TITLE: Intergenerational Mobility, the Case Study of Chile

AUTHOR: Alejandra Paz Rivera Vicencio

UNDERGRADUATE: Economics

TUTOR: Maite Cabeza Gutés

DATE: 7/06/2019

ABSTRACT

This Bachelor's thesis focuses on the study of intergenerational social mobility which can help understanding how inequality might be transferred from generation to generation. In the first part of the thesis, some of the key contributions of the literature are revised, including both, how intergenerational mobility is measured and also, what might determine for this type of mobility to increase or decrease. Some general trends and patterns included in the literature are illustrated, followed by some initial correlations between intergenerational mobility and its proposed predictors as an initial step to try to explain some of the observed differences in the trends and patterns discussed. Finally, the case of Chile is used as a case study. The role of intergenerational mobility in Chile is examined using research of other authors and an exercise to try to measure Chile's intergenerational mobility is followed by using "2001 Chilean Mobility Survey".

Key words: social mobility, intergenerational mobility, inequality, education, Chile.

INDEX

1. INTRODUCTION

Intergenerational mobility is a widely studied concept in social sciences both in economics, political science or sociology. It represents equality of opportunity of a given society, by studying the chances of achieving a better socioeconomic situation than the previous generation.

Poverty and inequality are important issues, not only in developing countries but also in high-income countries, where there has been a substantial rise in inequality and therefore, in poverty. In fact, reducing poverty and inequality are part of the UN's sustainable development goals of 2030 (United Nations, 2015). These important topics in economics, are profoundly related with intergenerational mobility. Inequality and poverty, as we shall discuss, make a society more immobile. Simultaneously a lower intergenerational mobility can foment and perpetuate the differences produced by poverty and inequality.

Inequality represents the distribution of resources in a specific point of time. On the other hand, intergenerational mobility portrays equality of opportunity. A high degree of inequality could be acceptable, if it is accompanied with high social mobility, especially intergenerational mobility, since a greater social mobility can lead to better incentives for individuals and promotes a better allocation of resources (Corak, 2013, pp. 97) (Torche, 2005a, pp. 424) (Ferreira, 2013, pp. 55) (Núñez and Risco, 2005, pp.1).

Intergenerational mobility helps us understanding why the transmission of economic disadvantage do not work identically across countries, nor transmission of inequality is shaped equally along the different regions of a given.

In the literature are identified some transmitters of intergenerational mobility, such as inequality and education, which are widely studied. As well as, segregation, non-monetary investments or school quality that could show a correlation with social mobility. These transmitters can work as predictors of intergenerational mobility and could underpin the initial socioeconomic differences that children from different backgrounds face.

Measuring intergenerational mobility is difficult, as countries do not always have the necessary data. Data of intergenerational mobility is usually obtained by surveys which are expensive and arduous to due to term. Besides, too often the data available is mostly not comparable across countries, which makes the study even tougher.

In fact, the initial goal of this thesis was in understanding intergenerational mobility of poor countries of LAC (Latin America and the Caribbean), and especially Honduras. The lack of data and the difficulties on obtaining information have led the research to another path. The case of Chile is studied instead.

The objective of this thesis is to understand intergenerational mobility, focusing on the different patterns and trends and the predictors that cause differences across countries and within a given country. The other objective of this thesis is to describe and give comprehension of intergenerational mobility in Chile.

In an era of rising inequality, intergenerational mobility should be an aspect to focus on, especially for policymakers so public programmes do not exacerbate the effects of the transmission of economic disadvantages (Corak, 2013, pp. 95-97).

In section 2 the concept of intergenerational mobility, some measurement and some trends and patterns will be in explained in more detail. In section 3 some of the predictors identified in the literature of intergenerational mobility will be reviewed. Section 4 will show the correlations of predictors across countries. In section 5 the case on Chile's intergenerational mobility will be described. Finally, in section 6 the conclusions of this thesis are included.

2. INTERGENERATIONAL MOBILITY, MEASUREMENT, PATTERNS AND TRENDS

2.1. The Concept of Intergenerational Mobility

Social mobility contemplates the possibility of movement among social classes or along the income distribution. It can be approached within or between generations, depending on whether the achievement of and individual is compared to a previous point of his career or to a previous generation (Lopreato et al., 1970, pp. 201-202).

Intragenerational mobility could be understood as the contrast between an individual's level of outcome achieved and the level of outcome of an earlier point of his life. Intragenerational mobility is studied with the purpose of answering which is the degree of importance of the initial point in reaching the final level of outcome. Hence, whether the initial point of a career defines the chances of moving up on the outcome distribution

of a specific generation (Lopreato et al., 1970, pp. 202-203). Intragenerational mobility refers to the degree of mobility in a given population, tracking and individual and his movements across the distribution of outcome (Sapelli, 2013, pp. 2-4).

Intergenerational mobility, in which this research focuses on, could be defined as the transmission of inequality across generations. For instance, to which degree the parents' achievement of outcome determines the achievement of their child, moulding the probabilities of an individual to move up within the income distribution. Intergenerational mobility, therefore, allows the comprehension of the likelihood of persisting in the top or the bottom of a society's income distribution relative to their parents' position (Neidhöfer et al., 2018, pp. 329) (Chetty et al., 2014a, pp. 141).

Intergenerational and intragenerational mobility are related. A high degree of intergenerational mobility is positive, as the achievement of outcome depends more on self-effort, which could promote intragenerational mobility (Sapelli, 2013, pp. 4).

Intergenerational mobility is not only focused on income, as there are other outcomes that define the opportunities of children. Education is a key outcome of intergenerational mobility. Education is used in Neidhöfer et al. (2018) to measure intergenerational mobility as it has a double function; it is a driver of human development and a proxy of social status, there is a correlation between income mobility and educational mobility. Besides education has some advantages as it normally is invariant in an adult age, eliminating life-cycle effects of income (Neidhöfer et al., 2018, pp. 332).

2.2. Measuring Intergenerational Mobility

In this section some of the measures of intergenerational mobility are discussed.

Intergenerational mobility can be measured using relative or absolute measures. The focus of relative mobility is to answer what is the level of outcomes of children relative to their different family backgrounds. On the other hand, absolute mobility would answer that given a level of family outcome, what will be the mean outcome of their offspring (Chetty et al, 2014b, pp. 1560-1562).

The most commonly used measure of relative mobility is the Intergenerational Income Elasticity (IGE), which can be expressed in terms of a regression of parents' income (y^p) on the income of their child ($y^{c)}$ (Chetty et al., 2014b, pp. 1560), like:

Consider

$$(1) \quad \log(y_i^c) = \beta_0 + \beta_1 \log\left(y_i^p\right) + \varepsilon$$

Then, the least squares version of parameter β_1 in (1) at a population level is:

$$(2) \quad \beta_1 = \frac{E(log(y^c)\, log(y^p)) - E(log(y^c))E(log(y^p))}{E(log^2(y^p)) - [E(log(y^p))]^2} = IGE$$

Expression (2) will give us the IGE. This can be rewritten in terms of correlation between log (y^p) and log (y^c), ρ, and their standard deviations σ as[1]:

$$(3) \quad IGE = \rho_{\log(y^p)\log(y^c)} * \frac{\sigma_{\log(y^c)}}{\sigma_{\log(y^p)}}$$

Notice that a value of IGE=1 would indicate that there is a total dependence between the income that children achieve and the income of the parents, which implies that there is intergenerational immobility. Whereas, if IGE=0 there is not such dependence relationship, meaning that there exists intergenerational mobility.

It is easy to see that a sample version of IGE is given by:

$$(4) \quad IGE = r_{\log(y_i^p)\log(y_i^c)} * \frac{SD(\log(y_i^c))}{SD(\log(y_i^p))}$$

Where "r" is the sample version of the correlation between log (y^p) and log (y^c), which at the population level is represented by ρ, and SD stands for standard deviation, that at a population level was σ.

