005**	-0.1066***	-0.1441***
	[0.0403]	[0.0403]	[0.0186]
Parental schooling			
father's primary education = 1 dummy	0.0122		0.0341**
	[0.0305]		[0.0159]
father's secondary schooling = 1 dummy	0.0052		0.0901***
	[0.0341]		[0.0188]
father's technical education=1 dummy	0.073		0.1549***
	[0.0459]		[0.0275]
father's university education=1 dummy	0.2792***	0.2778***	0.3711***
	[0.0445]	[0.0323]	[0.0262]
mother's primary education=1 dummy	-0.01		0.0479***
	[0.0291]		[0.0153]
mother's secondary education = 1 dummy	0.1896***	0.2059***	0.1916***
	[0.0331]	[0.0187]	[0.0187]
mother's technical education = 1 dummy	0.2010***	0.2362***	0.2417***
	[0.0509]	[0.0418]	[0.0309]
mother's university education = 1 dummy	0.1506***	0.1808***	0.2236***
	[0.0442]	[0.0362]	[0.0265]
Childhood household attributes			
Household size	-0.004		-0.0060***
	[0.0027]		[0.0015]
Biparental household = 1 dummy	0.0779***	0.0724***	0.0484***
	[0.0218]	[0.0211]	[0.0127]
Father employer dummy	0.1113***	0.1194***	0.0989***
	[0.0354]	[0.0355]	[0.0203]
Mother employer = 1 dummy	0.2092***	0.2101***	0.2533***
	[0.0618]	[0.0618]	[0.0363]
Childhood household location characteristics			
Income of municipality of origin	0.0000***		
	[0.0000]		
Rural population in municipality of origin	-0.0891**	-0.1724***	
	[0.0398]	[0.0381]	
Constant	5.8547***	5.8885***	5.779***
	[0.0666]	[0.0650]	[0.0339]
Sample size	8452	8452	24.891
R-squared	0.4293	0.4255	0,4312
Adjusted R-squared	0.4279	0.4245	0,4308

1) Dependent variable is log of hourly wage rate.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level;
****=significant at the 5% prob. level; ***=significant at the 1% prob.level**
3) Specification used in simulations

Table 4.1 Wage Equations; Women[1)]			
Variable	**Specifications [2)]**		
	1	**2**	**3[3)]**
Schooling return			
Primary education	0.0863***	0.0863***	0.0647***
	[0.0277]	[0.0272]	[0.0128]
Secondary education	-0.0156	-0.0047	0.0261
	[0.0356]	[0.0356]	[0.0179]
Tertiary education	0.1421***	0.1394***	0.1053***
	[0.0188]	[0.0188]	[0.0113]
Experience variables			
Potential experience	0.0254***	0.0232***	0.0228***
	[0.0062]	[0.0061]	[0.0037]
Potential experience - squared	-0.0003**	-0.0003**	-0.0003***
	[0.0001]	[0.0001]	[0.0001]
Personal charasteristics			
Birth handicap = 1 dummy	-0.2073**	-0.1883**	-0.1789***
	[0.0848]	[0.0827]	[0.0591]
Amerindian ethnic group=1 dummy	-0.1561***	-0.1799***	-0.1222***
	[0.0607]	[0.0620]	[0.0322]
Parental schooling			
father's primary education = 1 dummy	0.0145		0.0492**
	[0.0525]		[0.0242]
father's secondary schooling = 1 dummy	0.0682		0.1050***
	[0.0672]		[0.0347]
father's technical education=1 dummy	0.0706		0.1563***
	[0.0837]		[0.0533]
father's university education=1 dummy	0.2070***	0.1770***	0.3051***
	[0.0811]	[0.0568]	[0.0534]
mother's primary education=1 dummy	0.02		
	[0.0542]		
mother's secondary education = 1 dummy	0.1354***		0.1353***
	[0.0697]		[0.0316]
mother's technical education = 1 dummy	0.0616		0.0746
	[0.0904]		[0.0533]
mother's university education = 1 dummy	0.275	0.1940***	0.2895***
	[0.0961]	[0.0736]	[0.0603]
Childhood household attributes			
Household size	0.0005		
	[0.0053]		
Biparental household = 1 dummy	-0.0101		
	[0.0446]		
Father employer dummy	0.2060***	0.2353***	0.1975***
	[0.0661]	[0.0656]	[0.0439]
Mother employer = 1 dummy	0.0889		
	[0.1221]		
Childhood household location characteristics			
Income of municipality of origin	0.0000***		
	[0.0000]		
Rural population in municipality of origin	-0.1333*	-0.1769***	
	[0.0688]	[0.0664]	
Constant	5.1827***	5.2504	5.3409***
	[0.2541]	[0.2639]	[0.1187]

1) Dependent variable is log of hourly wage rate.
2) Heckman selection model estimates. Robust standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 4.2 Selection Equation; Women[1)]			
Variable	**Specifications [2)]**		
	1	**2**	**3[3)]**
Age	0.1345***	0.1344***	0.1157***
	[0.0047]	[0.0047]	[0.0033]
Age - squared	0.1421***	0.1413***	0.1414***
	[0.0119]	[0.0118]	[0.0087]
Schooling	-0.0017***	-0.0016***	-0.0017***
	[0.0001]	[0.0001]	[0.0001]
Birth handicap = 1 dummy	-0.3435***	-0.3441***	-0.4040***
	[0.1235]	[0.1235]	[0.0996]
Number of children	-0.0982***	-0.0989***	-0.1140***
	[0.0144]	[0.0143]	[0.0109]
Lives with partner = 1	-0.5950***	-0.5934***	-0.6891***
	[0.0315]	[0.0315]	[0.0244]
Mother employer =1 dummy	0.2723**	0.2629**	0.2054**
	[0.1149]	[0.1141]	[0.0961]
Constant	-4.5127***	-4.4928***	-3.6125**
	[0.2554]	[0.2545]	[0.1824]
Censored observations	33.741	33.741	33.741
Uncensored observations	4.798	4.805	12.988
Wald chi2	741,14	671,16	1972,29
Prob > chi2	0,0000	0,0000	0,0000
Rho	0,2476	0,2513	0,2439
	[0.1074]	[0.1128]	[0.0707]
Likelihood ratio test (rho=0) chi2(1)	4,88	4,55	10,95
Prob > chi2	0,0272	0,0329	0,0009

1) Dependent variable is log of hourly wage rate.

2) Heckman selection model estimates. Robust standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**

3) Specification used in simulations

Table 5. Effects of Equalizing Circumstances on Labor Income Inequality, Men
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.481 [0.474 - 0.488]	0.511 [0.503 - 0.518]	0.608 [0.601 - 0.615]	0.535 [0.527 - 0.543]
Simulated Models				
Partial Effect (W^P)	0.436 [0.429 - 0.442]	0.47 [0.463 - 0.477]	0.557 [0.550 - 0.563]	0.491 [0.483 - 0.499]
Total Effect (W^T)	0.395 [0.389 - 0.401]	0.441 [0.433 - 0.451]	0.503 [0.496 - 0.511]	0.455 [0.447 - 0.464]
10 Years of Schooling Guaranteed (W^{SG})	0.389 [0.384 - 0.395]	0.434 [0.426 - 0.443]	0.487 [0.479 - 0.495]	0.447 [0.439 - 0.456]
Equalized Schooling (W^{ES})	0.353 [0.347 - 0.358]	0.396 [0.388 - 0.403]	0.436 [0.429 - 0.442]	0.406 [0.399 - 0.414]

Q5/Q1 Quintile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	9.872 [9.563 - 10.224]	12.507 [12.089 - 12.907]	19.789 [18.949 - 20.467]	13.314 [12.859 - 13.767]
Simulated Models				
Partial Effect (W^P)	8.196 [7.955 - 8.421]	10.121 [9.825 - 10.437]	15.198 [14.665 - 15.668]	10.834 [10.473 - 11.200]
Total Effect (W^T)	7.267 [7.085 - 7.435]	8.933 [8.637 - 9.280]	11.909 [11.543 - 12.329]	9.471 [9.182 - 9.807]
10 Years of Schooling Guaranteed (W^{SG})	7.043 [6.867 - 7.213]	8.519 [8.231 - 8.861]	10.886 [10.547 - 11.273]	9.040 [8.743 - 9.341]
Equalized Schooling (W^{ES})	5.989 [5.824 - 6.136]	7.053 [6.835 - 7.284]	8.636 [8.367 - 8.870]	7.465 [7.258 - 7.702]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping.

