The evolution of opportunities for children in Chile, 1990–2006

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ABSTRACT

In this paper we measure the evolution of inequality of opportunity in Chile. These measures assess how unequal the distribution of socioeconomic outcomes is, based on exogenous circumstances. The results show a reduction in inequality of opportunity from 1990 to 2006. The gains are of two classes. First, social service coverage has increased substantially, leading to a general improvement in opportunities. Second, the gaps in access probabilities among population subgroups have been reduced, making the playing field more balanced. These results should be interpreted as partial evidence for the evolution of opportunities in Chile. We also found a significant gap in the opportunity index across Chile, which reflects differences in both coverage rates and the distribution of opportunities within regions. The reduction in inequality is good news, but Chile still has a long way to go to achieve an equitable distribution of welfare.

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I

Introduction

Chile has undergone sustained economic growth since the mid-1980s, recording an average annual rate of 5% from 1987 to 2008. Poverty reduction has benefited from the expansion of the economy: the percentage of the population in poverty in 2006 was only one third of the share in 1990. The cost of the optimal transfer to eliminate poverty was 4.6% of GDP in 1990, versus only 0.9% in 2006 (Larrañaga, 2009). These results represent a dramatic decline in poverty in a relatively short period.

Chile still shows a high level of income inequality, however, compared with developed countries. Chile's Gini coefficient is approximately 25 points higher than the average for developed countries, according to data reported in De Ferranti and others (2003). Nevertheless, all indicators show that income inequality has fallen in Chile since 2000. The decline in inequality is related to a reduction in the wage premium following a large expansion in tertiary education (Eberhard and Engel, 2008; Larrañaga and Herrera, 2008). Income inequality has also declined in other Latin American countries in the past several years, which reflects increases in export prices and domestic wages (CEDLAS, 2009).

Another important dimension of the distribution of welfare is inequality of opportunity, a dimension that has traditionally been neglected because of the lack of empirical measures to assess and monitor it. The distinction between inequality of outcomes and inequality of opportunity is of interest, as pointed out by Ferreira and Gignoux (2008), because of the widespread normative view that inequality of opportunity is important in the design of public policy. Disadvantaged groups should be compensated through public policies that balance the playing field and thus ensure that the distribution of outcomes is not dependent on exogenous circumstances.

In this paper we apply some recently developed methodologies to measure the evolution of inequality of opportunity (Paes de Barros, Molinas and Saavedra, 2008). These measures assess how unequal the distribution of socioeconomic outcomes is among subgroups, grouped by circumstances. These circumstances are exogenous

factors that contribute to determining socioeconomic outcomes. The more unequal the distribution of outcomes due to differences in circumstances, the more unequal is the distribution of opportunity in the country.

The focus of the analysis is the population under 18 years of age. This is the period of the life cycle in which most cognitive and non-cognitive skills are determined. These skills, in turn, have a strong influence on adult socioeconomic outcomes, such as labour market productivity, social behaviour, political participation and health status.

The paper assesses the impact of circumstances on the following intermediate outcomes: access to preschool, access to sanitary infrastructure, nutritional status and timely completion of secondary education. Circumstance variables include gender, the mother's education level, the father's education level, the location of the household, per capita household income and family structure.

The results show a reduction in inequality of opportunity between 1990 and 2006. The gains are of two classes. First, social services coverage has increased substantially, leading to a general improvement in opportunities. Second, the gaps in access probabilities among population subgroups have been reduced, making the playing field more balanced. These results should be interpreted as partial evidence for the evolution of opportunities in Chile. Data are not available for assessing the evolution of other important socioeconomic outcomes, such as health-related variables and school quality.

At the same time, there is a significant gap in the opportunity index across Chile, which reflects differences in both coverage rates and the distribution of opportunities within regions. Some convergence occurred in 1990–2006, as the regions that lagged the most in the beginning of the period posted the largest gains in the opportunity index. There are still large regional differences, however, which add to the inequality of opportunity in the country.

The paper is organized as follows: in section II we discuss the relationship between achievements, resources and opportunities; section III presents the methodology to compute an opportunity index for children; section IV describes the data set and estimates; section V presents the main results; section VI decomposes changes in the index in terms of changes in coverage and changes in the dissimilarity index; and section VII concludes.

II

Outcomes, resources and opportunities

Human welfare has different dimensions, including income, health and education. Monetary income represents purchasing power for goods and services that satisfy human needs; good health is a state of physical and mental well-being that allows people to live long and satisfactory lives; and education generates knowledge and learning capacities. These outcomes are intertwined by complex cause-effect links, so that some have a positive influence on others and vice versa.

Socioeconomic outcomes are determined by resources. Examples of resources include parents' education and income, school inputs, nutrition intakes and characteristics of dwellings and neighbourhoods. The distinction between resources and outcomes is somewhat arbitrary. Some resources represent intermediate outcomes, which are determined by other, more basic resources. For example, graduation from high school is an educational outcome determined by school and household inputs, but it is also a resource for future income generation.

Resources can be classified as exogenous or endogenous to the individual. An exogenous resource is called a circumstance, as is the case of parental household endowments. Children do not choose the time and location of their birth, the education level of their parents, household income, number of siblings, and so forth. However, these variables shape the formation of skills in the early stages of the life cycle. Endogenous resources are those that are chosen by the individual, such as the effort exerted in schools and jobs, the allocation of time among competing ends, and the allocation of income between consumption and savings.

The classification of resources into endogenous or exogenous categories is contingent to the age of the individual. While most, if not all, family resources are exogenous to children, adults have the greatest command over their living conditions. The scope of endogenous choices is also dependent on socioeconomic status. Sen (1999) defines poverty as the lack of freedom to choose the type of life in which an individual would have reasons to live.

The line between exogenous and endogenous resources is not well defined. The debate about the penal responsibilities of young offenders or the mentally ill illustrates some of the complexities that arise when one tries to ascertain how responsible people are for their acts. In our discussion, one dimension of endogeneity that is particularly relevant for public policy is family choices that affect children's expectations. Variables such as family structure, location of residence and preschool attendance are, to a certain extent, chosen by families. These factors are exogenous to the child, but endogenous to their families. This leads to the question of whether public policies should compensate for family choices that are bad for children.