A different approach to measure relative mobility is to use rank-rank regressions. In this regression R is the dependent variable, which is the rank of the child's outcome in children's distribution of outcome. The regressor is P, that is the rank of parents' outcome in the distribution of outcome (Chetty et al., 2014b, pp. 1561). The distributions are divided in quantiles, which are intervals of the distribution. For instance, if the distribution is divided in centiles, then the regression consists on the centile on which

[1] Since: $IGE = \frac{E(\log(y^c)\log(y^p)) - E(\log(y^c))E(\log(y^p))}{E(\log^2(y^p)) - [E(\log(y^p))]^2} * \frac{SD(\log(y^c))}{SD(\log(y^p))}$

parents' outcome is situated as the predictor, and the centile that child's outcome holds as the dependent variable. Thus, the regression could be expressed like:

Consider

$$(5) \quad R_i = \beta_0 + \beta_1 P_i + \varepsilon$$

Where "i" denotes the quantile. The least squares version of β_1 in (5) at a population level is:

$$(6) \quad \beta_1 = \frac{E(RP) - E(R)E(P)}{E(P^2) - [E(P)]^2} = \frac{cov(R,P)}{var(P)}$$

The effect of the rank that parents occupy on the rank of children is given by (6), which can be rewritten in terms of the correlation coefficient, ρ, between the rank of the child and the rank of the parents as[2]:

$$(7) \quad \beta_1 = \rho_{RP}$$

Notice that if β_1=1, there is a total dependence between the rank of parents and the rank that children hold in the distribution, which equals to intergenerational immobility. If β_1=0, there is intergenerational mobility between the ranks of parents and offspring.

It is simple to see that the sample version of β_1 is:

$$(8) \quad \widehat{\beta_1} = r_{RP}$$

In (8), "r" stands for the correlation coefficient, which was previously denoted by ρ, at a sample level.

On the other hand, a regression can be used to measure educational intergenerational mobility as it is used in Neidhöfer et al. (2018), basing the regression on educational outcomes (Neidhöfer et al., 2018, pp. 331). Where y is the educational outcome of children and x is the educational outcome of parents. The regression could be expressed as:

Consider

$$(9) \quad y = \beta_0 + \beta_1 x + \varepsilon$$

[2] Since: $\beta_1 = \frac{cov(R,P)}{var(P)} * \frac{sd(R)}{sd(R)} = \rho_{RP}$ considering that the standard deviations are the same.

The least squares expression of β_1 in (9) at a population level is:

$$(10) \qquad \beta_1 = \frac{E(xy)-E(x)E(y)}{E(x^2)-[E(x)]^2}$$

Where (10) can be expressed in terms of the correlation coefficient, ρ, between the educational outcomes of parents and the educational outcomes of children like[3]:

$$(11) \qquad \beta_1 = \rho_{xy} * \frac{\sigma_y}{\sigma_x}$$

As in the case of IGE, if β_1=1 there is total dependence between the educational outcome that a child can achieve and the outcome of the parents. On the other hand, if β_1=0, there is no such dependence relationship, so there is intergenerational educational mobility.

Expression (11) can be easily rewritten in sample terms as:

$$(12) \qquad \widehat{\beta_1} = r_{xy} * \frac{SD(y)}{SD(x)}$$

Where "r" denotes the sample correlation coefficient, in this case between the educational outcomes and SD means standard deviation.

In this type of regression controls can be included, as the age of the individuals, sex and even if the individual holds an immigrant status, so the regressor coefficient does not capture other demographic effects, as it is done in Jerrim and Macmillan (2015) and in Neidhöfer et al. (2018).

Variance is measured in squared units of the studied variable. On the other hand, covariance is measured in the different units of the variables. Neither of them uses a standard unit so it is possible to observe to which degree the variables move together, it is only observable if the variables move in the same direction. To avoid the problem of unit dependence of β_1, there is a standardised β_1 which makes the coefficient unit free. It consists on multiplying the regression coefficient by the ratio of the standard deviations:

$$\beta_1^S = \beta_1 * \frac{\sigma_x}{\sigma_y}$$

[3]Since: $\beta_1 = \frac{\sigma_{xy}}{\sigma_x^2} * \frac{\sigma_y}{\sigma_y} = \frac{\sigma_{xy}}{\sigma_x \sigma_y} * \frac{\sigma_y}{\sigma_x}$

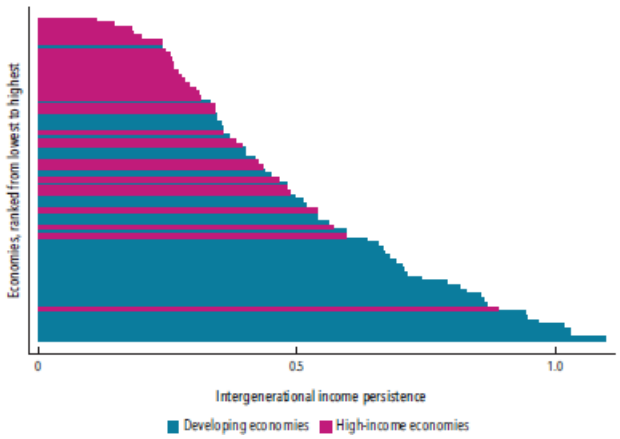
Relative mobility pictures the transmission of inequality, but it does not show if the possibility of movement implies that children have a better or a worse outcome than their parents.

2.3. Patterns and Trends in Intergenerational Mobility

In unequal societies, the degree in which economic advantages or disadvantages are transferred across generations tends to be more considerable (Corak, 2013, pp. 80). In Nordic countries, evidence shows that lower inequality, measured by the Gini coefficient, leads to more intergenerational mobility. In contrast, more unequal countries like Italy, United Kingdom and United States show a lower mobility across generations (Corak, 2013, pp. 81). The differences across countries are related to the weight that family's influence, the labour market or public policies have in determining the chances that children have (Corak, 2013, pp. 85). Nonetheless, some countries, like Denmark, tend to combine high mobility with a dynasty of the top earners in the income distribution (Corak, 2013, pp. 99). Demographic diversity must be considered in order to make comparisons across countries, as comparing a country with a homogeneous population to another with diversity can mislead the drivers of intergenerational mobility (Corak, 2013, pp. 86).

Intergenerational income mobility tends to be lower in developing regions, even if the income mobility in the US is comparable to these developing economies (Narayan et al., 2018, pp. 139).

Figure 1: Intergenerational Income Mobility



Source: Narayan et al. (2018), pp. 139

As it can be observed in Figure 1, high income economies tend to be much more mobiles, showing that the lowest values of income persistence are obtained in high-income

countries. On the other hand, the highest values of income persistence, meant as being an immobile country, are obtained in developing countries. These results about income intergenerational mobility are from the study of the World Bank done by Narayan et al. (2018), which allows certain comparability across countries. Authors use different measures of intergenerational mobility depending on the databases available. Data for intergenerational mobility measures is difficult to access, as it is very specific and requires the track of families during time, which is expensive and laborious.

Another approach of intergenerational mobility is educational mobility. Educational mobility is linked with income mobility and it is widely studied in Narayan et al. (2018).

In developing economies, it is observed that a great share of population did not acquire any formal education. In addition, there is a low percentage of population in less economically developed countries (LEDCS) that achieved education of a tertiary level. There is a persistence of educational outcomes in developing regions, as children do no differ in their achievement of education from the level of their parents. The persistence of educational outcomes is argued to be greater in LEDCS than in high-income economies (Narayan et al., 2018, pp. 96-97).

In some developing regions like LAC, East Asia and Pacific, Middle East and North Africa, the has been an improvement in educational relative mobility from 1950 to 1980. On the other hand, Sub-Saharan Africa has experimented a negative change in intergenerational relative mobility, and South Asia has suffered no changes. It is curious the case of a rich region like Europe and Central Asia, that have seen an increase in educational persistence between generations, but at the same time High-income economies have achieved a better degree of relative mobility (Narayan et al., 2018, pp. 101).

The changes in educational absolute mobility between 1950-1980 are similar to the ones experimented in relative mobility. The developing regions that acquired a better degree of relative mobility, have also improved in absolute mobility terms, in this case Sub-Saharan Africa is included in the group. High-income economies, Europe and Central Asia have decreased on absolute mobility, meaning that a lower share of individuals have achieved a higher educational attainment than their parents (Narayan et al., 2018, pp. 101).

The persistence at the top or at the bottom of the educational distribution seems to be a global pattern. The shares of population remaining at the top or bottom are not very distant between LEDCS and High-income economies (Narayan et al., 2018, pp. 108).