Table 6. Effects of Equalizing Circumstances on Labor Income Inequality, Women
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	Age= 23-36	Age=37-50	Age=51-65	Age=23-65
Total Inequality *(W)*	0.435 [0.429 - 0.441]	0.526 [0.516 - 0.536]	0.547 [0.537 - 0.557]	0.502 [0.494 - 0.511]
Simulated Models				
Partial Effect (W^P)	0.395 [0.389 - 0.400]	0.486 [0.477 - 0.495]	0.517 [0.507 - 0.529]	0.466 [0.457 - 0.475]
Total Effect (W^I)	0.362 [0.355 - 0.369]	0.442 [0.433 - 0.453]	0.488 [0.475 - 0.503]	0.434 [0.424 - 0.445]
10 Years of Schooling Guaranteed (W^{SG})	0.356 [0.349 - 0.363]	0.436 [0.426 - 0.446]	0.470 [0.455 - 0.489]	0.428 [0.416 - 0.439]
Equalized Schooling (W^{ES})	0.317 [0.308 - 0.324]	0.401 [0.391 - 0.409]	0.456 [0.433 - 0.481]	0.397 [0.384 - 0.411]

Q5/Q1 Quintile Ratio	Age= 23-36	Age=37-50	Age=51-65	Age=23-65
Total Inequality *(W)*	8.815 [8.382 - 9.166]	12.666 [12.140 - 13.272]	15.766 [15.053 - 16.612]	11.746 [11.363 - 12.187]
Simulated Models				
Partial Effect (W^P)	7.122 [6.932 - 7.325]	10.590 [10.187 - 11.070]	13.854 [13.213 - 14.601]	9.834 [9.495 - 10.214]
Total Effect (W^I)	6.133 [5.934 - 6.342]	8.959 [8.564 - 9.327]	12.086 [11.421 - 12.901]	8.587 [8.191 - 8.978]
10 Years of Schooling Guaranteed (W^{SG})	5.943 [5.763 - 6.136]	8.606 [8.227 - 8.960]	10.874 [10.165 - 11.619]	8.258 [7.884 - 8.644]
Equalized Schooling (W^{ES})	4.899 [4.734 - 5.073]	7.206 [6.956 - 7.455]	9.642 [8.774 - 10.508]	7.012 [6.686 - 7.403]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping.

Table 7. Effects of Equalizing Circumstances on Labor Income Inequality, Men and Women
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.468 [0.463 - 0.473]	0.522 [0.517 - 0.527]	0.599 [0.593 - 0.605]	0.529 [0.523 - 0.536]
Simulated Models				
Partial Effect (W^{P})	0.425 [0.420 - 0.430]	0.483 [0.478 - 0.488]	0.553 [0.547 - 0.559]	0.489 [0.483 - 0.496]
Total Effect (W^{I})	0.391 [0.387 - 0.395]	0.451 [0.445 - 0.458]	0.505 [0.498 - 0.512]	0.457 [0.450 - 0.464]
10 Years of Schooling Guaranteed (W^{SG})	0.386 [0.382 - 0.390]	0.444 [0.438 - 0.451]	0.488 [0.481 - 0.496]	0.450 [0.443 - 0.457]
Equalized Schooling (W^{ES})	0.346 [0.342 - 0.351]	0.404 [0.399 - 0.410]	0.446 [0.439 - 0.445]	0.410 [0.404 - 0.416]

Q5/Q1 Quintile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	9.647 [9.396 - 9.858]	13.066 [12.781 - 13.340]	18.999 [18.484 - 19.554]	13.411 [12.950 - 13.822]
Simulated Models				
Partial Effect (W^{P})	7.961 [7.762 - 8.138]	10.792 [10.540 - 11.061]	15.522 [15.087 - 15.935]	10.896 [10.634 - 11.190]
Total Effect (W^{I})	7.042 [6.903 - 7.180]	9.422 [9.187 - 9.704]	12.411 [12.042 - 12.798]	9.576 [9.324 - 9.880]
10 Years of Schooling Guaranteed (W^{SG})	6.846 [6.716 - 6.976]	8.964 [8.740 - 9.238]	11.248 [10.890 - 11-617]	9.176 [8.920 - 9.470]
Equalized Schooling (W^{ES})	5.697 [5.568 - 5.801]	7.374 [7.203 - 7.553]	9.182 [8.890 - 9.485]	7.581 [7.404 - 7.785]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping

Table 8. Effects of Equalizing Circumstances on Labor Income Inequality, Men and Women
Theil Index, and Top-Bottom Decile Ratio[1)]

Theil Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.417 [0.402 - 0.432]	0.543 [0.523 - 0.567]	0.749 [0.720 - 0.776]	0.574 [0.550 - 0.601]
Simulated Models				
Partial Effect (W^P)	0.344 [0.330 - 0.357]	0.454 [0.437 - 0.478]	0.617 [0.597 - 0.639]	0.481 [0.460 - 0.503]
Total Effect (W^I)	0.287 [0.278 - 0.296]	0.397 [0.375 - 0.426]	0.531 [0.507 - 0.558]	0.423 [0.400 - 0.449]
10 Years of Schooling Guaranteed (W^{SG})	0.280 [0.271 - 0.289]	0.388 [0.366 - 0.416]	0.504 [0.478 -0.534]	0.414 [0.390 - 0.440]
Equalized Schooling (W^{ES})	0.227 [0.218 - 0.236]	0.327 [0.312 - 0.343]	0.425 [0.397 - 0.460]	0.348 [0.38 - 0.373]

D10/D1 Decile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	16.808 [16.219 - 17.359]	23.833 [22.793 - 24.607]	39.400 [37.696 - 41.056]	24.332 [23.433 - 25.603]
Simulated Models				
Partial Effect (W^P)	13.490 [13.041 - 13.902]	19.006 [18.470 - 19.580]	30.652 [29.490 - 31.811]	19.735 [19.104 - 20.431]
Total Effect (W^I)	12.163 [11.782 - 12.565]	16.885 [16.227 - 17.350]	24.702 [23.699 - 25.708]	17.657 [17.059 - 18.440]
10 Years of Schooling Guaranteed (W^{SG})	11.839 [11.517 - 12.143]	16.130 [15.578 - 16.795]	22.090 [21.152 - 23.013]	16.947 [16.356 - 17.680]
Equalized Schooling (W^{ES})	9.724 [9.436 - 9.951]	13.126 [12.734 - 13.546]	17.978 [17.197 - 18.737]	13.821 [13.348 - 14.339]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping

Effects on Income Inequality of Equalizing Parental Education only vs. equalizing all Circumstances
Gini and Top-bottom quintile Ratios[1)]

	Men, ages 23-65		Women, ages 23-65	
A. Gini Coefficient	**Employing All Circumstances**	**Employing only Parental Education**	**Employing All Circumstances**	**Employing only Parental Education**
Observed Inequality	0,535 [0.527 - 0.543]		0,502 [0.494 - 0.511]	
Simulated Models				
Partial Effect	0,491 [0.483 - 0.499]	0,494	0,466 [0.457 - 0.475]	0,468
Total Effect	0,455 [0.447 - 0.464]	0,459	0,434 [0.424 - 0.445]	0,441
10 years schooling guaranteed	0,447 [0.439 - 0.456]	0,450	0,428 [0.416 - 0.439]	0,434
Equalized Schooling	0,406 [0.399 - 0.414]	0,408	0,397 [0.384 - 0.411]	0,401

	Men, ages 23-65		Women, ages 23-65	
B. Q5/Q1 Ratios	**Employing All Circumstances**	**Employing only Parental Education**	**Employing All Circumstances**	**Employing only Parental Education**
Observed Inequality	13,314 [12.859 - 13.767]		11,746 [11.363 - 12.187]	
Simulated Models				
Partial Effect	10,834 [10.473 - 11.200]	10,970	9,834 [9.495 - 10.214]	9,901
Total Effect	9,471 [9.182 - 9.807]	9,644	8,587 [8.191 - 8.978]	8,871
10 years schooling guaranteed	9,040 [8.743 - 9.341]	9,134	8,258 [7.884 - 8.644]	8,474
Equalized Schooling	7,465 [7.258 - 7.702]	7,507	7,012 [6.686 - 7.403]	7,118

SERIE DOCUMENTOS DE TRABAJO

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THE RELATIONSHIP BETWEEN INEQUALITY OF OUTCOMES AND INEQUALITY OF OPPORTUNITIES IN A HIGH-INEQUALITY COUNTRY: THE CASE OF CHILE

Autores: Javier Núñez y
Andrea Tartakowsky

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The relationship between Inequality of Outcomes and Inequality of Opportunities in a high-inequality country: The case of Chile[1]

Javier Núñez Andrea Tartakowsky

Abstract

Based on the methodology developed by Bourguignon, Melendez and Ferreira (2005) we explore the extent to which income inequality in Chile is associated with inequality of observed exogenous circumstances of origin, which shape individuals "opportunities" to pursue their chosen life plans. We find that equalizing a diverse set of observed circumstances of origin across individuals such as parents' schooling and employment, household size and composition, ethnic background and features of the municipality of origin reduces the Gini coefficient in about 7-8 percentage points. About half of this effect is transmitted directly on earnings, while the remaining part through its indirect effect on the accumulation of schooling. Further results suggest that the influence of unobserved circumstances on income distribution may be limited, and hence aspects such as preferences, effort, luck, income shocks and income measurement errors may also be important factors behind income inequality, issue that awaits further research.