The issue is related to the discussion of familism versus de-familism in public policies (Esping-Andersen, 1999). The former view establishes that families are responsible for the welfare of their members and public policies should intervene only when families do not have the necessary resources or capacities to take care of their own. De-familism prioritizes individual rights and establishes that the state has obligations to individuals, regardless of their family resources or choices.

The relationship between outcomes, resources and opportunities is also time and place contingent. This introduces an important caveat in empirical assessments of the distribution of opportunities. For example, life expectancy represents a main health outcome. A person who died at 65 years old in Chile in 2009 would have had a shorter life-span than the average individual, but in 1960 that was seven years more than the average. Likewise, being literate represented a substantial achievement in education decades ago, but today people need to be functionally literate to perform adequately in society.

As for resources, good nutrition, vaccines, mother-child health services, drinkable water and other sanitary infrastructure represent key resources for health outcomes. Only a fraction of the population had access to these resources decades ago, but now coverage is almost universal. Quality of life thus depends on access to health care services that address old-age health risks, such as physical and mental disabilities, coronary disease and others.

Similarly, granting universal access to primary education and ensuring that most children complete six or eight years of schooling is a reasonable policy goal in very low-income countries. For a middle-income country, however, achieving social and economic inclusion requires no less than complete secondary education.

The relative nature of outcomes and resources is also an issue for other dimensions of the distribution of welfare. A leading example is the poverty line, or income threshold, used to define poverty status. Developed countries use higher poverty lines than poor countries, because the amount of income that is needed to achieve a decent standard of living depends on consumption patterns that are socially determined. Many years ago Adam Smith pointed out that a woman in Ireland could walk the streets barefoot without feeling ashamed, whereas an Englishwoman could not because of the higher standard of living in that country at the time.

III

Methodology[1]

Consider m circumstance groups, and denote the unconditional probability of access to a particular outcome as $\bar{p}$. Paes de Barro, Molinas and Saavedra (2008) consider the minimum proportion of all available opportunities that one must reallocate to ensure equal access for all circumstance groups, that is, a situation in which $p(x_j) = p_j$ is equal to $\bar{p}$, where x_j represents a circumstance group, $j = 1, \ldots, m$. They propose the following index based on the dissimilarity index:

$$D = \frac{1}{2\bar{p}} \sum_{j=1}^{m} \alpha_j \left| p_j - \bar{p} \right|,$$

where $\alpha_j = N_j/N$ corresponds to the proportion of individuals in circumstance group j. As this expression indicates, the index is proportional to the mean absolute distance between group-specific access probabilities and the overall access probabilities. In this sense, it is a measure of the inequality of opportunity.

The sample analog is:

$$D = \frac{E\left| P\left(I = 1 \middle| x\right) - P\left(I = 1\right) \right|}{2P\left(I = 1\right)},$$

where I is an indicator function, which is equal to one (1) if an individual had access to a given opportunity and zero otherwise.

The computation of the inequality-of-opportunity index is similar to the parametric approach for computing the dissimilarity index. First, assume that we have a random sample from the population, with information on whether person i had access to a given opportunity

($I_i = 1$ if that person had access and $I_i = 0$ otherwise) and a vector of variables indicating his or her circumstances, $x_i = (x_{1i}, \ldots, x_{mi})$. Then we can rewrite the index as follows:

$$D = \frac{E\left| P\left(I = 1 \middle| x\right) - P\left(I = 1\right) \right|}{2P\left(I = 1\right)} = $$
$$\frac{E\left| P\left(I = 1 \middle| x\right) - E\left(P\left(I = 1 \middle| x\right)\right) \right|}{2E\left(P\left(I = 1 \middle| x\right)\right)},$$

where the second equality comes from $P(I=1) = E(I) = E(E(I \mid x))$ by the law of iterated expectations. This expression also indicates the central role of group-specific coverage rates, $P(I=1 \mid x)$, in estimating D. Given this information, we estimate the inequality-of-opportunity index in three steps. First, we estimate the conditional probabilities. The simplest way of estimating conditional probabilities is to assume a separable logistic regression:

$$Ln\left(\frac{P\left(I = 1 \middle| x_1,\ldots,x_m\right)}{1 - P\left(I = 1 \middle| x_1,\ldots,x_m\right)} \right) = \sum_{k=1}^{m} h_k\left(x_k\right),$$

where x_k denotes a k-dimension vector of circumstances.

In the second step, we predict, for each individual in the sample, the probability of access to the opportunity under consideration, using the estimated coefficients in step one:

$$\hat{p}_i = \frac{Exp\left(\hat{\beta}_o + \sum_{k=1}^{m} x_{ki}\hat{\beta}_k \right)}{1 + Exp\left(\hat{\beta}_o + \sum_{k=1}^{m} x_{ki}\hat{\beta}_k \right)}.$$

[1] This section closely follows Paes de Barros, Molinas and Saavedra (2008).

In the final step, we compute

$$\bar{p} = \sum_{1}^{n} w_i \hat{p}_i$$

and

$$\hat{D} = \frac{1}{2\bar{p}} \sum_{i=1}^{n} w_i \left| \hat{p}_i - \bar{p} \right|,$$

where $w_i = 1/n$ or some sampling weights.

Since, almost surely, $\underset{n \to \infty}{Lim}(\bar{p}) = P(I = 1)$ under the assumption that the regression has been correctly specified and its coefficients are consistently estimated, then we also have

$$\mathrm{v}\, \underset{n \to \infty}{Lim}\left(\sum_{i=1}^{n} w_i \left| \hat{p}_i - \bar{p} \right| \right) = E\left| P\left(I = 1 | x \right) - P\left(I = 1 \right) \right|$$

almost surely. Hence, $\hat{D} \overset{p}{\longrightarrow} D$. Paes de Barros, Molinas and Saavedra (2008) discuss the properties of the estimator, such as consistency and asymptotic variance.

Because $\bar{p} = M/N$, where M is the number of opportunities available and N is the number of opportunities needed to ensure access for all, we can reinterpret $\bar{p}$ as the percentage of the total number of opportunities required for universal access that are actually available. This interpretation indicates that $\bar{p}$ is a measure of the stock of available opportunities, but it is insensitive to how these opportunities are allocated.