Table 1: Intergeneration Educational and Income Mobility

Country Name	Cohort	Intergenerational Educational Mobility	Intergenerational Income Mobility
Belarus	1970	0,27	0,34
Belgium	1960	0,36	0,18
Bolivia	1970	0,69	0,87
Canada	1960	0,22	0,27
Chile	1970	0,46	0,57
Colombia	1970	0,68	1,10
Croatia	1970	0,57	0,46
Cyprus	1960	0,38	0,34
Czech Republic	1960	0,42	0,43
Denmark	1960	0,38	0,15
Ecuador	1970	0,65	1,03
Finland	1960	0,28	0,11
France	1960	0,37	0,36
Germany	1960	0,47	0,24
Greece	1960	0,43	0,31
Guatemala	1970	0,93	1,02
Ireland	1960	0,34	0,26
Italy	1960	0,51	0,49
Netherlands	1960	0,29	0,30
Norway	1960	0,49	0,20
Peru	1960	0,70	0,67
Portugal	1960	0,77	0,28
Russian Federation	1960	0,18	0,33
Spain	1960	0,50	0,42
Sweden	1960	0,29	0,26
Switzerland	1960	0,31	0,25
United Kingdom	1960	0,36	0,48
United States	1960	0,45	0,54

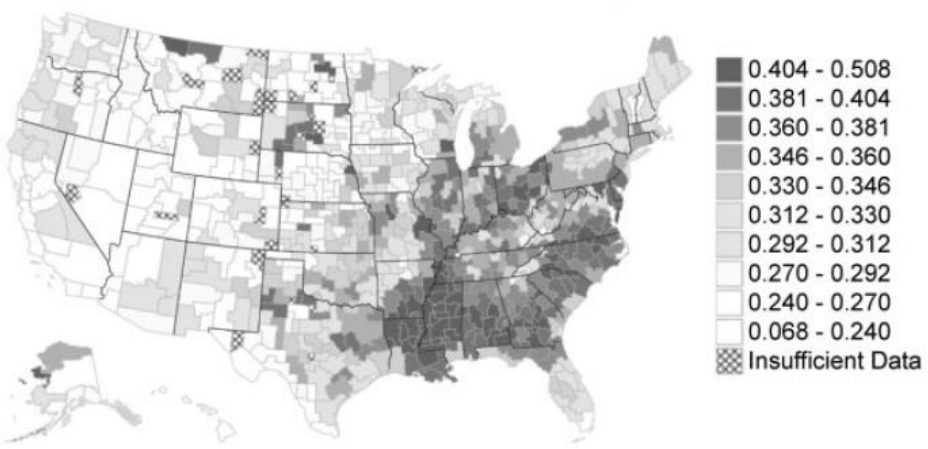
Source: Own elaboration with data from GDIM (2018)

As it can be observed in Table 1, intergenerational mobility varies strongly across countries even if they pertain to the same region. Countries that present a high intergenerational income persistence, tend to have a lower mobility in education terms.

The paper by Chetty et al. (2014b), examines the different spatial patterns in the United States and the possible drivers of intergenerational mobility. The authors use county zones (CZs), which are small geographical units consisting in an aggregation of counties (Chetty et al., 2014b, pp. 1586). Interpreting the CZs as the area where the child grew up, even if afterwards he moved to another CZs (Chetty et al., 2014b, pp. 1587). Based on their data analysis, spatial patterns are found; upward mobility varies strongly at regional level, it varies within a region and urban areas present a lower intergenerational mobility

than rural areas. In addition, evidence shows that more intergenerationally mobile areas have better absolute outcomes from low-income background children (Chetty et al., 2014b, pp. 1597).

Figure 2: Relative Mobility measured as Rank-Rank slopes in the US by county zones



Source: Chetty et al. (2014b) pp. 1591.

Chetty et al. (2014b) founds great differences in intergenerational mobility by county zones, as it can be appreciated in Figure 2. Near cities can show different levels of transmission of economic advantages, and there is a clear pattern of more mobility in the west of the US. Through Figure 2 it is observable that inside the measure of intergenerational mobility of the US, different realities are hidden.

Relative mobility in Europe is also quite different across the countries. United Kingdom, Italy and France, for example, have a lower mobility, as the earnings of parents have a higher weight in determining the future earnings of children. On the other hand, Nordic countries have a low intergenerational earnings elasticity, therefore the countries are more mobile. In Southern Europe and United Kingdom, if the father achieved tertiary education the wage persistence is even tighter, while in Nordic countries, Austria and Greece the link is not that strong (OEDC, 2010, pp. 186-188).

On the other hand, in terms of educational mobility in Europe there is a high persistence on educational attainment between generations. Children from more educated families, have higher probabilities of achieving tertiary education. On the other hand, coming from a low-educated family, increases the probabilities of dropping education before the tertiary level. For instance, this is a trend in all European OEDC countries (OEDC, 2010, pp. 190-191).

Latin America consists in various developing regions and countries that have achieved a rapid growth in the last decades. Thereby the continent portrays an image of unequal and in some cases developing regions. High income inequality accompanied with low intergenerational mobility are common trends in Latin American countries (Ferreira et al., 2013, pp. 55).

Latin America presents a high intergenerational educational persistence, even if in the last decades it has improved. However, it is important to highlight that intergenerational educational persistence is a problem in Latin America and it is still higher than in developed and developing countries (Ferreira et al., 2013, pp. 60-62).

As it is observable in Table 1, Latin American countries are the less mobile in income. The countries of the region show values of intergenerational income mobility clearly distant from the values of other developed regions as Europe. The only country which could be similar is the US, as it shows a mobility of income not very different than Chile.

The educational gap, which is the difference between the potential years of education and the completed years, has decreased due to the expansion of education in the continent and the increase in independence from the educational antecedents of parents. Nonetheless, even if there has been and improvement, in all Latin American countries there is a dependence relationship between the level of education of parents and children (Ferreira et al., 2013, pp. 64-65).

Latin America presents immobility at the top, meaning that children whose parents are at the top of the distribution are more likely to persist at the top, and decreasing mobility at the bottom; sons and daughters from people at the bottom of the distribution are likely to live worse conditions than their parents (Neidhöfer et al., 2018, pp. 330).

The study of Neidhöfer et al. (2018) suggests that the rise in intergenerational mobility of education in Latin America is related to the decrease in income inequality experienced since the 2000's (Neidhöfer et al., 2018, pp. 330). The decline in poverty has a positive relationship with intergenerational mobility, likewise lower returns to education (Neidhöfer et al., 2018, pp. 340-341).

The mobility of younger cohorts in some countries of Latin America is similar to the patterns in the US. Evidence shows, that on average in Latin America there is a high probability of remaining in the top of the distribution of outcomes if the individual was

born in a family of the top. On the other hand, the probability of bottom-up mobility has increased in almost all the countries, but despite the rise it still has low levels (Neidhöfer et al., 2018, pp. 340-342).

The rise in intergenerational mobility observed in the sixties, seen as an increase in completed years of education, reduces the improvements of the offspring of such generation. Neidhöfer et al. (2018), also find that downward mobility, meant as having worse outcomes than the progenitors, is stable through the cohorts and is around one year of education (Neidhöfer et al., 2018, pp. 340-342).

Latin America has experienced a decrease in the degree of persistence in the bottom of the educational distribution, while the degree of persistence in the top is high and around an 80% (Neidhöfer et al., 2018, pp. 340). In addition, the authors suggest that the fall in inequality and poverty in Latin America could be due to the rise in intergenerational mobility, through the decline in returns to education as the supply of educated workers grew, since people from a low educated background could access education (Neidhöfer et al., 2018, pp. 342).

3. UNDERSTANDING INTERGENERATIONAL MOBILITY

The different trends and patterns in intergenerational mobility are due to the different factors which make family background acquire a weight in influencing the future outcomes of children. These drivers of economic advantages or disadvantages actuate in fact as predictors of the degree of intergenerational mobility.

There are clear predictors of intergenerational mobility. Chetty et al. (2014b) identify a set of variables that can be related to these different predictors and spatial variation of mobility rates (Chetty et al. 2014b, pp. 1620).

In the following subsections, the relationship between intergenerational mobility and inequality, education, non-monetary investments, segregation, family structure, school quality and differences in urban or rural locations will be explained in more detail.