JEL classification:

D31, D63

Keywords:

Income Inequality, Equality of Opportunities.

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I. Introduction

An old normative debate has existed around the question of what kind of economic inequality should public policies aim to reduce. While many authors have leaned towards dealing with the inequality of "outcomes" (i.e. income inequality), other traditions have instead proposed that public policies should promote "equality of opportunities" across individuals.[2] This debate has benefited from various conceptual and philosophical contributions, yet limited insights have been gained from empirical perspectives. Building upon the methodology developed by Bourguignon, Melendez and Ferreira (2005), this paper aims to contribute to this debate by empirically examining the extent to which observed income inequality is associated with the inequality of circumstances of origin that shape individuals´ opportunities.

The idea of equality of opportunities rests on the notion that individuals should be entitled to similar opportunities to pursue their desired life plans, which in turn requires that those opportunities not be determined by circumstances of origin that individuals inherit without their consent, such as, for example, parental and family background. Equal opportunities advocates have argued that differences in economic outcomes (i.e. income inequality) partly reflect differences in dimensions controlled by individuals, such as effort, responsibility, choices and so on. Accordingly, public policies should aim to equalize the exogenous circumstances that shape individuals' opportunities that constrain their choices, and then accept the resulting level of income inequality that would emerge from individuals' choices and preferences. With variations, this has somewhat become the dominant view of the notion of equity that deserves legitimate public action, as suggested, for example, by The World Banks' 2005 Report on Equity and Development:

[2] See for example Roemer (1996), (1998) and (2000) and Dworking (1981) for descriptions of the notions of equality of opportunities and of outcomes. Also, Amartya Sen's Capability approach has a resemblance with the notion of equality of opportunities, as described for example in Sen (1999) and Nussbaum and Sen (2000). See Roemer (1996) for a discussion of the main theories of distributive justice. See also Alessina, Di Tella and MacCulloch (2004) for a discussion on different attitudes between Europeans and Americans towards different notions of equality.

"By equity we mean that individuals should have equal opportunities to pursue a life of their choosing and be spared from extreme deprivation in outcomes", (p. 2)[3]

Yet, little is known about the extent to which income inequality reflects individual choices and preferences vs. the exogenous circumstances that individuals inherit. Empirical investigation of the relationship between "opportunities" and "outcomes" is relevant for various reasons. First, the practical implications of the philosophical distinction between "opportunities" and "outcomes" would be less significant if both were empirically associated. This would reinforce the interpretation of income distribution indicators as good measures of both equality of outcomes and equality of opportunities. This scenario would also suggest a more significant role for the individual circumstances of origin versus individual choices and preferences, as a means of jointly promoting equality of outcomes and of opportunities in the long run. If, on the contrary, exogenous circumstances empirically played a limited role in shaping income inequality, then this would have different implications depending on the chosen normative standpoint: advocates of equality of opportunities should expect and accept that a significant amount of income inequality would remain upon equalizing opportunities. Advocates of equality of outcomes, in turn, should realize that achieving this aim would require more than policies intended to equalize opportunities and circumstances, and that some additional, purely redistributive policies would be needed.

For this task we follow Bourguignon et al (2005) pioneering work, which attempts to establish the effect of circumstances of origin vs. individual "effort" in the determination of income inequality in Brazil.[4] In their work, a double role is played by circumstances:

[3] On page 3 of the overview this view is reinforced in these passages: "Three considerations are important at the outset. First, while more even playing fields are likely to lead to lower observed inequalities in educational attainment, health status and incomes, the policy aim is not equality in outcomes"…." Second a concern with equality of opportunities implies that public action should focus on the distributions of assets, economic opportunities, and political voice, rather than directly on inequality in incomes. "

[4] Behrman (2006) and Ruiz Tagle (2007) also examine the role of schooling on income inequality, although employing a framework different to that developed by Bourguignon et. al., which allows establishing and separating the direct and indirect effects of observed circumstances on income inequality. However, their results are similar to the results found in this work, in the sense that both studies suggest a limited role of schooling in reducing income inequality.

they have a direct impact on earnings, and an indirect effect on "effort", that they take to be the schooling level. They define the former effect as the "partial effect" of observed circumstances on earnings, and the "total effect" to be the joint effect of the direct and indirect effects of observed circumstances on earnings. Our work differs from theirs in three respects. First, we employ a larger and diverse set of circumstances of origin, which includes parental education and employment characteristics, ethnic background, household size and composition, and features of the municipality of origin, among others. Second, our aim is more modest in the sense that we do not address the (more complex) issue of the effects of "effort on income distribution, but simply attempt to establish the effects of observed circumstances on earnings. Accordingly, we refer to the indirect effect simply as the effect of observed circumstances on the level of schooling (not effort), and also interpret the unexplained part of the income distribution simply as an unknown combination of unobserved circumstances, individual effort, sheer luck and possibly income measurement errors. Finally, we provide some circumstance-equalizing benchmarks in addition to the "partial" and "total" effects outlined above, in order to shed some light on the possible effects of unobserved circumstances on the income distribution. One benchmark consists of an extreme situation where everyone's schooling levels only reflect individuals circumstances- either observed or unobserved-, such that individual "merit" and "effort" play no role in the determination of schooling, which amounts to simply computing the income distribution after equalizing schooling levels across individuals. The second equalizing benchmark consists of guaranteeing everyone a minimum of 10 years of schooling (completed at about age 16) and employ the simulated level of schooling otherwise, to reflect the idea that a simulated value of schooling lower than 10 would almost certainly reflect unobserved circumstances. In addition, we perform other exercises to examine further the role of unobserved circumstances.

The paper is structured as follows: The next section presents the basic model and the empirical identification strategy of the four observed circumstances-equalizing benchmarks. The third section describes the data and the set of circumstances employed. The fourth section presents and discusses the results in comparative perspective, and discusses the role of unobserved circumstances, and finally section five concludes.

II. The model

Following Bourguignon et al (2005) and the adaptations in Núñez and Tartakowsky (2007), it is possible to distinguish two different kinds of determinants of individual earnings: those that result from actions that people take along their lives, which allow them to expand their productivity, and those that obey to circumstances out of people's control. Bourguignon et al (2005) refer to the first set of determinants as "effort variables" and the second as "circumstances". The relationship between incomes, efforts and circumstances is described as $W_i = f(C_i, E_i)$, where circumstances C typically includes a series of variables of the individuals' socioeconomic origin and effort E reflects human capital variables.

In order to estimate the model empirically, this relationship can be expressed as a linearized model, as follows:

$$Ln(W_i) = \alpha \cdot C_i + \beta \cdot E_i + U_i \qquad (1)$$

where a and ß are coefficient vectors and $U_{i,}$ is the residual that includes the unobserved circumstance and effort variables, measurement error and variations of the individuals' measured income from their corresponding permanent income level. All these factors are supposed to be independent from the included variables in C_i and E_i, to have zero mean and to be identically and independently distributed across individuals.

However, this formulation is restrictive and debatable, as it assumes additive separability between circumstances and efforts. For example, it seems reasonable to expect that an individual's circumstances during his childhood and the characteristics of his household and his parents' human capital must have had an influence on his own human capital accumulation and "effort". Accordingly, Bourguignon et al (2005) propose "effort" to be partly a function of circumstances:

$$E_i = B \cdot C_i + V_i \qquad (2)$$

where B is a coefficient matrix and V_i represents a non-observable effort determinant vector. As usual, V_i it is supposed to have mean zero and to be i.i.d. across individuals.

Introducing equation (2) in (1) yields,

$$Ln(W_i) = (\alpha + \beta \cdot B) \cdot C_i + \beta \cdot V_i + U_i \qquad (3)$$

The formulation in (3) is more general than model (1) since it allows the circumstance variables to affect people's incomes directly, as well as indirectly through its effects on the effort variables. In particular, in model (1) the marginal effect of circumstances on earnings amounts only to a. Bourguignon et al (2005) call this effect the "Partial Effect" of observed circumstances on earnings. On the other hand, in model (3) the effect of observed circumstances on earnings is $\alpha + \beta \cdot B$. This corresponds to the "Total Effect" of observed circumstances on earnings. Note that this effect includes the partial effect of circumstances on earnings, a, but also de indirect effect of circumstances on earnings through "effort", ßB. The total effect of observed circumstances on earnings is larger than the partial effect if ßB>0, as expected.