Thus, the natural way to proceed is to relate D and $\bar{p}$. Since the inequality-of-opportunity index, D, is the proportion of opportunities that must be reallocated for equality of opportunity to prevail, then $1 - D$ is the proportion properly allocated and $M(1 - D)$ is the total number of opportunities allocated according to the principle of equal opportunity for all. Hence, Paes de Barros, Molinas and Saavedra (2008) define $0 = M(1 - D)$ as the available opportunities allocated according to the principle of equal opportunity. Finally, the overall measure of opportunity is given by

$$r = \frac{O}{N} = \frac{M}{N}(1 - D) = \bar{p}(1 - D),$$

which can be interpreted the percentage of available opportunities allocated according to the equality-of-opportunity principle. We estimate this index of children's opportunities in the following sections.

IV

Data and estimation

The estimates are based on data from the 1990, 1996 and 2006 editions of the National Characterization Socioeconomic Survey (CASEN). CASEN is a multi-topic household survey with a large sample size (75,000 households in 2006), which has been conducted every two or three years since 1987 and is the traditional source for statistics on income distribution, poverty and the impact of social spending in Chile. The data is collected by the Microdata Centre of the University of Chile by mandate of the Ministry of Planning and Cooperation (MIDEPLAN).

Paes de Barros and others (2009) analyse the evolution of inequality of opportunity for 19 Latin American countries and conclude that Chile has the highest level of equality. The objective of our research is to study inequality within Chile, and some of the indicators used by Paes de Barros and others (2009) are not relevant in this case. For example, timely competition of sixth grade is not an issue, because Chile has a high coverage level of primary education. We therefore chose a different set of variables that are more likely to affect the formation of human capital in Chile: namely, access to preschool, timely completion of secondary education, access to sanitary infrastructure and nutritional status[2] (see table 1).

The importance of schooling for explaining most adult socioeconomic outcomes is extensively documented in the literature (see the review in Cunha and others, 2005). Access to preschool and graduation from high

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[2] Our study thus complements the evidence in Paes de Barros and others (2009). Moreover, we perform the analysis by geographical region, which allows us to identify the most disadvantaged regions and compare the regional evolution over time.

TABLE 1

Indicators of inequality of opportunity

Number	Indicator	Type of service	Access or direct benefit	Universe (child's age)
1	Probability of completing secondary education (12th grade) on time	Education	Direct benefit	18
2	Access to preschool	Education	Access	0–5
3	Access to a good nutrition	Health	Access	0–5
4	Access to water and sanitation	Housing	Access	0–16

Source: prepared by the authors.

school represent primary outcomes in current education. Preschool attendance contributes to the formation of basic cognitive and non-cognitive skills that are needed in later stages of the educational cycle, while graduation from high school is currently the minimum level of education required for accessing most non-professional jobs. In 1990 only 16% of the child population (under 6) attended preschools and only 46% of the population of 18-year-olds had already completed secondary education. Moreover, preschool attendance and high school graduation rates were highly differentiated by household per capita income.

Access to sanitary infrastructure is defined as a categorical variable equal to one (1) when children live in dwellings with access to drinkable water and sewage treatment, and zero (0) otherwise. Sanitary infrastructure represents a basic input to health status and has been a factor behind the reduction in child mortality and morbidity. Healthier children become healthier adults, live longer and better lives, exhibit better education results and are more competitive in the labour market (Case, Fertig and Paxson, 2003; Case, Lubotsky and Paxson, 2002). In 1990, 71% of children under 16 years old had access to sanitary infrastructure. Access was strongly determined by location: children living in rural areas were particularly disadvantaged, with coverage reaching only 41%.

Finally, nutritional status is measured as a dichotomous variable that takes the value one (1) when the child's weight is normal and zero (0) otherwise. The latter category includes both over- and underweight children. Underweight children are likely to lack essential nutrients, which hinders their physical and intellectual development and has negative long-run effects on socioeconomic outcomes, while being overweight is considered a major risk to future health conditions and can also hinder emotional development. In 1990, 85% of children were classified as having good nutritional status, 9% were underweight and 5% were overweight. Good nutritional status was dependent on the socioeconomic status of the parental household: the share of children with good nutritional status was 93% in the highest income per capita quintile and 81% in the lowest quintile.

The estimation of the opportunity index requires classifying the population into subgroups according to type. The set of circumstance variables, $x = (x_1, …, x_m)$, includes parents' education, per capita family income, gender, number of siblings, family structure (number of siblings, single-parent household), and area of residence (urban versus rural).[3] The functions $\{h_k\}$ that relate each circumstance with outcomes are specific to each dimension: quadratic on education, logarithmic on income and nonparametric (dummy variables) on age and other dimensions. All functions end up being linear in the parameters, so that $h_k(x_k) = x_k \beta_k$. From the estimation of this logistic regression, we obtain estimates of the parameters $\{\beta_k\}$, denoted $\{\hat{\beta}_k\}$. Table 2 provides a complete specification of this logistic regression, which uses the same circumstance variables as Paes de Barros and others (2009).[4]

TABLE 2

Specification of separable logistic regression function

Circumstance	Specification
Gender	Free (dummy)
Parents' education	Quadratic
Per capita income	Logarithmic
Number of Siblings	Linear
Presence of parents	Free (dummy)
Area of residence (urban versus rural)	Free (dummy)

Source: prepared by the authors.

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[3] In the case of education, we also used age to predict the probability of completing each grade.

[4] Another circumstance that may be of interest is the ethnicity or race of the head of the household. Unfortunately, this information is available only for the 2006 CASEN, so the empirical application excludes this circumstance unless it is explicitly mentioned.

V

Results

Tables 3 to 6 show the results for the dimensions under evaluation: access to preschool, timely completion of secondary school, access to sanitary infrastructure and nutritional status, respectively. Each table shows the opportunity index in 1990, 1996 and 2006, providing an overview of the evolution of opportunities over the period.

Recall that the opportunity index is the product of the average coverage rate and one (1) minus the dissimilarity index, $O = p(1 - D)$. Thus, the index shows the percentage of available opportunities allocated according to the equality-of-opportunity principle. The average coverage and the dissimilarity index for each dimension and year are listed in the statistical annex.