3.1. Inequality

The United States is often perceived as "the land of opportunity", meaning that in the country there are possibilities of achieving success, which do not depend, or depend little, on the family background (Chetty et al., 2014b, pp. 1554). "The land of opportunity" is in fact expressing that in the United States there is equality of opportunity, which implies that the socioeconomic background has little, or none, effect in the achievement of an individual. Therefore, a higher degree of equality of opportunity is expected to rise intergenerational mobility, as the effect of the family background is lower (Núñez and Miranda, 2011, pp. 196).

The role of inequality in intergenerational mobility has been widely studied. In the same way that an increase in equality of opportunity is expected to improve intergenerational mobility, an increase in inequality is supposed to have a negative effect in intergenerational mobility. The relationship is often illustrated as the "Great Gatsby Curve", in which evidence shows that societies with a higher level of inequality experience a lower intergenerational mobility. Thus, a rise in inequality in the present can make family background acquire a more important role in determining the outcomes of younger generations (Corak, 2013, pp.79-80) (Núñez and Miranda, 2011, pp. 196).

The relationship between inequality and intergenerational mobility is rather complex, the "Great Gatsby Curve" can be interpreted as a summary of all the factors that transmit economic advantages or disadvantages (Corak, 2013, pp. 85). Inequality underpins initial differences, as it shapes the chances of accessing education or human capital investments, determines opportunities and aspirations, and moulds the structure and objectives of institutions and policies (Corak, 2013, pp. 98).

In unequal societies there are larger disparities in the investments of high and low-income families, including non-monetary investments as parental time. Income inequality promotes neighbourhood segregation, which influences in the quality of schools dampening the skill gap between social groups and decreasing the opportunities of certain groups of reaching a bachelor's degree and, thereby, better earnings (Jerrim and Macmillan, 2015, pp. 508).

A rise in the shares of income in the top 1% of the distribution, which equals to a rise in inequality, entails to having more access to human capital investment or a greater

transmission of employers and wealth for children on the top, leading to a higher weight of in the transmission of economic advantage (Corak, 2013, pp. 80).

On the other hand, income inequality measure by the Gini coefficient, as in the Great Gatsby Curve, has a rather strong negative correlation with intergenerational mobility. In contrast, the share of the top 1% of the income distribution, has a much lower negative correlation, remaining uncorrelated. Consequently, the inequality in the 99% of the distribution has a negative effect in intergenerational mobility, but the inequality of the upper tail does not, which matches the results of affluence segregation not significantly correlated with mobility (Chetty et al., 2014b, pp. 1612-1614).

3.2. Education

The transmission of socioeconomic status starts in utero, influencing early cognitive and social development of a child. The circumstances and outcomes of parents play a role in the future outcomes of children, so does neighbourhoods, schools and family connections. These factors determine the access to primary and secondary education, colleges or jobs of offspring, which shape the future earnings of offspring (Corak, 2013, pp. 85) (Jerrim and Macmillan, 2015, pp. 508).

In Neidhöfer et al. (2018), it is stated, based in Solon (2004), that intergenerational mobility decreases with the inheritability of abilities, the efficacy of human capital investment and the returns on human capital, while it increases with public investment on children's human capital. This last factor is seen by the authors as a substitute of the private investment on human capital (Neidhöfer et al., 2018, pp. 330).

Jerrim and Macmillan (2015) use parental education as a social stratification measure and focus on the role of education in child's earnings. Parental education influences child's income, which operates through different mechanisms. The first is the intergenerational correlation of education, meant as the relationship between children's and parents' educational attainment, which consists in the inheritability of skills, monetary (tuition payment) and non-monetary (helping with homework) investments. Then inequality plays a role, defining returns on education that accentuate or diminish the advantages of children with educated parents. The last mechanism lies on heredity endowments as beauty, other financial resources and social and cultural resources, which include labour market connections (Jerrim and Macmillan, 2015, pp. 511-514).

In the paper of Neidhöfer et al. (2018), the results show that intergenerational mobility is positively associated with higher income performance and more progressive public expenditure in education (Neidhöfer et al., 2018, pp. 330), particularly in primary and secondary education (Neidhöfer et al., 2018, pp. 341).

The differences between children start at an early age, before entering the labour market, which lead to the differences in intergenerational mobility in adulthood (Chetty et al. 2014b, pp. 1602). Policies promoting mainly tertiary education accentuate the transmission of inequality, as only a few have access to it. Therefore, to dampen the influence of the socioeconomic background, primary and secondary education policies are more suitable (Corak, 2013, pp. 86).

School outputs, income adjusted in Chetty et al. (2014b), are highly correlated with upward mobility, consistent with the hypothesis of the importance of differences produced during young ages (Chetty et al., 2014b, pp. 1615).

High returns to education, which are positively related with a high degree of inequality, are associated with lower intergenerational mobility. Educated parents tend to achieve a better income and they also have greater incentives to invest such income in their children as they have a better cultural capital (Corak, 2013, pp. 86) (Jerrim and Macmillan, 2015, pp. 509). In unequal societies, the persistence between the economic outcomes of parents and children, will be partly observed if low-income parents cannot borrow to invest in the human capital of their children (Neidhöfer et al., 2018, pp. 330).

3.3. Non-Monetary Investments

Nonmonetary investments, such as connections or spending time with both parents, are relevant to a child's development and shapes aspirations and motivation. Corak argues that in an era of increasing inequality, the divergence between nonmonetary investments in children from low or high-income families will lead to differences in cognitive skills, which are requisites for college (Corak, 2013, pp. 90; 92).

Labour market connections are a channel of transmission of earnings at the top of the income distribution, children employed by their parents' employer reach the same or more earnings as their predecessor in the firm. On the other hand, children employed by a different employer tend to descend in the income distribution. The transmission of employers, which consists in children and parents having the same employer, can be

interpreted as a transmission of traits and skills valuable for the firm, but evidence shows that is a matter of transmission of connections (Corak, 2013, pp. 93-94).

3.4. Segregation

In areas with a large proportion of African American population, intergenerational mobility tends to be lower (Chetty et al., 2014b, pp.1605). Both black and white population in these areas have lower mobility rates, thus the authors argue that the trend is due to differences in institutions or industries among others. Therefore, the lower mobility can be a product of segregation, affecting white and African American individuals (Chetty et al., 2014b, pp. 1607).

Segregation is argued to have harmful effects, for instance lower funding for public goods or impeding the access to nearby jobs (Chetty et al. 2014b, pp. 1608). Evidence shows that more racially segregated areas have lower intergenerational mobility, moreover areas with a high proportion of black population tend to suffer more income segregation. Thereby, income segregation could partly explain the lower rates in white population. Segregation of poverty has a negative effect in intergenerational mobility, while segregation of wealth does not. Commute times are another measure of segregation, which could operate by hindering access to jobs, thus having a negative effect in mobility (Chetty et al., 2014, pp. 1609-1611).

3.5. Family Structure

The pattern of family structure is similar to segregation, meaning that in the US CZs with a large proportion of single parents for example, tend to have lower mobility rates also in children from married couples. As it was mentioned before, spending time with both parents is an important non-monetary investment. Family structure is a variable that affects at a community level, through the stability of social environment (Chetty et al., 2014b, pp. 1616-1617).

Despite, as it happened with racial shares, family structure may capture other variables as income inequality (Chetty et al., 2014b, pp. 1619). Moreover, social capital, like religiosity or voter turnouts, are highly correlated with mobility as these factors affect children at a community level (Chetty et al., 2014b, pp. 1616).

3.6. School Quality

The use of resources in education is an important aspect for intergenerational mobility. Family background influences school environment, as their children attend different schools depending on the socioeconomic status, related with urban segregation. There is evidence on which attending a school with students from a high economic background is beneficial (OECD, 2010, pp. 189-190).

Increasing the spending on educational inputs does not necessarily improve intergenerational mobility, but allocating such inputs where are needed can make family background play a less important role. A well-targeted rise in school inputs, like quality of teacher can ameliorate equality of opportunity at early ages (OECD, 2010, pp. 192-193).

3.7. Urban vs. Rural

Rural areas tend to experience a higher degree of intergenerational mobility. In the US, living in an urban area as a child, decreases on average absolute mobility. Children that come from low-income families tend to have worse incomes if they lived in large urban areas (Chetty et al., 2014b, pp. 1593-1595).

It is important to highlight that the measures used in Chetty et al. (2014b), account the effect of urban or rural as where individuals lived at a young age. In fact, more than a 50% of children who grew up in rural areas moves to urban areas at an adult age (Chetty et al., 2014b, pp. 1595).