In practice, Bourguignon et al (2005) employ schooling as their measure of "effort" E_i. However, as discussed in the introduction we believe it is both controversial and misleading to refer to schooling as an "effort" variable, at least in countries with known inequality of educational opportunities. Accordingly, we have preferred to replace effort E_i simply by individual schooling level S_i. Given this new interpretation, equation (1) would simply indicate that wages are a function of human capital (i.e. schooling), circumstances of origin, as well as term U_i, which captures unobserved circumstances, sheer luck, "effort" at work, deviations from permanent income, and possibly income measurement errors. In addition, parameter ß would be more directly interpreted simply as the return to schooling, while parameter B would reflect the effect of observed circumstances of origin on the accumulation of schooling. For example, parameter B can

capture parents' resources to invest in their son's tertiary education, the role of cognitive and non-cognitive abilities acquired during infancy and adolescence on the chances of gaining access to tertiary education. In addition, parameter a would reflect the direct effect of circumstances on earnings, for a given schooling level, or alternatively, as the effect of circumstances on the return of a given amount of schooling. For example, parameter a can capture the effect of the *quality* of education (likely to be associated with circumstances), the role of abilities acquired in the household of origin on labor productivity and earnings, access to social networks and even the possibility of "class discrimination" in the labor market.[5] In conclusion, this modified interpretation openly treats "effort" as a non observable variable, which would be captured in term V_i in equation (2).

a. Partial and Total effects of observed circumstances on income inequality

The estimation of parameters a, ß and B through an OLS estimation of equations (1) and (2) allows performing two types of simulations of the distribution of income after equalizing exogenous observed circumstances C. Let W^P denote the simulated income distribution associated with the "Partial Effect" described above, obtained after equalizing all the circumstance variables across individuals in equation (1). Accordingly, the resulting income distribution would reflect individual differences in schooling and in the residue U_i. More formally, the hypothetical distribution W^P would be derived from the simulation of the individual incomes W_i^P using the following equation, and after estimating equation (1) by OLS:

$$Ln(W_i^P) = \hat{\alpha} \cdot \overline{C} + \hat{\beta} \cdot S_i + \hat{U}_i \quad (4)$$

where $\overline{C}$ is the vector of population means of the circumstance variables.

An alternative hypothetical wage distribution W^T associated with the "Total effect" of observed circumstances on earnings can be obtained by equalizing all the observed

[5] See for example Núñez and Gutiérrez (2004).

circumstance variables across individuals in equation (3), after estimating equation (1) and (2) by OLS. The income distribution W^T would thus be obtained from:

$$Ln(W_i^T) = (\hat{\alpha} + \hat{\beta} \cdot \hat{B}) \cdot \overline{C} + \hat{\beta} \cdot \hat{V}_i + \hat{U}_i \quad (5)$$

where again $\overline{C}$ stands for the population means of the circumstance variables and the coefficients are obtained from OLS estimations of equations (1) and (2) .

The comparison between the actual (observed) distribution W and distribution W^P reflects the partial effect of observed circumstances on the distribution of income, while the comparison between W and W^T provides the effect of the total effect of observed circumstances on earnings, i.e. including the effect of observed circumstances on the accumulation of schooling. Both measures of income inequality allows distinguishing the part of income inequality associated with the direct influence of observed circumstances on earnings, from the part that comes from the indirect effect of the observed circumstances on the accumulation of schooling.

b. Two additional circumstance-equalizing benchmarks

However, a limitation of the methodology described above is that part of the income inequality obtained after equalizing observed circumstances may still be caused by differences in unobserved circumstances. In particular, it can be argued that unobserved circumstances can explain part of the diversity in schooling that is not associated with observed circumstances, βV_i. In this context, in addition to the circumstance-equalizing propositions of Bourguignon et. al. (2005) described above, namely the partial and total effects, we perform two additional equalizing benchmarks of the effect of circumstances on income distribution to explore the possible role of unobserved circumstances. Following Núñez and Tartakowsky (2009), assume an extreme hypothetical situation where all schooling acquired by an individual were fully determined by his circumstances of origin, either observed or unobserved. Or to phrase it more simply, assume that there is

no role for "effort" or "merit" in the accumulation of schooling. This situation would be equivalent to setting the term $V_i = 0$ (which includes unobserved effort) for all individuals. In this context, schooling would vary across individuals only due to the effect of circumstances, not effort. This is equivalent to simulating individuals' income by replacing C_i by the population mean circumstances $\overline{C}$ and $V_i = 0$ in equation (3), or equivalently, replacing C_i and S_i by $\overline{C}$ and the population mean schooling $\overline{S}$ in equation (1), respectively.[6] More formally, the simulated income distribution after equalizing observed circumstances and schooling, W^{ES}, would be derived from the simulated individual earnings from:

$$Ln(W_i^{ES}) = (\hat{\alpha} + \hat{\beta} \cdot \hat{B}) \cdot \overline{C} + \hat{U}_i$$

Hence, in this case the only source of variation in the simulated income distribution would arise from term U_i in equation (1).[7] [8]

The second additional exploratory equalizing benchmark that we carry out arises from the observation that individuals cannot be made responsible for their human capital accumulation in the early years of the life cycle, but they can arguably be made partly responsible for it later in their life cycle, after some age threshold. Let $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i$ denote the simulated schooling of individual I after equalizing observed circumstances in equation (2). In this context, a low level of simulated schooling level $S_i^{'}$, say dropping out of school at an early age, can be interpreted not as lack of "effort", but as the result of unobserved circumstances contained in $\hat{V}_i$. However, after some age threshold, the value of simulated schooling $S_i^{'}$ will presumably reflect a combination of effort and unobserved circumstances. Although it may seem absurd to fix a specific age threshold after which individuals can be made partly responsible for their accumulation of

[6] Note that estimating equation (2) by OLS yields $\overline{K} = B\overline{C}$.
[7] Note however, that term U_i can include the direct effect of unobserved circumstances on earnings.
[8] However, in the earnings regressions we include potential experience as an independent variable, which adds another source of variation in the simulated incomes.

schooling, it must be remembered that this happens *de facto* in other spheres such as penal responsibility, and in the gain of rights such as voting and driving, during the teen years. For simulation purposes, we implement this benchmark by guaranteeing everyone 10 years of schooling (achieved at about age 16), and employ the simulated value of schooling $S_i^{'}$ whenever it is greater than 10. More formally, the simulated income distribution after guaranteeing 10 years of schooling, W_i^{GS}, is derived from:

$$Ln(W_i^{GS}) = \hat{\alpha}\,\overline{C} + \hat{\beta}\,S_i^{''} + \hat{U}_i$$

where,

$S_i^{''} = 10$ if $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i \leq 10$, and $S_i^{''} = S_i^{'} = \hat{B}\overline{C} + \hat{V}_i$ if $S_i^{'} = \hat{B}\overline{C} + \hat{V}_i > 10$.

Although this threshold is admittedly arbitrary, we claim that it partly addresses the shortcoming implicit in the indirect effect, namely that infants and young teenagers are assumed to be partly responsible for their schooling achievement.[9]

Finally, let ψ denote an operator that computes an income inequality coefficient from a given income distribution *W*, such as the Gini and Theil coefficients, and top-bottom ratios. Given the differences in the sources of variation in the observed and in the simulated individual incomes under each of the four circumstance-equalizing benchmarks, it can be expected that $\psi(W) > \psi(W^P) > \psi(W^T) > \psi(W^{GS}) > \psi(W^{ES})$.

III. Data

This work employs data from the 2006 National Socio-Economic Characterization Survey (CASEN) in Chile. In this survey, various questions were added to the traditional questionnaire in order to obtain measures of the individuals' circumstances of origin, in addition to the standard core of socio-economic and labor market questions. These include household characteristics during infancy such as household size, if the respondent was raised in a single vs. a bi-parental household, father's and mother's schooling,

[9] Using alternative age thresholds in the range of 14 to 18 years of age yielded only marginally different results than those reported below for age threshold 16.

ethnicity, existence of a birth handicap, municipality of origin, father and mother's participation in the labor market, frequency of father's and mother's employment, as reported by their offspring. Besides, income and urban/rural composition of the respondent's municipality of origin were computed.[10]

The sample of sons and daughters was delimited to ages in the range from 24 to 65 years both in the schooling regressions and earnings regressions in order to avoid possible selectivity problems, as individuals younger than 23 may be in tertiary education and not fully inserted in the labor market, and may not have achieved their long-run level of schooling. Unemployed individuals or those who did not report positive incomes were eliminated, as well as those who did not report sufficient information about the characteristics of their parents. Finally, we considered individuals working between 30 and 72 hours per week.