Table 3 shows that the opportunity index for access to preschool at the national level increased from 13.3% in 1990 to 34.2% in 2006. This represents a significant improvement in the allocation of preschool attendance, although the 2006 rate is still low in absolute terms.

The opportunity index for access to preschool varies considerably across regions, although that variance fell during the period. All the regions improved significantly, but the regions that lagged the most in 1990 posted the largest gains in 2006. Thus 6 of the 13 regions had an opportunity index below 10% in 1990, whereas all but one was above 30% in 2006. This resulted in a reduction in the variance of the opportunity index among regions, although differences are still large: in 1990, the region with the best results (Tarapacá) had triple the rate of the least advanced region (Los Lagos), but the gap fell to approximately 50% in 2006.

The opportunity index for timely completion of secondary education shows a similar trend, as shown in table 4. Between 1990 and 2006, this opportunity index increased from 38% to 58% at the national level. Thus, in 2006, three out of every five 18-year-olds was graduating from high school. The results are consistent with Paes de Barros and others (2009), who find a significant increase in the probability of completing sixth grade on time between 1996 and 2006.[5] The table also shows a significant reduction in regional variation in the period. The gap between the highest and lowest regional indices decreased from a factor of three in 1990 to a factor of two in 2006.

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[5] Paes de Barros and others (2009) do not analyse the evolution of the probability of completing twelfth grade on time.

TABLE 3

Evolution of the opportunity index for access to preschool

Region	Year			Total increase 1990–2006
	1990 (percentages)	2000 (percentages)	2006 (percentages)	
I Tarapacá	23.5	28.2	43.4	0.20
II Antofagasta	12.2	27.6	33.6	0.21
III Atacama	16.6	29.3	35.1	0.18
IV Coquimbo	12.0	28.7	37.9	0.26
V Valparaíso	13.5	26.3	35.5	0.22
VI Libertador General B. O'Higgins	10.6	20.8	30.9	0.20
VII Maule	8.6	21.0	34.6	0.26
VIII Biobío	10.6	20.4	30.7	0.20
IX La Araucanía	7.9	19.7	29.9	0.22
X Los Lagos	7.5	15.2	29.0	0.21
XI Aisén del General C. I. del Campo	10.4	29.0	44.0	0.34
XII Magallanes and A. Chilena	16.5	26.0	44.4	0.28
RM Santiago Metropolitan Region	18.0	25.6	35.9	0.18
National	*13.3*	*23.6*	*34.2*	*0.21*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE 4

Evolution of the opportunity index for timely completion of secondary school

Region	Year			Total increase 1990–2006
	1990 (percentages)	2000 (percentages)	2006 (percentages)	
I Tarapacá	53.9	60.0	63.3	0.09
II Antofagasta	44.0	38.8	51.7	0.08
III Atacama	32.0	31.9	64.6	0.33
IV Coquimbo	36.1	53.7	59.9	0.24
V Valparaíso	37.1	43.9	56.5	0.19
VI Libertador General B. O'Higgins	29.6	50.5	57.3	0.28
VII Maule	21.1	46.7	53.1	0.32
VIII Biobío	38.8	39.9	61.5	0.23
IX La Araucanía	28.3	41.4	53.1	0.25
X Los Lagos	19.1	42.0	51.3	0.32
XI Aisén del General C. I. del Campo	16.7	34.9	40.1	0.23
XII Magallanes and A. Chilena	46.3	65.6	72.3	0.26
RM Santiago Metropolitan Region	46.9	55.1	61.8	0.15
National	*37.9*	*48.0*	*58.4*	*0.21*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

Not surprisingly, the regions with the best results in the opportunity index for high school graduation also have the highest positions in the opportunity index for access to preschool. Conversely, those with the worst results in graduation from secondary school also have the lowest index for access to preschool.

Table 5 shows the evolution of the opportunity index for access to potable water and sanitation. Opportunities in this area have improved significantly over time, as also reported by Paes de Barros and others (2009). The national opportunity index increased from 60% in 1990 to 83% in 2006, and the regions that lagged behind in 1990 posted the largest gains. In 1990, the most advanced regions had opportunity-adjusted coverage rates of around 80% or higher, while the lagging regions, which were mostly rural, recorded index values below 40%. The only way to improve the national index in this context was through substantial increases in the least advanced regions, which was precisely what happened during the period.

Finally, table 6 presents the evolution of the opportunity index for nutrition. This time, the opportunity index shows little progress during the period, rising slightly from 83% to 87% at the national level. One obvious explanation for this is that the high value of the index in the initial year offers little room for further improvement. This also explains the homogeneity in the distribution of opportunities across regions. However, the poor nutritional status includes both underweight and overweight children. In 1990 the ratio between these two categories was 2:1 in favour of the underweight, whereas in 2006 the ratio was 2.5:1.0 in favour of the overweight. Thus, the stability in the opportunity index over time reflects compensating trends in the poor nutritional category.

TABLE 5

Evolution to the opportunity index for access to water and sanitation

Region	Year			Total increase 1990–2006
	1990 (percentages)	2000 (percentages)	2006 (percentages)	
I Tarapacá	91.3	85.0	91.9	0.01
II Antofagasta	75.5	97.9	98.6	0.23
III Atacama	73.1	88.5	91.7	0.19
IV Coquimbo	40.0	68.8	83.3	0.43
V Valparaíso	65.2	82.6	88.3	0.23
VI Libertador General B. O'Higgins	43.3	61.7	77.6	0.34
VII Maule	37.0	54.1	68.3	0.31
VIII Biobío	41.8	60.6	72.9	0.31
IX La Araucanía	25.6	45.8	54.0	0.28
X Los Lagos	26.6	47.4	62.2	0.36
XI Aisén del General C. I. del Campo	52.8	70.1	89.8	0.37
XII Magallanes and A. Chilena	85.7	96.3	97.0	0.11
RM Santiago Metropolitan Region	86.5	90.1	94.0	0.07
National	*58.5*	*74.2*	*82.7*	*0.24*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE 6