4. CORRELATIONS AND INTERGENERATIONAL MOBILITY

As discussed in Section 3, there are various variables that have been found to be correlated with intergenerational mobility. These variables include: inequality, education or family structure. In this section, some of these correlations are examined at a cross country level with the available data.

Data for these variables for different countries can be found in the Global Database on Intergenerational Mobility (GDIM), which was published in 2018 by the World Bank Group. Other sources used for this section are the World Bank, through the World Bank

Development Indicators, and the UN, which provided variables of marital status and divorce rates.

The different variables are obtained for 72 countries, even if some of them do not proportionate such detailed data. The data of intergenerational mobility of education is observed for the cohort of 1980, including two measures of inequality examined: GINIc 1980 and GINIp 1980 which are the Gini indexes of children's years of education and of parents' years of education respectively. All the other proxies are measured in 2010, except the crude divorce rate (2005), as it was the year with more data availability.

For further information about the countries selected and the values of the variables selected for this section, in the Appendix (Section A.7.), a table constructed for the estimates is included.

Firstly, the different correlations between the different variables were calculated. The measure of intergenerational mobility selected is the IGP 1980 (Intergenerational Persistence), which denotes mobility in education of the cohort of 1980. Lamentably, variables for intergenerational mobility of income were not available in many countries and could not be used for comparisons.

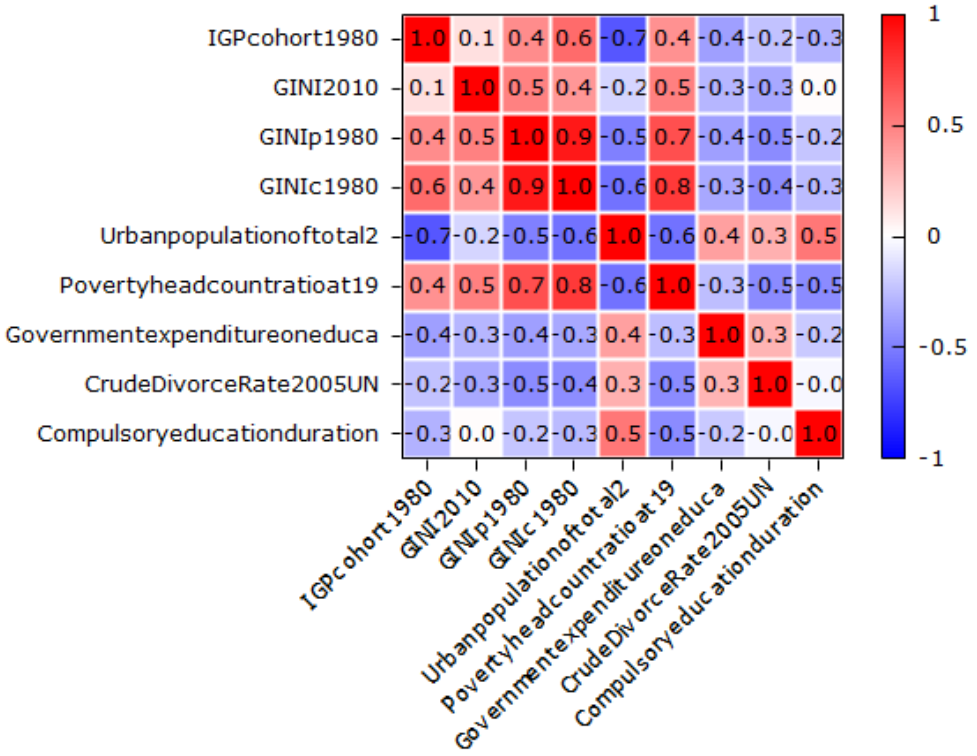
For other correlations it is used the percentage of urban population, extreme poverty measured by the headcount ratio of population living at 1,90$ a day, the government expenditure on education as a proxy of school quality, the crude divorce rate as a measure for family structure and the compulsory years of education of each country as an another measure of quality of education.

It can be observed in Table 2, that IGP presents greatest correlations with the percentage of urban population and with the GINI index of children's years of education.

In the case of urban population, the correlation is significative, as it holds a negative value of 0,7. This means, that intergenerational mobility of education and urban population in 2010, are correlated at a 70%, which is a high correlation. Urban population in 2010 is supposed to move in a different direction than IGP of the cohort from 1980, from an increase in urban population, a decrease in intergenerational mobility could be expected. This correlation does not support the results found in Chetty et al. (2014b) within the US. This could be justified by the inclusion of developing countries, as an increase in urban population could be explaining economic growth, taking into account that developed

countries tend to have a greater share of urban population and tend to be more intergenerationally mobile.

Table 2: Heat Map of Correlations[4]



Source: Own elaboration with data from GDIM (2018), World Bank (2019), UN (2009).

The second highest correlation of intergenerational persistence of education of the cohort from 1980 is GINIc, the Gini index of children's years of education. This correlation holds a positive value of 0,6. The result is significative, as it is a high correlation of the 60%. In this variable, GINIc is supposed to move in the same direction of IGP, meaning that an increase of the inequality in the children's years of education could suppose an increase in immobility.

GINIp, the gini index of parents' years of education has a lower correlation with IGP than GINIc. The result is of 0,4, which is a moderate positive correlation. The same value is calculated for the proxy of extreme poverty, moving also in the same direction of intergenerational educational persistence. On the other hand, government expenditure,

[4] Red represents a positive correlation, while blue shows a negative correlation between the two variables.

which is the selected proxy of school quality, holds a correlation of -0,4. This is a moderate negative correlation, which seems to be logic, given that an increase in government expenditure on education is expected to rise educational mobility.

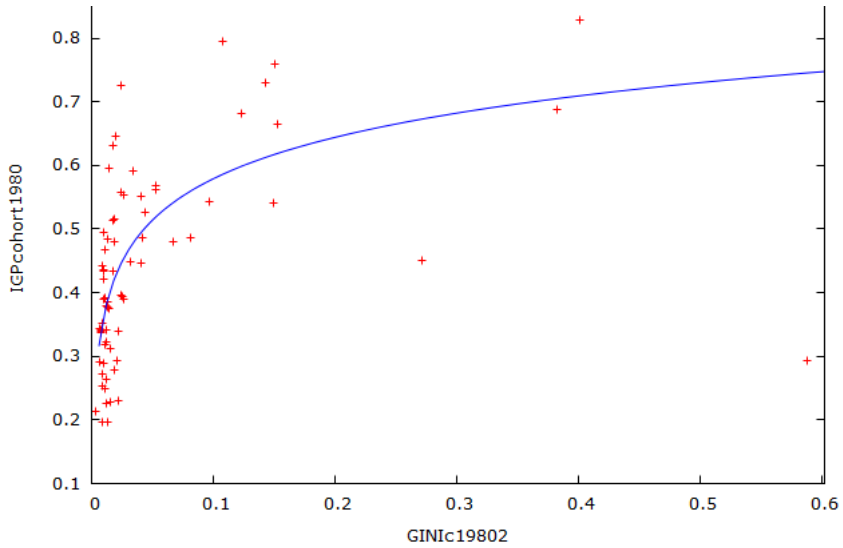
Crude divorce rate, compulsory years of education and Gini index of 2010 have very low correlation with Intergenerational Persistence (IGP) of education. The proxy of family structure is almost not showing a correlation with a negative value of 0,2, which does not seem very logic, but this result is attributed to the lack of data and maybe a bad chosen proxy of family structure. Compulsory years of education holds a negative correlation of 0,3, which is low, given that the variation in the compulsory years in the countries selected is very small. It seems to be interesting that GINI 2010 shows almost no correlation with the intergenerational mobility measure having a value of 0,1, being very low. Nonetheless, the three measures of inequality displayed show a correlation between them, which seems to be logic.

4.1. The Great Gatsby Curve

Following the previous explanations on the role of inequality in intergenerational mobility, an increase in inequality is supposed to make a society more immobile. In this subsection it is expected to show the positive relationship of inequality and IGP.

For Graph 1, GINIc was selected as a measure of inequality, given that it was the measure, between the three studied, that has a higher correlation with IGP.

Figure 3: Relationship between IGP and GINIc (minimum-square adjusted)



Source: Own elaboration with data from GDIM (2018), World Bank (2019).