IV. Results

a. Schooling and earnings regressions

Tables 1 and 2 provide the results of OLS regressions of schooling determinants for men and women, respectively, as in equation (2) of the model.[11] Tables 1 and 2 indicate that various observed circumstances of origin have a significant effect on the accumulation of schooling in both men and women. In particular, parental education has a strong effect on the offspring schooling, up to approximately 6 to 7 extra years for the offspring of university-educated parents vs. parents with incomplete primary schooling. Tables 1 and 2 also indicate that household size, being raised in a single parent household, or in poorer and rural Municipalities decrease schooling. In conclusion, Tables 1 and 2 indicate that a diverse set of observed circumstances of origin have a significant effect in reproducing inequality through their impacts on the accumulation of human capital in Chile. We

[10] These variables were obtained from the 1994 CASEN Survey, which is the oldest with an important number of municipalities having a representative sample.
[11] We performed regressions with robust standard errors for both the schooling and earnings regressions, but yielded similar result to the ones reported here.

employ specification 2 of Tables 1 and 2 to carry out the income simulations associated with the circumstance-equalizing benchmarks described above.

[Insert Tables 1 and 2 about here]

Tables 3 and 4 show the results of OLS wage equations for men and women, including the labor market participation equation for women to address the standard selection bias. All specifications show the standard effects of schooling and potential experience on earnings. In addition, Tables 3 and 4 indicate that parental schooling has a significant effect on earnings, of about 50 to 60 per cent for offspring of university-educated parents, relative to offspring of parents with incomplete primary schooling.[12] In addition, Tables 3 and 4 show that Amerindian ancestry is associated with about 10 to 15 per cent lower wages. Municipality characteristics do not have a robust effect once other circumstance variables are included. We employ specification 3 of Tables 3 and 4 for the simulation of individual incomes based on the four circumstance-equalizing benchmarks described above.

[Insert Tables 3 and 4 about here]

b. Simulated income distribution coefficients

Using the results of specifications 2 in Tables 1 and 2 and of specifications 3 in Tables 3 and 4, we performed the four circumstance-equalizing benchmarks described above in order to compute the simulated income distribution coefficients. Tables 5 to 7 report the results for the Gini coefficient and the top/bottom quintiles ratios, including bootstrap-generated 95 per cent confidence intervals for each inequality measure.[13]

[12] This is consistent with the finding reported by Bravo, Contreras and Medrano (1999), who report statistically significant coefficients of about 0.02 and 0.01 for the father's and the mother's schooling on their sons' earnings, respectively.

[13] Confidence intervals were computed using a bootstrap method. We generated 200 estimates for each inequality coefficient. The reported value of the inequality coefficient is the average of the sampling distribution, and the confidence intervals were built from the values between percentile 2.5 and 97.5 of the distribution.

Tables 5-7 report Gini coefficients for the actual (observed) inequality of 0.54, 0.5 for women and 0.53 for men, women and total population, respectively, consistent with the known values for Chile.[14] They also indicates that the Gini coefficient for the younger cohorts is lower, which may be a consequence of earnings profiles being less heterogeneous early in the life cycle.

[Insert Tables 5, 6 and 7 about here]

Tables 5-7 indicate that the Partial Effect associated with a wide and diverse set of observed circumstances explain about 4 and 5 points of the Gini coefficients for men and women, respectively, which represent drops of about 8 to 10 per cent. The Total Effect, in turn, yields a drop of about 7-8 points of the Gini coefficient, about 14-16 percent drop for men and women. These results indicate that part of the observed income inequality in Chile is associated with inequalities in the set of circumstances of origin employed in this work. However, these results also suggest that, after equalizing this wide and diverse set of observed circumstances, a significant amount of income inequality remains, in fact about 85 per cent of it. Another significant feature of the results in Table 1 is that the Partial and the Total effects of observed circumstances yield rather similar changes in income inequality, suggesting that the direct effect of circumstances on earnings and the indirect effect of them on schooling are of a similar order of magnitude in their effect on the income distribution.

Regarding the two additional circumstance-equalizing benchmarks described above, Tables 5 to 7 indicate that guaranteeing 10 years of schooling would yield similar income inequality to the Total effect, a fall of about 7-9 points in the Gini coefficient. Finally, the rather extreme situation of equalizing schooling at complete secondary education for everyone (close to Chile's average schooling of 10.5 years for adults in 23-65 age range) reduces the Gini coefficient in about 11-13 points that is, about a 22-25 per cent fall. Even though this equalizing exercise may seem extreme, it reinforces the idea that still a significant amount of income inequality would persist even under these circumstances.

[14] See for example Ferranti, Perry, Ferreira and Walton (2003).

We report the results also for the Theil coefficient for men and women in Table 8. In this case the Partial and Total Effects explain about 9 and 15 points of the Theil coefficient, respectively, representing falls of about 16 and 26 per cent. Table 8 also report that 10 years of schooling guaranteed yields a drop of about 6 points of the Theil coefficient, equivalent to a 28 per cent fall. Equalizing schooling at complete secondary education reduces the Theil coefficient in about 23 points, implying almost a 40 per cent fall. Hence, as noted in other studies, the influence of observed circumstances seems to have a larger relative effect on the Theil coefficient than on the Gini coefficient.

[Insert Tables 8 about here]

It is interesting to note that the results reported in Tables 5-8 are similar to the results obtained by Bourguignon et. al. (2005) for Brazil, who employ parental schooling and race as circumstances of origin. In their study, the Partial and Total effects for adult men and women are approximately 5 and 10 points of the Gini coefficient, which amount to falls of about 9 and 18 per cent. In addition, the results of Table 5 (for men) are also similar to the results in Núñez and Tartakowsky (2007) study conducted only on adult men in Greater Santiago, Chile's capital city. In that study, which also employs parental schooling and household size and composition as circumstances of origin, the Partial and Total effects are 7 and 8 points of the Gini coefficient, respectively. These comparisons suggest that the larger set of circumstance variables employed here do not seem to yield higher orders of magnitude of the Partial and Total effects.

In order to explore this issue further, Table 9 presents the effects on income inequality of equalizing parental education only vs. equalizing all observed circumstances, including ethnicity, income and urban-rural composition of the respondents' municipality of origin, size and composition (mono-parental vs. bi-parental) of the household of origin, parental employment features, all in addition to parental education. The purpose of this exercise is to compare the effects of equalizing a larger and more diverse set of circumstances of origin with those of equalizing parental education only, as if all the circumstances other

that parental education remained "unobserved". This exercise informs us about the marginal effect on income distribution of equalizing all the circumstances other than parental education, once this latter dimension has been already equalized.

Columns 2 and 4 of Table 9 presents the effects on income inequality of equalizing all circumstances for men and women, respectively, as in column 5 of Tables 5 and 6. Columns 3 and 5 of Table 9, in turn, report the results of equalizing parental education only for men and women, respectively.

[Insert Table 9 about here]

Table 9 shows that, as expected, the simulated inequality derived from equalizing parental education only is indeed higher that equalizing all the circumstance variables (including parental education) for all four circumstance-equalizing benchmarks. This indicates that all circumstances other than parental education contribute to income inequality, in addition to the effect associated with parental education, pattern that is observed for both men and women. Yet, the additional effect on the simulated income inequality associated with the circumstances other than parental schooling is small, about half a point of the Gini coefficient for the total effect, which represents a small fraction of what equalizing parental education achieves on its own. Moreover, note that the values of the simulated inequality indicators derived from equalizing parental education only always falls within the confidence interval of the inequality coefficients obtained from equalizing all observed circumstances. This indicates that the differences of the simulated inequality values for all four equalizing benchmarks are low and statistically similar.