Evolution of the opportunity index for access to good nutrition

Region	Year			Total increase 1990–2006
	1990 (percentages)	2000 (percentages)	2006 (percentages)	
I Tarapacá	85.1	88.1	88.1	0.03
II Antofagasta	86.6	86.0	86.0	–0.01
III Atacama	86.0	85.3	85.3	–0.01
IV Coquimbo	81.6	84.7	84.7	0.03
V Valparaíso	76.8	87.3	87.3	0.11
VI Libertador General B. O'Higgins	82.5	84.9	84.9	0.02
VII Maule	79.5	85.9	85.9	0.06
VIII Biobío	83.4	84.4	84.4	0.01
IX La Araucanía	82.3	84.2	84.2	0.02
X Los Lagos	86.0	86.1	86.1	0.00
XI Aisén del General C. I. del Campo	84.9	78.7	78.7	–0.06
XII Magallanes and A. Chilena	85.2	88.0	88.0	0.03
RM Santiago Metropolitan Region	83.8	86.1	86.1	0.02
National	*82.6*	*85.7*	*85.7*	*0.03*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

VI

Decomposing the change
in the opportunity index

Paes de Barros, Molinas and Saavedra (2008) propose a simple decomposition of the opportunity index into situations A and B. These can correspond to two points in time in a single country or to two countries at the same point in time. Thus, any change in the index can be decomposed into a scale effect, $\Delta \bar{p}$, and a distributional effect, Δ_D

$$\Delta = O^B - O^A = \bar{p}^B \left(1 - D^B\right) - \bar{p}^A \left(1 - D^A\right) = \Delta_{\bar{p}} + \Delta_D$$

where

$$\Delta_{\bar{p}} = \bar{p}^B \left(1 - D^A\right) - \bar{p}^A \left(1 - D^A\right) = \left(\bar{p}^B - \bar{p}^A\right)\left(1 - D^A\right)$$

and

$$\Delta_D = \bar{p}^B \left(1 - D^B\right) - \bar{p}^B \left(1 - D^A\right) = \bar{p}^B \left(D^A - D^B\right)$$

As can be easily checked, $\Delta \bar{p} + \Delta_D = \Delta$.

We go beyond this decomposition and implement a Oaxaca decomposition to Δ_D, so as to explain the distributional change as stemming from changes in circumstances (quantities) or changes in the parameters (prices). Hence,

$$D^B - D^A = D\left(X^B \beta^B\right) - D\left(X^A \beta^A\right) = \Delta_\beta + \Delta_X$$

where

$$\Delta_\beta = D\left(X^B \beta^B\right) - D\left(X^B \beta^A\right)$$

and

$$\Delta_X = D\left(X^B \beta^A\right) - D\left(X^A \beta^A\right)$$

Then, the total decomposition can be written as follows:

$$\Delta = \Delta_{\bar{p}} + \Delta_{\bar{D}} = \Delta_{\bar{p}} + \bar{p}^B \Delta_\beta + \bar{p}^B \Delta_X$$

The first term corresponds to changes in the coverage of the opportunity (the scale effect), the second term is the change in the distribution of opportunities as a result of changes in the coefficients that relate circumstances and outcomes (the price distribution effect) and the third is the change in the distribution of opportunities stemming from changes in the circumstances faced by children (the endowment distribution effect).

Decomposition results

Table 7 presents the decomposition of the changes in the opportunity index for access to preschool from 1990 to 2006, in terms of the scale effect and the distribution effect. The scale effect explains 17 of the 21 percentage points of the increase in this opportunity index at the national level. Thus, during this period there was a large, across-the-board expansion in preschool for all subgroups, regardless of type or circumstance. This can also be seen at the regional level, as the scale effect explains most of the increase in the opportunity index in every region.

Changes in the dissimilarity index explain the remaining 4 percentage points of the increase in the opportunity index. This effect reflects a more balanced distribution of opportunity among types of children, with a reduction in the gap between the most and least advantaged groups in terms of access to preschool. The Oaxaca decomposition of the distribution effect shows that the 4 percentage point impact results from large offsetting effects in circumstances (endowments and prices). Changes in endowments cause the opportunity index to increase by 14 points. This happens when the subgroups with the highest probability of attending preschool experience the largest increase in their share in the total population. This is an expected development in the context of a growing economy, because people become more educated, migrate to fast growing regions, have fewer children, and so on. On the other hand, price changes cause a decrease in the opportunity index of about 10 points. This effect originates in a reduction in the coefficients that link the disadvantaged and access to preschool, a result that has to be interpreted in the context of a large-scale effect that benefits all subgroups.

The scale effect also dominates in the decomposition of changes in the opportunity index for completing secondary education (table 8). This effect explains

TABLE 7

Decomposition of the change in the opportunity index for access to preschool

| Region | Scale effect: $\Delta\bar{p}$ | Decomposition: Increase HOI 1990–2006 | | Total increase |
| | | Distribution effect: $\bar{p}^B\Delta_\beta$ | Distribution effect: $\bar{p}^B\Delta_x$ | |
	(1)	(2)	(3)	(1)+(2)+(3)
I Tarapacá	0.17	–0.08	0.11	0.20
II Antofagasta	0.19	–0.16	0.19	0.21
III Atacama	0.16	–0.08	0.11	0.18
IV Coquimbo	0.21	–0.19	0.23	0.26
V Valparaíso	0.19	–0.14	0.17	0.22
VI Libertador O'Higgins	0.16	–0.10	0.14	0.20
VII Maule	0.20	–0.23	0.29	0.26
VIII Biobío	0.17	–0.14	0.17	0.20
IX La Araucanía	0.17	–0.18	0.22	0.22
X Los Lagos	0.17	–0.20	0.24	0.21
XI Aisén del General C. I. del Campo	0.28	–0.39	0.44	0.34
XII Magallanes and A. Chilena	0.24	–0.20	0.23	0.28
RM Santiago Metropolitan Region	0.16	–0.07	0.09	0.18
National	*0.17*	*–0.10*	*0.14*	*0.21*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE 8