The relationship between IGP and GINIc, observable in Figure 3, would represent the Great Gatsby Curve. For the 72 countries selected, the relationship between unequal societies and being less intergenerationally mobile can be observed.

More equal societies, shown by a low GINIc index tend to have a lower intergenerational persistence of educational outcomes for the cohort of 1980. On the other hand, countries with high degrees of inequality experimented by the cohort of 1980, show to be remarkably immobile.

4.2. Predictors for Differences in Intergenerational Mobility Across Countries

To measure the effect of the possible predictors of intergenerational mobility across countries, a series of regressions were estimated. The dependent variable in all the models estimated is IGP of the cohort of 1980.

Table 3: Linear Regression Models[5]

Dependent Variable: IGP cohort 1980	
	Model 1
GINIc 1980	1,76902***
Urban Population	-0,00153273
Poverty (1,90$ a day)	-0,00334688
Government Expenditure	-0,0629769***
Crude Divorce Rate	0,0275644
Compulsory Education Duration	-0,00169157
Constant	0,568273***
R^2	0,599022

Source: Own elaboration and estimations with robust standard errors with data from GDIM (2018), World Bank (2019), UN (2009).

In the model estimated it is observable that, as it was seen in in Table 3, the Gini index of children's year of education of the cohort of 1980 is a measure of inequality that has a significative effect on the intergenerational educational mobility of the cohort of 1980.

[5] In Table 3: x means that the variable was not considered in the model; * means that the variable is significative at a 10%, ** at a 5% and *** at a 1%.

As it was presented before, inequality has a positive relationship with IGP, more inequality is expected to lower the educational mobility of children from 1980's.

Urban population is a variable that has a negative effect with IGP, more urban population would seem to rise intergenerational mobility of educational outcomes. Nonetheless, the effect is not significative. The positive effect of urban population in intergenerational mobility could in fact be representing economic growth for developing countries or distinguishing between more developed countries and LEDCS,

The negative relationship between extreme poverty and intergenerational mobility is supposed to reflect that an increase in extreme poverty would diminish intergenerational educational persistence. The negative effect of extreme poverty could be due to a consequence of the lack of data for some countries and the small size of the sample.

Government expenditure on education seems to have a positive and significative at a 1% effect on intergenerational mobility. A greater percentage of educational expenditure is expected to lower educational intergenerational persistence. Nonetheless, other school quality proxies could give a better representation of educational quality inputs.

Crude divorce rates and the years of compulsory education show no significative effect with intergenerational mobility. The two variables maybe do not capture neither family structure nor educational quality. Furthermore, in both variables there are no huge differences between countries.

Better proxies could show more light on the effect of the role of families and quality of education on intergenerational mobility. The lack of specific data of poverty, family structure and government expenditure during the cohort's childhood is a great disadvantage for this section, since the socioeconomic situation of children during young ages is a key determinant of intergenerational mobility. Moreover, some of the variables should be examined within a national level, taking into consideration the different economic stages of the countries studied.

5. CASE STUDY: CHILE'S INTERGENERATIONAL MOBILITY

5.1. Chile's Presentation

Chile is an interesting case, as it is a late-industrialised country that suffered a market-oriented reform under the dictatorial regime of Augusto Pinochet, which lasted 17 years.

The economic transformation was characterised by privatisation of many sectors including education and the other sectors of the welfare state.

Table 4: Chile: some Descriptive Statistics: 2000, 2015[6]

CHILE	2000	2015
GDP per capita, PPP (constant 2011 international $)	14315,43	22516,61
GDP growth (annual %)	5,33	2,31
GINI index (World Bank estimate)	52,8	47,7
Income share held by lowest 20%	3,8	4,8
Income share held by highest 20%	58	53,6
Income share held by highest 10%	42,6	38
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)	4,4	1,3
Compulsory education, duration (years)	8	13
Government expenditure on education, total (% of GDP)	3,78	4,87
Urban population (% of total)	86,073	87,36

Source: Own elaboration with data from World Bank (2019).

In table 4 only 2000 and 2015 are illustrated, since there is lack of data for other years. Chile has experienced a great growth during the 2000's, as it is observable in Table 4 by the increase in GDP per capita. The Latin American country suffered from the consequences of the crisis of 2008, but the recovery was fast. Nowadays, growth is at normal levels, a little below the mean of OECD (OECD, 2018, pp.2).

Even if the country experienced a significant growth and improved the conditions of living of its citizens, inequality is still a problem in Chile. Chile's Gini Index is at high levels, as it is almost 0,5. Chile decreased inequality substantially, but it remains significantly above the mean of OECD countries (OECD, 2018, pp. 2).

[6] The estimation were calculated with and without robust standard errors and the same coefficients were obtained.

Chile has reduced poverty and improved the living standards measured by the "OECD Better Life Index". It has achieved a better level of GDP per capita than other countries of Latin America as Brazil or Mexico. Nonetheless poverty and the concentration of income at the top 10% of the distribution are higher than the OECD standards (OECD, 2018, pp. 7).

During the dictatorial regime, Pinochet introduced a system in which parents have a "full choice" in primary and secondary education, thus, children can go to public, private-voucher and private-paid schools (Torche, 2005b, pp. 317). This educational reform of 1981 established subsidies for public and private schools based on the number of students. Parents have a voucher with which they can choose between the private and the public system. Furthermore, the public schools were transferred to local governments and the public spending on education dropped, from 4.9 of the GDP in 1982 to a 2.5 in 1989. The results of the reform were; public schools, which are more dependent on local governments, received a lower percentage of the budget. Private-voucher schools emerged in affluent locations of the main cities as a profitable business, getting government subsidies by competing with public schools. Private-paid schools do not accept the subsidy and charge a high tuition. Children who are more dependent of public educational inputs are the most damaged by the process of "privatisation" (Torche, 2005b, pp. 320-322).

There were more reforms on tertiary education, as the regime of Pinochet promoted the expansion of private tertiary education. Nowadays, there are almost 300 of private institutions offering tertiary education. Moreover, public universities, which were free, introduced fees (Troche, 2005, pp. 324).

The 70s and 80s in Chile were a decade of economic crisis, deepening inequality and poverty (Torche, 2005b, pp.324). Thereby, in Chile the educational background still has a constant effect in children's educational attainment (Torche, 2005b, pp. 316). In Torche (2005b), evidence shows that due to the reform, educational background has more weight in determining secondary educational attainment and that the increase in inequality consisted in losses of the less-advantaged rather than gains of the most affluent social classes (Torche, 2005b, pp. 335).

Chile is unequal as the wealthiest segment of the income distribution have a large share of the GDP; it is an extreme case of concentration at the top. Across the other segments of the society, the distribution is much more uniform (Torche, 2005a, pp. 423; 430).

5.2. Intergenerational Mobility in Chile: Presentation

In terms of intergenerational mobility of income, Chile has low mobility very distant from developed countries. The intergenerational persistence of income level is concentrated at the top and at the bottom of the distribution, being greater at the top meaning that there is a higher persistence of the top-earners (Núñez and Risco, 2005, pp. 6-9). Mobility is higher for the middle levels of the income distribution (Celhay et al, 2010, pp. 51).

The coefficients on intergenerational mobility in Chile are greater than other developing countries as Malaysia or Nepal, which implies that Chile is more immobile than other countries who are poorer but have a lower Gini coefficient. The only country that has a similar pattern is Brazil, as both Latin American countries have unequal income distributions and a low level of intergenerational mobility. The findings are consistent with the hypothesis of an inverse relationship between inequality and intergenerational mobility (Núñez and Miranda, 2010, pp. 9).

Chilean mobility is characterised by a high hierarchical effect that performs as barriers to mobility in the top social classes, and weak between classes that seem to be near. Class mobility in Chile has the same structure as inequality, accentuating the differences between the top-earners and the rest of the society (Torche, 2005, pp. 443-444).

Nonetheless, there is a tendency of a decreasing weight of the socioeconomic background for younger cohorts, argued by the authors to be due to investments on human capital, while having a static unequal distribution of income, since the Gini coefficient is fixed around 0.5 during the last decades (Núñez and Risco, 2005, pp. 10-11). On the other hand, in Núñez and Miranda (2010), it is observed the same tendency of increasing mobility in younger cohorts, but the fact is attributed to a life-cycle effect (Núñez and Miranda, 2010, pp. 7). Intergenerational income mobility on average has remained constant over time, noticing a slight decrease in intergenerational mobility (Celhay, 2010, pp. 55).