These results reinforce the idea that the effect of unobserved circumstances on inequality may be limited. Indeed, the evidence in Table 9 suggests that, adding to parental education a larger and more diverse set of circumstances such as the ones considered here ("as if" they were initially unobserved), adds little in explaining income inequality. Of course, it is certainly possible that other key circumstances may not be included in this set

of circumstances, but considering the relevance and diversity of these circumstances, these results are nevertheless suggestive.[15]

The idea that unobserved circumstances have a limited role in shaping income inequality is coherent with evidence in the related literature. For example, Behrman and Rosenzweig (2004) suggest that the influence of unobserved circumstances (fixed family background) on the offspring's performance is indeed important, indicating that a part of the income inequality obtained after equalizing observed circumstances may indeed be associated with unobserved circumstances. However, in an earlier related study, Behrman and Rosenzweig (2002) also suggest that maternal schooling seems to proxy some important unobserved factors associated with family background. This evidence, consistent with the evidence in Table 9, would suggest that the observed circumstances employed in this work are likely to capture the effect of important unobserved circumstances associated with family background. In fact, Núñez and Tartakowsky (2007) employ data for Greater Santiago to show that parental schooling is highly associated with other circumstances of origin, namely parents' involvement in their offspring´s progress at school, attendance to a private vs. a public school, access to sanitation during infancy, parent's reading and writing skills, growing in an urban vs. a rural environment, parents' ethnicity (amerindian vs. non-amerindian), and access to pre-school education during infancy. This reinforces the idea that parental schooling and possibly the other circumstances of origin employed in this work are likely to capture the effects of a variety of relevant unobserved circumstances of origin than may have an impact on income distribution, at least many of those that can be affected by public action.

V. Conclusions

[15] This result also suggests a promising perspective for studying "equality of opportunities" and the influence of circumstances of origin on observed inequality from a comparative perspective employing a restricted set of common circumstances that includes parental education as an essential single one.

This paper has examined the extent to which income inequality is associated to inequalities in a large and diverse set of observed circumstances of origin, including parental schooling, ethnic background, household size and composition (single vs. a bi-parental), parental occupations, income and urban/rural composition of the Municipality of origin. We find that after equalizing individual circumstances to the mean values of the population, the resulting standard income distribution indicators become more egalitarian, indicating that a part of income inequality does indeed reflect inequalities of circumstances of origin. Yet, a large amount of income inequality is not associated with inequality in these observed circumstances. In particular, after equalizing observed circumstances, the Gini coefficient decreases in about 7-8 percentage points, representing approximately a fall of 15 per cent. About half of this variation is associated with the direct effect of observed circumstances of origin on earnings, while the remaining part is associated with its indirect effect on earnings through the accumulation of schooling. These results are similar to those obtained by Bourguignon et al (2005) for Brazil and Núñez and Tartakowsky (2007) in Chile, despite the wider the set of observed circumstances employed here.

This paper also finds that a significant amount of income inequality persists even after equalizing individuals' schooling to the population mean, to reflect an hypothetical extreme situation where all schooling is tacitly assumed to depend on circumstances-either observed or unobserved. Likewise, guaranteeing all individuals 10 years of schooling to account for adverse unobserved circumstances of those who achieve less than 10 years of schooling, yield similar results to the total effect. Further on the influence of unobserved circumstances on inequality, we find that adding a large set of circumstances to parental schooling adds little to the effect on income inequality that parental schooling achieves on its own. These results jointly suggest a limited influence of unobserved circumstances on income distribution.

These results suggest that, as long as the exercise of equalizing observed circumstances is an accepted approximation of the notion of "equality of opportunities", then income inequality indicators may not necessarily reflect adequately a country's degree of equality

of opportunities, as income inequality may be also reflecting aspects such as individual "effort", preferences, choices, sheer luck and possibly transitory shocks in income and income measurement errors. This, in turn, suggests implications for public policy, depending on the preferred moral standpoint in the equality-of-outcomes vs. equality-of-opportunities debate: Promoting equality of outcomes would require more than trying to equalize circumstances and "opportunities" across individuals, and in consequence additional redistributive policies are likely to be needed. On the other hand, advocates of equality of opportunities must be ready to accept that promoting equal opportunities is likely to yield a significant amount of income inequality. However, a challenging agenda remains ahead to distinguish more precisely the roles of unobserved circumstances and the consequences of individual choices and preferences, as well as other sources of variation in measured incomes.

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Table 1. Schooling Determinants; Men[1)]		
Variable	**Specifications[2)]**	
	1	**2[3)]**
Personal characteristics		
Age	-0.0551***	-0.0544***
	[0.0030]	[0.0030]
Birth handicap = 1 dummy	-1.0665***	-1.2412***
	[0.3639]	[0.3496]
Amerindian ethnic group=1 dummy	-0.6554***	-0.6337***
	[0.1706]	[0.1696]
Parental schooling		
father's primary education = 1 dummy	1.1927***	1.1560***
	[0.1260]	[0.1249]
father's secondary schooling =1 dummy	2.5465***	2.5443***
	[0.1408]	[0.1397]
father's technical education=1 dummy	4.1030***	4.0781***
	[0.1884]	[0.1874]
father's university education=1 dummy	4.8102***	4.8245***
	[0.1801]	[0.1788]
mother's primary education=1 dummy	0.8596***	0.8778***
	[0.1212]	[0.1203]
mother's secondary education = 1 dummy	1.9119***	1.9330*
	[0.1382]	[0.1374]
mother's technical education = 1 dummy	1.8882***	1.9410***
	[0.2154]	[0.2135]
mother's university education = 1 dummy	2.0429***	2.0634***
	[0.1855]	[0.1839]
Childhood household attributes		
Household size	-0.1244***	-0.1218***
	[0.0108]	[0.0107]
Biparental household = 1 dummy	0.6122***	0.6333***
	[0.0899]	[0.0860]
Father employer dummy	0.1219	
	[0.1483]	
Mother employer = 1 dummy	1.1680***	1.2447***
	[0.2572]	[0.2365]
Childhood household location characteristics		
Income of municipality of origin	0.0000***	
	[0.0000]	
Rural population in municipality of origin	-1.6350***	-1.6118***
	[0.1642]	[0.1619]
Constant	11.4796***	11.4108***
	[0.1851]	[0.1814]
Sample size	10.737	10.988
R-squared	0,3743	0,3746
Adjusted R-squared	0,3733	0,3737

1) Dependent variable is years of schooling.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 2. Schooling Determinants; Women[1)]		
Variable	**Specifications [2)]**	
	1	**2[3)]**
Personal charasteristics		
Age	-0.0782***	-0.0780***
	[0.0026]	[0.0025]
Birth handicap = 1 dummy	-1.3973***	-1.3746***
	[0.2268]	[0.2204]
Amerindian ethnic group=1 dummy	-0.3775***	-0.3547**
	[0.1447]	[0.1424]
Parental schooling		
father's primary education = 1 dummy	0.6966***	0.7109***
	[0.0988]	[0.0968]
father's secondary schooling =1 dummy	1.8407***	1.8726***
	[0.1123]	[0.1099]
father's technical education=1 dummy	2.7614***	2.7864***
	[0.1557]	[0.1536]
father's university education=1 dummy	3.2474***	3.3033***
	[0.1462]	[0.1437]
mother's primary education=1 dummy	1.1225***	1.1259***
	[0.0966]	[0.0946]
mother's secondary education = 1 dummy	2.3641***	2.3450***
	[0.1118]	[0.1095]
mother's technical education = 1 dummy	2.5997***	2.6091***
	[0.1776]	[0.1749]
mother's university education = 1 dummy	3.0483***	3.0465***
	[0.1556]	[0.1530]
Childhood household attributes		
Household size	-0.1114***	-0.1111***
	[0.0090]	[0.0089]
Biparental household = 1 dummy	0.9123***	0.9458***
	[0.0766]	[0.0731]
Father employer dummy	-0.0652	
	[0.1229]	
Mother employer = 1 dummy	0.9167***	0.7660***
	[0.2235]	[0.2104]
Childhood household location characteristics		
Income of municipality of origin	0.0000***	
	[0.0000]	
Rural population in municipality of origin	-1.1733***	-1.2006***
	[0.1375]	[0.1351]
Constant	11.7688***	11.7163***
	[0.1549]	[0.1509]
Sample size	14.27	14.653
R-squared	0,3588	0,3611
Adjusted R-squared	0,3580	0,3604