Decomposition of the change in the opportunity index for timely completion of secondary education

| Region | Scale effect: $\Delta\bar{p}$ | Decomposition: Increase HOI 1990–2006 | | Total increase |
| | | Distribution effect: $\bar{p}^B\Delta_\beta$ | Distribution effect: $\bar{p}^B\Delta_x$ | |
	(1)	(2)	(3)	(1)+(2)+(3)
I Tarapacá	0.07	–0.01	0.03	0.09
II Antofagasta	0.06	0.00	0.02	0.08
III Atacama	0.25	–0.05	0.12	0.33
IV Coquimbo	0.15	0.04	0.05	0.24
V Valparaíso	0.14	0.02	0.03	0.19
VI Libertador General B. O'Higgins	0.18	0.03	0.07	0.28
VII Maule	0.22	–0.02	0.12	0.32
VIII Biobío	0.17	0.02	0.03	0.23
IX La Araucanía	0.16	0.05	0.04	0.25
X Los Lagos	0.22	–0.07	0.17	0.32
XI Aisén del General C. I. del Campo	0.19	–0.02	0.06	0.23
XII Magallanes and A. Chilena	0.18	0.00	0.08	0.26
RM Santiago Metropolitan Region	0.12	0.01	0.02	0.15
National	*0.15*	*0.03*	*0.03*	*0.21*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

15 of the 21 percentage points of the increase in the national index in 1990–2006. Every type or population subgroup increases its probability of graduating from high school, representing an across-the-board improvement in opportunities. The scale effect also dominates at the regional level, accounting for over half of the increase in the opportunity index in each region.

Changes in the direction of a more balanced distribution of opportunities in the dissimilarity index explain the remaining 5 percentage points of the increase. This time changes in endowments and prices work in the same direction, with both causing the opportunity index to increase. Therefore, all three effects are responsible for having created more opportunities to complete secondary education over time and more equality of opportunity among subgroups.

Table 9 shows that the large gains in the opportunity index for accessing sanitary infrastructure result from an across-the-board increase in coverage and from changes in endowments. The former explains 14 of the 24 percentage points of the increase in the opportunity index, while the latter explains the remaining 10 percentage points.

Changes in endowments are particularly important for regions that show the largest gains in the opportunity index, which are also the regions that lagged behind in the initial year. In seven of the thirteen regions, the opportunity index for accessing sanitary infrastructure increased by over 30 percentage points in the period under analysis; in four of these seven regions, the endowment effect explains at least half of the increase.

Finally, table 10 presents the decomposition of changes in the opportunity index for nutritional status. There is relatively little change in this index, so the decomposition is less informative than in the previous cases. Nonetheless, the scale effect predominates, explaining 2.3 of the 3.1 percentage points of the increase in this opportunity index.

TABLE 9

Decomposition of the change in opportunity index for access to water and sanitation

| Region | Scale effect: $\Delta\bar{p}$ | Decomposition: Increase HOI 1990–2006 | | Total increase |
| | | Distribution effect: $\bar{p}^B\Delta_\beta$ | Distribution effect: $\bar{p}^B\Delta_x$ | |
	(1)	(2)	(3)	(1)+(2)+(3)
I Tarapacá	0.00	0.00	0.01	0.01
II Antofagasta	0.16	−0.03	0.10	0.23
III Atacama	0.13	−0.02	0.07	0.19
IV Coquimbo	0.25	−0.03	0.21	0.43
V Valparaíso	0.16	−0.02	0.09	0.23
VI Libertador General B. O'Higgins	0.19	0.01	0.14	0.34
VII Maule	0.17	0.01	0.13	0.31
VIII Biobío	0.21	−0.06	0.15	0.31
IX La Araucanía	0.18	−0.04	0.15	0.28
X Los Lagos	0.21	−0.06	0.20	0.36
XI Aisén del General C. I. del Campo	0.24	−0.03	0.16	0.37
XII Magallanes and A. Chilena	0.08	0.00	0.04	0.11
RM Santiago Metropolitan Region	0.05	0.01	0.02	0.07
National	*0.14*	*0.00*	*0.09*	*0.24*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE 10

Decomposition of the change in the opportunity index for good nutrition

| Region | Scale effect: $\Delta\bar{p}$ | Decomposition: Increase HOI 1990–2006 | | Total increase |
| | | Distribution effect: $\bar{p}^B\Delta_\beta$ | Distribution effect: $\bar{p}^B\Delta_x$ | |
	(1)	(2)	(3)	(1)+(2)+(3)
I Tarapacá	0.022	0.004	0.004	0.031
II Antofagasta	–0.010	–0.007	0.012	–0.006
III Atacama	–0.011	–0.008	0.012	–0.007
IV Coquimbo	0.024	0.004	0.002	0.031
V Valparaíso	0.092	–0.015	0.029	0.106
VI Libertador General B. O'Higgins	0.018	0.004	0.002	0.024
VII Maule	0.056	0.000	0.008	0.064
VIII Biobío	0.006	–0.001	0.006	0.010
IX La Araucanía	0.012	0.004	0.003	0.019
X Los Lagos	–0.002	–0.004	0.008	0.001
XI Aisén del General C. I. del Campo	–0.061	–0.031	0.031	–0.061
XII Magallanes and A. Chilena	0.022	0.004	0.002	0.028
RM Santiago Metropolitan Region	0.017	0.003	0.003	0.024
National	*0.023*	*0.006*	*0.002*	*0.031*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

VII

Concluding remarks

The paper assesses the impact of circumstances on the following intermediate outcomes: access to preschool, timely completion of secondary education, access to sanitary infrastructure and good nutritional status. The circumstances include gender, the mother's level of education, the father's level of education, the location of the household, per capita household income and family structure.

The results show a reduction in inequality of opportunity between 1990 and 2006. The gains are of two classes. First, coverage has increased substantially, leading to an across-the-board improvement in opportunities. Second, there has been a reduction in the access probabilities across population subgroups, resulting in a more balanced playing field.

The evidence presented in the paper suggests that Chile has been successful in reducing inequality of opportunity, together with poverty and income inequality. However, the starting point of the sample period was characterized by high inequality in opportunities and outcomes. Thus, while the reduction in inequality is good news, Chile still has a long way to go to achieve an equitable distribution of welfare.