There are also differences between both sexes, as women seem to have a greater intergenerational mobility than men. The gender gap in intergenerational mobility has reached a certain convergence over time, meaning that women have become more

dependent on their family background. Educational mobility, which seems to be invariant on average over time, is higher than intergenerational mobility in lower levels of schooling, and in these same terms of education women are also more mobile than men (Celhay et al., 2010, 50-62).

The main urban centre of Chile, Greater Santiago, shows to be more mobile than other areas of the country like rural areas or small cities, as the education and labour opportunities are greater in the big centre of the country (Núñez and Miranda, 2010, pp. 196; 205). In urban Chile the patterns are similar to Chile as a whole, there is a high persistence in the extremes and substantial mobility in the middle of the income distribution. Noticing that the persistence at the top of the distribution in urban Chile is also higher than at the bottom (Núñez and Miranda, 2010, 210). These results are contrary to the patterns found in the US in Chetty et al. (2014b), on which mobility is lower in urban areas (Chetty et al., 2014b, pp. 1597).

5.3. Understanding Chile's Intergenerational Mobility

This section consists on the study of different variables and some estimates to show some of the tendencies of intergenerational mobility in Chile. The estimates are based on data from the "2001 Chilean Mobility Survey".

The "2001 Chilean Mobility Survey" (CMS) was conducted by Florencia Torche and Guillermo Wormald (2005) in order to recompile data for measures of intergenerational and intragenerational mobility. It consists in 3,234 men respondents from all the regions of Chile who answer questions about their socioeconomic status, demographic variables and social origins. The CMS does not include the household income of parents in 2001 and neither when the men are surveyed. Therefore, the measures of intergenerational mobility must be carried out with educational data, which is available for the surveyed individuals and both parents.

The CMS did not provide the exact years of education of every individual, it just provided the levels of education of the respondents and the parents. To carry on some estimates of intergenerational educational mobility, the years of formal education were estimated based on the information of the Chilean educational system, which was obtained from the Ministry of Education of Chile (2019) and the level of education answered in the survey. Through this method the years of education of fathers, mothers and children were calculated.

As it can be observed, in Table 5 a conversion of the years of education through the achieved level of education was calculated. The problem with the data of the "2001 Chilean Mobility Survey" is that different values were given for the same level of education. Moreover, a variable consisting in the sum of years of parents' education was created.

Table 5: Conversion of levels of education into years of education

	CMS level of Education	Estimated Years of Formal Education
0	NA	-
1	No formal education	0
2	Primary new system	8
3	Primary old system	8
4	Secondary academic new system	12
5	Secondary technical new system	12
6	Secondary academic old system	12
7	Secondary technical old system	12
8	College technical (not finished)	13
9	College technical graduate	14
10	Professional college (not finished)	14,5
11	Professional college graduate	17
12	College (not finished)	12,5
13	College graduate	17
14	Graduate	18

Source: Own elaboration with data from CMS (2015) and the Ministry of Education of Chile (2019)

For the levels of education which the respondent began, but did not complete, the estimation was done by adding half of the years of the duration of the whole level.

The information about the level of education of children is completed, but in the variables of levels of education of fathers and mothers there are missing values, especially in the case of mothers.

Given that the household income information in the CMS was divided in different intervals, it did not contain the specific information of household income for the respondents. An approximation of the income depending on the interval was made. It must be remarked that income is measured in Chilean pesos.

Lamentably, the information of monthly household income is just available for the respondents and not the previous generation. Thus, intergenerational income elasticity cannot be examined, at least not with this data.

As it can be seen in Table 6, the estimation of the household income was done by calculating half of the values which compose the interval. For open intervals as 1 or 15, approximated incomes were assigned. With the household income data, the purpose is to examine the importance of parents' education, not to give an exact measure of intergenerational mobility, since the available data does not allow such estimates.

Table 6: Conversion of levels of Monthly Household Income[7]

CMS level of Monthly Household Income		Estimated Monthly Household Income
0	NA	-
1	Without work income	0
2	Less than 90.000	45.000,00
3	91.000-120.000	105.000,00
4	121.000-160.000	140.000,00
5	161.000-210.000	185.000,00
6	211.000-240.000	225.000,00
7	241.000-290.000	265.000,00
8	291.000-390.000	340.000,00
9	391.000-600.000	495.000,00
10	601.000-1.000.000	800.000,00
11	1.000.001-1.500.000	1.250.000,00
12	1.500.001-2.000.000	1.750.000,00
13	2.000.001-3.000.000	2.500.000,00
14	3.000.001-5.000.000	4.000.000,00
15	more than 5.000.000	6.000.000,00

Source: Own elaboration with data from the CMS (2015)

From the previous estimations of years of education and household income, linear regressions are estimated. The objective of this section was to elaborate a series of measures of intergenerational mobility as it was presented in Section 2.2. and given the data it is not possible to carry on.

The CMS provides information of cohorts from 1936 to 1976. As it is observable in the following Table 7, generally the education of children tends to be higher than both father and mother. Even if fathers and mother have similar mean years of education, the maximum years of education of mothers are equivalent to finishing secondary education, which could be produced by a lack of data about mothers' education or to an important educational gender gap.

[7] The estimations of monthly household income are measured in Chilean pesos. One euro is approximately 781,78 Chilean pesos according to Emol (2019)

Table 7: Descriptive Statistics

	Age Respondent	Estimated Years of Education Child	Estimated Years of Education Father	Estimated Years of Education Mother	Estimated Monthly Household Income
Mean	45,092	11,271	8,7706	8,0365	337.970,00
Median	45	12	8	8	185.000,00
Minimum	25	0	0	0	0
Maximum	64	18	18	12	6.000.000,00
SD	10,395	3,2573	4,1915	3,8222	584.710,00

Source: Own elaboration with data from the CMS (2015)

The mean household income is of 337.970 Chilean pesos, which would be less than 500€. The mean is very distant form the data of PIB per capita, nonetheless these estimations are not sufficient to claim the importance of such a difference since they do not reflect the exact income of families.

The following models of intergenerational mobility are not conclusive measures of intergenerational mobility but are the best approximation that could be done with the data problematic.

Nonetheless, given that the regressor are an approximation and not a real value, the regression in Table 8 are biased.

Table 8: Linear Regressions of Intergenerational Mobility[8]

Dependent Variable: Estimated Years Education Child		
	Model 1	Model 2
Estimated Years Education Father	0,252787***	x
Estimated Years Education Mother	0,200977***	x
Sum Estimated Years Education Parents	x	0,228034***
Constant	7,84453***	7,84015***
R^2	0,238346	0,237609

Dependent Variable: log Estimated Monthly Household Income		
	Model 3	Model 4
Estimated Years Education Father	0,0657847***	x
Estimated Years Education Mother	0,0386336***	x
Sum Estimated Years Education Parents	x	0,0527785***
Constant	11,4864***	11,4844***
R^2	0,167515	0,164835

Source: Own estimates and elaboration with data from CMS (2015).

[8] In Table 6: x means that the variable was not considered in the model; * means that the variable is significative at a 10%, ** at a 5% and *** at a 1%. The estimations were calculated with and without robust standard errors and the same coefficients were obtained. Collinearity was checked for Model 1 and 3 and VIF=1,6 showing no collinearity.

From Model 1 it is observable that fathers' education has a positive and significative effect on the education of children. The coefficient shown in the first model is rather high, since an increase of 1 year of education of fathers represents an increase of 0,25 years in children's education. Nonetheless, the result obtained is lower than other intergenerational elasticities on education found by many authors as Celhay et al. (2010) or Núñez and Miranda (2010) and (2011).

In Model 1 of Table 8, both variables of education are significative at a 1%. The intergenerational elasticities of education are still low compared to other studies, since a coefficient of 0,2 is similar to the situation of Nordic countries like Sweden.

To give a different approach on intergenerational educational mobility, the sum of both parents' education and its effect on children's education is observed. The education of the mother, as it was stated before, tends to be low or none and maybe the sum of the education years can decrease the effect on the offspring.

In models 1 and 2 shown in Table 8, the goodness of fit is not very high, given that the predictors are explaining around a 23% of the data.