1) Dependent variable is years of schooling.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 3. Wage Equations; Men[1)]			
Variable	**Specifications[2)]**		
	1	**2**	**3[3)]**
Schooling return			
Primary education	0.0391***	0.0396***	0.0422***
	[0.0080]	[0.0080]	[0.0039]
Secondary education	0.0390***	0.0403***	0.0486***
	[0.0120]	[0.0120]	[0.0060]
Tertiary education	0.1148***	0.1166***	0.1001***
	[0.0087]	[0.0087]	[0.0048]
Experience variables			
Potential experience	0.0339***	0.0344***	0.0311***
	[0.0028]	[0.0028]	[0.0015]
Potential experience - squared	-0.0004***	-0.0004***	-0.0003***
	[0.0001]	[0.0001]	[0.0000]
Personal charasteristics			
Birth handicap = 1 dummy	-0.1633*	-0.1694*	-0.2468***
	[0.0935]	[0.0937]	[0.0477]
Amerindian ethnic group=1 dummy	-0.1005**	-0.1066***	-0.1441***
	[0.0403]	[0.0403]	[0.0186]
Parental schooling			
father's primary education = 1 dummy	0.0122		0.0341**
	[0.0305]		[0.0159]
father's secondary schooling = 1 dummy	0.0052		0.0901***
	[0.0341]		[0.0188]
father's technical education=1 dummy	0.073		0.1549***
	[0.0459]		[0.0275]
father's university education=1 dummy	0.2792***	0.2778***	0.3711***
	[0.0445]	[0.0323]	[0.0262]
mother's primary education=1 dummy	-0.01		0.0479***
	[0.0291]		[0.0153]
mother's secondary education = 1 dummy	0.1896***	0.2059***	0.1916***
	[0.0331]	[0.0187]	[0.0187]
mother's technical education = 1 dummy	0.2010***	0.2362***	0.2417***
	[0.0509]	[0.0418]	[0.0309]
mother's university education = 1 dummy	0.1506***	0.1808***	0.2236***
	[0.0442]	[0.0362]	[0.0265]
Childhood household attributes			
Household size	-0.004		-0.0060***
	[0.0027]		[0.0015]
Biparental household = 1 dummy	0.0779***	0.0724***	0.0484***
	[0.0218]	[0.0211]	[0.0127]
Father employer dummy	0.1113***	0.1194***	0.0989***
	[0.0354]	[0.0355]	[0.0203]
Mother employer = 1 dummy	0.2092***	0.2101***	0.2533***
	[0.0618]	[0.0618]	[0.0363]
Childhood household location characteristics			
Income of municipality of origin	0.0000***		
	[0.0000]		
Rural population in municipality of origin	-0.0891**	-0.1724***	
	[0.0398]	[0.0381]	
Constant	5.8547***	5.8885***	5.779***
	[0.0666]	[0.0650]	[0.0339]
Sample size	8452	8452	24.891
R-squared	0.4293	0.4255	0,4312
Adjusted R-squared	0.4279	0.4245	0,4308

1) Dependent variable is log of hourly wage rate.
2) OLS estimates standard errors in brackets; *=significant at the 10% prob.level;
****=significant at the 5% prob. level; ***=significant at the 1% prob.level**
3) Specification used in simulations

Table 4.1 Wage Equations; Women[1)]			
Variable	**Specifications [2)]**		
	1	**2**	**3[3)]**
Schooling return			
Primary education	0.0863***	0.0863***	0.0647***
	[0.0277]	[0.0272]	[0.0128]
Secondary education	-0.0156	-0.0047	0.0261
	[0.0356]	[0.0356]	[0.0179]
Tertiary education	0.1421***	0.1394***	0.1053***
	[0.0188]	[0.0188]	[0.0113]
Experience variables			
Potential experience	0.0254***	0.0232***	0.0228***
	[0.0062]	[0.0061]	[0.0037]
Potential experience - squared	-0.0003**	-0.0003**	-0.0003***
	[0.0001]	[0.0001]	[0.0001]
Personal charasteristics			
Birth handicap = 1 dummy	-0.2073**	-0.1883**	-0.1789***
	[0.0848]	[0.0827]	[0.0591]
Amerindian ethnic group=1 dummy	-0.1561***	-0.1799***	-0.1222***
	[0.0607]	[0.0620]	[0.0322]
Parental schooling			
father's primary education = 1 dummy	0.0145		0.0492**
	[0.0525]		[0.0242]
father's secondary schooling = 1 dummy	0.0682		0.1050***
	[0.0672]		[0.0347]
father's technical education=1 dummy	0.0706		0.1563***
	[0.0837]		[0.0533]
father's university education=1 dummy	0.2070***	0.1770***	0.3051***
	[0.0811]	[0.0568]	[0.0534]
mother's primary education=1 dummy	0.02		
	[0.0542]		
mother's secondary education = 1 dummy	0.1354***		0.1353***
	[0.0697]		[0.0316]
mother's technical education = 1 dummy	0.0616		0.0746
	[0.0904]		[0.0533]
mother's university education = 1 dummy	0.275	0.1940***	0.2895***
	[0.0961]	[0.0736]	[0.0603]
Childhood household attributes			
Household size	0.0005		
	[0.0053]		
Biparental household = 1 dummy	-0.0101		
	[0.0446]		
Father employer dummy	0.2060***	0.2353***	0.1975***
	[0.0661]	[0.0656]	[0.0439]
Mother employer = 1 dummy	0.0889		
	[0.1221]		
Childhood household location characteristics			
Income of municipality of origin	0.0000***		
	[0.0000]		
Rural population in municipality of origin	-0.1333*	-0.1769***	
	[0.0688]	[0.0664]	
Constant	5.1827***	5.2504	5.3409***
	[0.2541]	[0.2639]	[0.1187]

1) Dependent variable is log of hourly wage rate.
2) Heckman selection model estimates. Robust standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**
3) Specification used in simulations

Table 4.2 Selection Equation; Women[1)]			
Variable	**Specifications [2)]**		
	1	**2**	**3[3)]**
Age	0.1345***	0.1344***	0.1157***
	[0.0047]	[0.0047]	[0.0033]
Age - squared	0.1421***	0.1413***	0.1414***
	[0.0119]	[0.0118]	[0.0087]
Schooling	-0.0017***	-0.0016***	-0.0017***
	[0.0001]	[0.0001]	[0.0001]
Birth handicap = 1 dummy	-0.3435***	-0.3441***	-0.4040***
	[0.1235]	[0.1235]	[0.0996]
Number of children	-0.0982***	-0.0989***	-0.1140***
	[0.0144]	[0.0143]	[0.0109]
Lives with partner = 1	-0.5950***	-0.5934***	-0.6891***
	[0.0315]	[0.0315]	[0.0244]
Mother employer =1 dummy	0.2723**	0.2629**	0.2054**
	[0.1149]	[0.1141]	[0.0961]
Constant	-4.5127***	-4.4928***	-3.6125**
	[0.2554]	[0.2545]	[0.1824]
Censored observations	33.741	33.741	33.741
Uncensored observations	4.798	4.805	12.988
Wald chi2	741,14	671,16	1972,29
Prob > chi2	0,0000	0,0000	0,0000
Rho	0,2476	0,2513	0,2439
	[0.1074]	[0.1128]	[0.0707]
Likelihood ratio test (rho=0) chi2(1)	4,88	4,55	10,95
Prob > chi2	0,0272	0,0329	0,0009

1) Dependent variable is log of hourly wage rate.

2) Heckman selection model estimates. Robust standard errors in brackets; *=significant at the 10% prob.level; **=significant at the 5% prob. level; *=significant at the 1% prob.level**

3) Specification used in simulations

Table 5. Effects of Equalizing Circumstances on Labor Income Inequality, Men
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.481 [0.474 - 0.488]	0.511 [0.503 - 0.518]	0.608 [0.601 - 0.615]	0.535 [0.527 - 0.543]
Simulated Models				
Partial Effect (W^P)	0.436 [0.429 - 0.442]	0.47 [0.463 - 0.477]	0.557 [0.550 - 0.563]	0.491 [0.483 - 0.499]
Total Effect (W^T)	0.395 [0.389 - 0.401]	0.441 [0.433 - 0.451]	0.503 [0.496 - 0.511]	0.455 [0.447 - 0.464]
10 Years of Schooling Guaranteed (W^{SG})	0.389 [0.384 - 0.395]	0.434 [0.426 - 0.443]	0.487 [0.479 - 0.495]	0.447 [0.439 - 0.456]
Equalized Schooling (W^{ES})	0.353 [0.347 - 0.358]	0.396 [0.388 - 0.403]	0.436 [0.429 - 0.442]	0.406 [0.399 - 0.414]

Q5/Q1 Quintile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	9.872 [9.563 - 10.224]	12.507 [12.089 - 12.907]	19.789 [18.949 - 20.467]	13.314 [12.859 - 13.767]
Simulated Models				
Partial Effect (W^P)	8.196 [7.955 - 8.421]	10.121 [9.825 - 10.437]	15.198 [14.665 - 15.668]	10.834 [10.473 - 11.200]
Total Effect (W^T)	7.267 [7.085 - 7.435]	8.933 [8.637 - 9.280]	11.909 [11.543 - 12.329]	9.471 [9.182 - 9.807]
10 Years of Schooling Guaranteed (W^{SG})	7.043 [6.867 - 7.213]	8.519 [8.231 - 8.861]	10.886 [10.547 - 11.273]	9.040 [8.743 - 9.341]
Equalized Schooling (W^{ES})	5.989 [5.824 - 6.136]	7.053 [6.835 - 7.284]	8.636 [8.367 - 8.870]	7.465 [7.258 - 7.702]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping.