The results in this paper must be interpreted simply as a gauge of the evolution of opportunities in the country, because they are based on a specific set of intermediate outcomes. Other key determinants of human capital need to be evaluated in the future to support this assessment of the evolution of opportunities, including health-related variables and the quality of schooling.

There is a significant gap in the opportunity index across Chilean regions, which reflects differences in both coverage rates and the distribution of opportunities within regions. The regions converged somewhat in 1990–2006, as the regions that lagged the most in 1990 posted the largest gains in 2006. There are still large regional differences, however, which add to the inequality of opportunity.

(Original: English)

Bibliography

Arneson, R. (1989), "Equality and equal opportunity for welfare", *Philosophical Studies*, vol. 56, No. 1, New York, Springer.

Bourguignon, F., F. Ferreira and M. Menéndez (2003), "Inequality of outcomes and inequality of opportunities in Brazil", *Policy Research Working Paper Series*, No. 3174, Washington, D.C., World Bank.

Case, A., A. Fertig and C. Paxson (2003), "From cradle to grave? The lasting impact of childhood health and circumstance", *nber Working Paper*, No. 9788, Cambridge, Massachusetts, National Bureau of Economic Research.

Case, A., D. Lubotsky and C. Paxson (2002), "Economic status and health in childhood: the origins of the gradient", *American Economic Review*, vol. 92, No. 5, Nashville, Tennessee, American Economic Association.

cedlas (Centro de Estudios Distributivos, Laborales y Sociales) (2009), "Cambios en la desigualdad del ingreso en América Latina. Contribución de sus principales determinantes (1995-2006)", *Investigación para la política pública. Desarrollo incluyente* (id-15-2009), New York, Regional Bureau for Latin America and the Caribbean, United Nations Development Programme (undp).

Contreras, D. (2003), "Poverty and inequality in a rapid growth economy: Chile 1990-1996", *Journal of Development Studies*, vol. 39, No. 3, London, Routledge.

Cunha, F. and others (2005), "Interpreting the evidence on life cycle skill formation", *nber Working Paper*, No. 11331, Cambridge, Massachusetts, National Bureau of Economic Research, May.

De Ferranti, D. and others (2003), *Inequality in Latin America and the Caribbean: Breaking with History?*, Washington, D.C., World Bank.

Eberhard, J. and E. Engel (2008), "The educational transition and decreasing wage inequality", Yale, Department of Economics, Yale University, draft.

Esping-Andersen, G. (1999), *Social Foundations of Postindustrial Economics*, New York, Oxford University Press.

Ferreira, F. and J. Gignoux (2008), "Inequality of economic opportunity in Latin America", *Regional Study, Measuring Inequality of Opportunities in Latin America and the Caribbean*, vol. 2: Background papers and appendices, Washington, D.C., World Bank.

Larrañaga, O. (2009), "Inequality, poverty and social policy: recent trends in Chile", *oecd Social, Employment and Migration Working Papers*, No. 85, Paris, OECD Publishing.

Larrañaga, O. and R. Herrera (2008), "Los recientes cambios en la desigualdad y la pobreza en Chile", *Estudios públicos*, No. 109, Santiago, Chile, Centre for Public Studies.

Paes de Barros, R., J. Molinas and J. Saavedra (2008), "Measuring inequality of opportunities for children", Background Paper, Washington, D.C., World Bank.

Paes de Barros, R. and others (2009), *Measuring Inequality of Opportunities in Latin America and the Caribbean*, Washington, D.C., World Bank.

Peragine, V. (2004), "Ranking income distributions according to equality of opportunity", *Journal of Economic Inequality*, vol. 2, No. 1, New York, Springer.

Roemer, J. (1998), *Equality of Opportunity*, Cambridge, Massachusetts, Harvard University Press.

Sen, A. (1999), *Development as Freedom*, New York, Knopf.

STATISTICAL ANNEX

TABLE A-1

Dissimilarity index for timely completion of secondary education (*D*)

Region	Year			Reduction 1990-2006
	1990	2000	2006	
I Tarapacá	0.10	0.09	0.07	0.03
II Antofagasta	0.13	0.15	0.10	0.03
III Atacama	0.17	0.20	0.07	0.10
IV Coquimbo	0.20	0.12	0.08	0.13
V Valparaíso	0.17	0.14	0.09	0.08
VI Libertador General B. O'Higgins	0.23	0.13	0.07	0.16
VII Maule	0.28	0.15	0.10	0.18
VIII Biobío	0.17	0.17	0.08	0.08
IX La Araucanía	0.25	0.19	0.11	0.15
X Los Lagos	0.27	0.14	0.09	0.18
XI Aisén del General C. I. del Campo	0.23	0.14	0.15	0.09
XII Magallanes and A. Chilena	0.14	0.09	0.03	0.10
RM Santiago Metropolitan Region	0.13	0.12	0.09	0.04
National	*0.18*	*0.15*	*0.09*	*0.09*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (casen) for 1990, 2000 and 2006.

TABLE A-2

Coverage of timely completion of secondary education (*p*)

Region	Year			Increase 1990-2006
	1990	2000	2006	
I Tarapacá	0.60	0.66	0.68	0.08
II Antofagasta	0.50	0.46	0.57	0.07
III Atacama	0.39	0.40	0.69	0.31
IV Coquimbo	0.45	0.61	0.65	0.19
V Valparaíso	0.45	0.51	0.62	0.17
VI Libertador General B. O'Higgins	0.39	0.58	0.62	0.23
VII Maule	0.29	0.55	0.59	0.30
VIII Biobío	0.47	0.48	0.67	0.20
IX La Araucanía	0.38s	0.51	0.59	0.21
X Los Lagos	0.26	0.49	0.57	0.30
XI Aisén del General C. I. del Campo	0.22	0.40	0.47	0.25
XII Magallanes and A. Chilena	0.54	0.72	0.75	0.21
RM Santiago Metropolitan Region	0.54	0.62	0.68	0.14
National	*0.46*	*0.56*	*0.64*	*0.18*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-3

Dissimilarity index for access to preschool (*D*)

Region	Year			Reduction 1990-2006
	1990	2000	2006	
I Tarapacá	0.10	0.09	0.04	0.06
II Antofagasta	0.12	0.10	0.04	0.08
III Atacama	0.12	0.09	0.05	0.06
IV Coquimbo	0.18	0.13	0.06	0.12
V Valparaíso	0.13	0.10	0.06	0.07
VI Libertador General B. O'Higgins	0.21	0.15	0.09	0.12
VII Maule	0.24	0.15	0.09	0.15
VIII Biobío	0.16	0.15	0.07	0.09
IX La Araucanía	0.24	0.16	0.10	0.14
X Los Lagos	0.22	0.16	0.09	0.13
XI Aisén del General C. I. del Campo	0.17	0.11	0.05	0.12
XII Magallanes and A. Chilena	0.11	0.09	0.04	0.07
RM Santiago Metropolitan Region	0.11	0.12	0.05	0.06
National	*0.17*	*0.13*	*0.07*	*0.10*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-4

Coverage of access to preschool (_p_)

Region	Year			Increase 1990-2006
	1990	2000	2006	
I Tarapacá	0.26	0.31	0.45	0.19
II Antofagasta	0.14	0.31	0.35	0.21
III Atacama	0.19	0.32	0.37	0.18
IV Coquimbo	0.15	0.33	0.41	0.26
V Valparaíso	0.15	0.29	0.38	0.22
VI Libertador General B. O'Higgins	0.13	0.24	0.34	0.20
VII Maule	0.11	0.25	0.38	0.27
VIII Biobío	0.13	0.24	0.33	0.21
IX La Araucanía	0.10	0.23	0.33	0.23
X Los Lagos	0.10	0.18	0.32	0.22
XI Aisén del General C. I. del Campo	0.12	0.33	0.46	0.34
XII Magallanes and A. Chilena	0.19	0.29	0.46	0.28
RM Santiago Metropolitan Region	0.20	0.29	0.38	0.18
National	_0.16_	_0.27_	_0.37_	_0.21_

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-5

Dissimilarity index for access to water and sanitation (_D_)

Region	Year			Reduction 1990-2006
	1990	2000	2006	
I Tarapacá	0.03	0.05	0.03	0.00
II Antofagasta	0.07	0.01	0.00	0.07
III Atacama	0.09	0.04	0.03	0.06
IV Coquimbo	0.27	0.15	0.07	0.20
V Valparaíso	0.12	0.07	0.04	0.08
VI Libertador General B. O'Higgins	0.27	0.19	0.10	0.18
VII Maule	0.32	0.23	0.14	0.18
VIII Biobío	0.23	0.17	0.11	0.12
IX La Araucanía	0.37	0.27	0.22	0.16
X Los Lagos	0.36	0.25	0.17	0.19
XI Aisén del General C. I. del Campo	0.18	0.13	0.04	0.14
XII Magallanes and A. Chilena	0.05	0.01	0.01	0.04
RM Santiago Metropolitan Region	0.04	0.03	0.02	0.02
National	_0.18_	_0.11_	_0.07_	_0.11_

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-6

Coverage of access to water and sanitation (*p*)

Region	Year			Increase 1990-2006
	1990	2000	2006	
I Tarapacá	0.94	0.89	0.94	0.00
II Antofagasta	0.81	0.99	0.99	0.18
III Atacama	0.80	0.93	0.94	0.14
IV Coquimbo	0.55	0.81	0.90	0.35
V Valparaíso	0.74	0.89	0.92	0.18
VI Libertador General B. O'Higgins	0.60	0.76	0.86	0.26
VII Maule	0.55	0.70	0.80	0.25
VIII Biobío	0.54	0.73	0.82	0.28
IX La Araucanía	0.41	0.63	0.69	0.28
X Los Lagos	0.41	0.64	0.75	0.33
XI Aisén del General C. I. del Campo	0.65	0.80	0.94	0.29
XII Magallanes and A. Chilena	0.90	0.97	0.98	0.08
RM Santiago Metropolitan Region	0.90	0.93	0.96	0.05
National	*0.71*	*0.83*	*0.89*	*0.18*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-7

Dissimilarity index for good nutritional status (*D*)

Region	Year			Reduction 1990-2006
	1990	2000	2006	
I Tarapacá	0.02	0.02	0.01	0.01
II Antofagasta	0.02	0.02	0.01	0.01
III Atacama	0.01	0.02	0.01	0.01
IV Coquimbo	0.02	0.02	0.01	0.01
V Valparaíso	0.03	0.01	0.01	0.02
VI Libertador General B. O'Higgins	0.02	0.02	0.01	0.01
VII Maule	0.02	0.02	0.01	0.01
VIII Biobío	0.02	0.02	0.01	0.01
IX La Araucanía	0.02	0.02	0.01	0.01
X Los Lagos	0.01	0.02	0.01	0.00
XI Aisén del General C. I. del Campo	0.02	0.03	0.02	0.00
XII Magallanes and A. Chilena	0.02	0.02	0.01	0.01
RM Santiago Metropolitan Region	0.02	0.02	0.01	0.01
National	*0.02*	*0.02*	*0.01*	*0.01*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.

TABLE A-8

Coverage of good nutritional status (*p*)

Region	Year			Increase 1990-2006
	1990	2000	2006	
I Tarapacá	0.87	0.83	0.90	0.03
II Antofagasta	0.88	0.87	0.87	−0.01
III Atacama	0.87	0.86	0.88	0.01
IV Coquimbo	0.83	0.85	0.87	0.04
V Valparaíso	0.79	0.89	0.89	0.10
VI Libertador General B. O'Higgins	0.84	0.85	0.88	0.04
VII Maule	0.81	0.83	0.89	0.07
VIII Biobío	0.85	0.84	0.87	0.02
IX La Araucanía	0.84	0.85	0.86	0.02
X Los Lagos	0.87	0.87	0.89	0.02
XI Aisén del General C. I. del Campo	0.86	0.80	0.82	−0.04
XII Magallanes and A. Chilena	0.87	0.85	0.92	0.06
RM Santiago Metropolitan Region	0.85	0.86	0.88	0.02
National	*0.84*	*0.86*	*0.88*	*0.03*

Source: Authors' calculations, on the basis of the National Characterization Socioeconomic Survey (CASEN) for 1990, 2000 and 2006.