Table 6. Effects of Equalizing Circumstances on Labor Income Inequality, Women
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	Age= 23-36	Age=37-50	Age=51-65	Age=23-65
Total Inequality *(W)*	0.435 [0.429 - 0.441]	0.526 [0.516 - 0.536]	0.547 [0.537 - 0.557]	0.502 [0.494 - 0.511]
Simulated Models				
Partial Effect (W^P)	0.395 [0.389 - 0.400]	0.486 [0.477 - 0.495]	0.517 [0.507 - 0.529]	0.466 [0.457 - 0.475]
Total Effect (W^I)	0.362 [0.355 - 0.369]	0.442 [0.433 - 0.453]	0.488 [0.475 - 0.503]	0.434 [0.424 - 0.445]
10 Years of Schooling Guaranteed (W^{SG})	0.356 [0.349 - 0.363]	0.436 [0.426 - 0.446]	0.470 [0.455 - 0.489]	0.428 [0.416 - 0.439]
Equalized Schooling (W^{ES})	0.317 [0.308 - 0.324]	0.401 [0.391 - 0.409]	0.456 [0.433 - 0.481]	0.397 [0.384 - 0.411]

Q5/Q1 Quintile Ratio	Age= 23-36	Age=37-50	Age=51-65	Age=23-65
Total Inequality *(W)*	8.815 [8.382 - 9.166]	12.666 [12.140 - 13.272]	15.766 [15.053 - 16.612]	11.746 [11.363 - 12.187]
Simulated Models				
Partial Effect (W^P)	7.122 [6.932 - 7.325]	10.590 [10.187 - 11.070]	13.854 [13.213 - 14.601]	9.834 [9.495 - 10.214]
Total Effect (W^I)	6.133 [5.934 - 6.342]	8.959 [8.564 - 9.327]	12.086 [11.421 - 12.901]	8.587 [8.191 - 8.978]
10 Years of Schooling Guaranteed (W^{SG})	5.943 [5.763 - 6.136]	8.606 [8.227 - 8.960]	10.874 [10.165 - 11.619]	8.258 [7.884 - 8.644]
Equalized Schooling (W^{ES})	4.899 [4.734 - 5.073]	7.206 [6.956 - 7.455]	9.642 [8.774 - 10.508]	7.012 [6.686 - 7.403]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping.

Table 7. Effects of Equalizing Circumstances on Labor Income Inequality, Men and Women
Gini and Top-Bottom Quintile Ratio[1)]

Gini Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.468 [0.463 - 0.473]	0.522 [0.517 - 0.527]	0.599 [0.593 - 0.605]	0.529 [0.523 - 0.536]
Simulated Models				
Partial Effect (W^{P})	0.425 [0.420 - 0.430]	0.483 [0.478 - 0.488]	0.553 [0.547 - 0.559]	0.489 [0.483 - 0.496]
Total Effect (W^{I})	0.391 [0.387 - 0.395]	0.451 [0.445 - 0.458]	0.505 [0.498 - 0.512]	0.457 [0.450 - 0.464]
10 Years of Schooling Guaranteed (W^{SG})	0.386 [0.382 - 0.390]	0.444 [0.438 - 0.451]	0.488 [0.481 - 0.496]	0.450 [0.443 - 0.457]
Equalized Schooling (W^{ES})	0.346 [0.342 - 0.351]	0.404 [0.399 - 0.410]	0.446 [0.439 - 0.445]	0.410 [0.404 - 0.416]

Q5/Q1 Quintile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	9.647 [9.396 - 9.858]	13.066 [12.781 - 13.340]	18.999 [18.484 - 19.554]	13.411 [12.950 - 13.822]
Simulated Models				
Partial Effect (W^{P})	7.961 [7.762 - 8.138]	10.792 [10.540 - 11.061]	15.522 [15.087 - 15.935]	10.896 [10.634 - 11.190]
Total Effect (W^{I})	7.042 [6.903 - 7.180]	9.422 [9.187 - 9.704]	12.411 [12.042 - 12.798]	9.576 [9.324 - 9.880]
10 Years of Schooling Guaranteed (W^{SG})	6.846 [6.716 - 6.976]	8.964 [8.740 - 9.238]	11.248 [10.890 - 11-617]	9.176 [8.920 - 9.470]
Equalized Schooling (W^{ES})	5.697 [5.568 - 5.801]	7.374 [7.203 - 7.553]	9.182 [8.890 - 9.485]	7.581 [7.404 - 7.785]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping

Table 8. Effects of Equalizing Circumstances on Labor Income Inequality, Men and Women
Theil Index, and Top-Bottom Decile Ratio[1)]

Theil Coefficient	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	0.417 [0.402 - 0.432]	0.543 [0.523 - 0.567]	0.749 [0.720 - 0.776]	0.574 [0.550 - 0.601]
Simulated Models				
Partial Effect (W^P)	0.344 [0.330 - 0.357]	0.454 [0.437 - 0.478]	0.617 [0.597 - 0.639]	0.481 [0.460 - 0.503]
Total Effect (W^I)	0.287 [0.278 - 0.296]	0.397 [0.375 - 0.426]	0.531 [0.507 - 0.558]	0.423 [0.400 - 0.449]
10 Years of Schooling Guaranteed (W^{SG})	0.280 [0.271 - 0.289]	0.388 [0.366 - 0.416]	0.504 [0.478 -0.534]	0.414 [0.390 - 0.440]
Equalized Schooling (W^{ES})	0.227 [0.218 - 0.236]	0.327 [0.312 - 0.343]	0.425 [0.397 - 0.460]	0.348 [0.38 - 0.373]

D10/D1 Decile Ratio	**Age= 23-36**	**Age=37-50**	**Age=51-65**	**Age=23-65**
Total Inequality *(W)*	16.808 [16.219 - 17.359]	23.833 [22.793 - 24.607]	39.400 [37.696 - 41.056]	24.332 [23.433 - 25.603]
Simulated Models				
Partial Effect (W^P)	13.490 [13.041 - 13.902]	19.006 [18.470 - 19.580]	30.652 [29.490 - 31.811]	19.735 [19.104 - 20.431]
Total Effect (W^I)	12.163 [11.782 - 12.565]	16.885 [16.227 - 17.350]	24.702 [23.699 - 25.708]	17.657 [17.059 - 18.440]
10 Years of Schooling Guaranteed (W^{SG})	11.839 [11.517 - 12.143]	16.130 [15.578 - 16.795]	22.090 [21.152 - 23.013]	16.947 [16.356 - 17.680]
Equalized Schooling (W^{ES})	9.724 [9.436 - 9.951]	13.126 [12.734 - 13.546]	17.978 [17.197 - 18.737]	13.821 [13.348 - 14.339]

1) 95 per cent confidence Intervals in brackets, obtained by bootstrapping

Effects on Income Inequality of Equalizing Parental Education only vs. equalizing all Circumstances
Gini and Top-bottom quintile Ratios[1)]

	Men, ages 23-65		Women, ages 23-65	
A. Gini Coefficient	**Employing All Circumstances**	**Employing only Parental Education**	**Employing All Circumstances**	**Employing only Parental Education**
Observed Inequality	0,535 [0.527 - 0.543]		0,502 [0.494 - 0.511]	
Simulated Models				
Partial Effect	0,491 [0.483 - 0.499]	0,494	0,466 [0.457 - 0.475]	0,468
Total Effect	0,455 [0.447 - 0.464]	0,459	0,434 [0.424 - 0.445]	0,441
10 years schooling guaranteed	0,447 [0.439 - 0.456]	0,450	0,428 [0.416 - 0.439]	0,434
Equalized Schooling	0,406 [0.399 - 0.414]	0,408	0,397 [0.384 - 0.411]	0,401

	Men, ages 23-65		Women, ages 23-65	
B. Q5/Q1 Ratios	**Employing All Circumstances**	**Employing only Parental Education**	**Employing All Circumstances**	**Employing only Parental Education**
Observed Inequality	13,314 [12.859 - 13.767]		11,746 [11.363 - 12.187]	
Simulated Models				
Partial Effect	10,834 [10.473 - 11.200]	10,970	9,834 [9.495 - 10.214]	9,901
Total Effect	9,471 [9.182 - 9.807]	9,644	8,587 [8.191 - 8.978]	8,871
10 years schooling guaranteed	9,040 [8.743 - 9.341]	9,134	8,258 [7.884 - 8.644]	8,474
Equalized Schooling	7,465 [7.258 - 7.702]	7,507	7,012 [6.686 - 7.403]	7,118