From Model 3 and 4 of Table 6, another approach is given to the data. The dependent variable is the logarithm of the household income, which was previously estimated. The regressions have also a low R squared, the predictors do not proportionate a great fit of the data, only around a 16%. Nonetheless, the objective of the models is to observe if there is a tendency of dependency between income and parents' education.

In Model 3, the coefficient of fathers' education is positive and significative on the household income of the offspring. An increase in a year of education of the father has a predicted consequence of around a 6,6% more of income. The years of education of the mother have also a positive and significative effect at a 1%, as it is seen in Model 4. Even if the education of the mother is significative, the impact on the household income of the child is much lower than the effect that the father provides. An increase in a year of education of the mother, provokes a rise in the household income of children of around a 3,9%.

As it occurred in Model 3, when the predictor is the sum of years of education, the influence of the education is much lower than when the two variables of education

separated are considered. This last predictor seems to lose or diminish the impact of education of parent in the education and in the monthly household income of offspring.

The fact of not separating the different cohorts of the sample is another limitation of Section 5.3. as the trends for each generation are not observed.

6. CONCLUSIONS

This Bachelor's thesis consisted on a study of intergenerational mobility. The main objectives were in exploring the relationship between intergenerational mobility, inequality and education, following on how the transmission on economic and educational advantages shape intergenerational mobility at a cross-country level or within a country or region was explored.

The role of inequality seems to be key determinant of intergenerational mobility during the whole research. Education is another important transmitter of socioeconomic advantage or disadvantage. The role of other predictors presented during the investigation need to be further examined, since the data available did not give conclusive results. Poverty, urban or rural location, school quality and the relationship of these predictors and intergenerational mobility are an interesting line of research for future investigations.

Another objective was the study of a developing economy as the case of Chile, which was the country selected for the investigation. Selecting Chile as the case of study was due to the availability of research and data on intergenerational mobility. Chile is a Latin American country that has presented a rapid growth, and which has suffered a market-oriented reform during the recent dictatorial regime of Pinochet. Chile, although improving its macroeconomic performance is a country with low mobility, even lower than some countries with much higher poverty rates. The estimations constructed with "2001 Chilean Mobility Survey" data, did not similar estimation to other research about the country, due to the bias of the regressions. My estimates are not conclusive, they show higher mobility rates than other research conducted about the country. The major problem of the estimates is the lack of data about specific information of parents and children years of education or income. The lack of data on the region in which the individual grew up and the income of the parents made impossible to test some of the correlations previously presented for other countries. Furthermore, the cohorts could not be separated so the

variation on intergenerational mobility in different generations is not observable in the results.

In a first instance the objective of the research was help understanding the intergenerational mobility in poor countries of Latin America and the Caribbean, as Honduras, and was of my especial interest, but this was not possible due to lack of the necessary data.

Intergenerational mobility of key importance in a era of increasing inequality and poverty both in developed and developing countries. The study of intergenerational mobility and its drivers, are crucial in trying to design welfare public policies.

REFERENCES

Celhay, P. et al. (2010), "Intergenerational Mobility of Income and Schooling: Chile 1996-2006", *Revista de Análisis Económico*, Vol. 25 (2), pp. 43-63.

Chetty, R. et al. (2014a), "Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility", *American Economic Review*, Vol. 104 (5), pp. 141-147.

Chetty, R. et al. (2014b), "Where is the land of opportunity? The geography of intergenerational mobility in the United States", *The Quarterly Journal of Economics*, Vol. 129 (4), pp. 1553-1623.

Corak, M. (2013), "Income Inequality, Equality of Opportunity, and Intergenerational Mobility", *Journal of Economic Perspectives*, Vol. 21 (3), pp. 79-102.

Emol (2019), "Monedas", El Mercurio de Santiago de Chile, available: https://www.emol.com/movil/economia/monedas/ [last visualisation: 4/6/19].

Ferreira, F. et al. (2013), *La movilidad económica y el crecimiento de la clase media en América Latina.* Washington, DC: Banco Mundial.

GDIM (2018) "Global Database on Intergenerational Mobility" Development Research Group, World Bank. Washington, D.C.: World Bank Group, available: https://www.worldbank.org/en/topic/poverty/brief/what-is-the-global-database-on-intergenerational-mobility-gdim [last visualisation: 02/06/19].

Lopreato, J. and Hazelrigg, L. E. (1970), "Intragenerational versus Intergenerational Mobility in Relation to Sociopolitical Attitudes", *Social Forces*, Vol. 49 (2), pp. 200-210.

Jerrim, J. and Macmillan, L. (2015), "Income Inequality, Intergenerational Mobility, and the Great Gatsby Curve: Is Education the Key?", *Social Forces*, Vol. 94 (2), pp. 505-533.

Ministry of Education of Chile (2019), "Información sobre Educación", available: https://www.mineduc.cl/servicios/informacion-sobre-educacion/# [last visualisation: 03/0619].

Narayan, A. et al. (2018) *Fair Progress? Economic Mobility across Generations around the World*. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO.

Núñez, J. and Miranda, L. (2010), "Intergenerational Income Mobility in a Less-Developed, High Inequality Context: The Case of Chile", *The B.E. Journal of Economic Analysis & Policy*, Vol. 10, pp. 1-15.

Núñez, J. and Miranda, L. (2011), "Intergenerational income and educational mobility in urban Chile", *Estudios de Economía*, Vol. 38 (1), pp. 195-221.

Núñez, J. and Risco, C. (2005), "Movilidad intergeneracional del ingreso en Chile", *Expansiva: En foco*, Vol. 58, pp. 1-15.

Neidhöfer, G. et al. (2018), "Educational inequality and intergenerational mobility in Latin America: A new database", *Journal of Development Economics*, Vol. 134, pp. 329-349.

OECD (2010), *Economic Policy Reforms 2010: Going for Growth*, OECD Publishing, Paris, available: https://doi.org/10.1787/growth-2010-en [last visualisation: 29/05/19].

OECD (2018), *2018 OECD Economic Surveys: Chile overview*, OECD, available: https://www.oecd.org/eco/surveys/Chile-2018-OECD-economic-survey-overview.pdf [last visualisation: 01/06/19].

Sapelli, C. (2013), "Movilidad Intrageneracional del Ingreso en Chile", *Estudios Públicos*, Vol. 131, pp. 1-35.

Torche, F. and Wormald, G. (2015), "2001 Chilean Social Mobility Survey" Ann Arbor, MI: Inter-university Consortium for Political and Social Research, available: https://doi.org/10.3886/ICPSR35299.v1 [last visualisation: 23/05/19].

Torche, F. (2005a), "Unequal But Fluid: Social Mobility in Chile in Comparative Perspective", *American Sociological Review*, Vol. 70, pp. 422-450.

Torche, F. (2005b), "Privatization Reform an Inequality of Educational Opportunity: The Case of Chile", *Sociology of Education*, Vol. 78, pp. 316, 343.

United Nations (2009) "World Marriage Data" Department of Economic and Social Affairs, Population Division, available: https://www.un.org/en/development/desa/population/publications/dataset/marriage/data.asp [last visualisation: 01/06/19]

United Nations (2015) "Sustainable Development Goals", UN, available: https://sustainabledevelopment.un.org/?menu=1300 [last visualisation: 6/6/19].

World Bank (2019), "Databank: World Development Indicators" World Bank Group, available: https://databank.worldbank.org/data/home.aspx [last visualisation: 01/06/19].

APPENDIX

A.1. Ordinary Least Squares

$$y = \beta_0 + \beta_1 x + u;\ sample\ \{(x_i, y_i)\}_{i=1}^{n}$$

$$Least\ Squares\ Problem:$$

$$\min_{\tilde{\beta}_0, \tilde{\beta}_1} \sum_{\iota=1} \widehat{(y_\iota - \tilde{y}_\iota)^2} = \sum_{\iota=1} (y_\iota - \widehat{(\tilde{\beta}_0 + \tilde{\beta}_1)})^2$$

$$FOCS_{\hat{\beta}_0}: \sum_{i=1} 2\left(\hat{\beta}_0 + \hat{\beta}_1 x_i\right) - 2y_i = 0$$

$$\sum_{i=1} y_i - \left(\hat{\beta}_0 + \hat{\beta}_1 x_i\right) = 0$$

$$\sum_{i=1} y_i = n\hat{\beta}_0 + \sum_{i=1} \hat{\beta}_1 x_i$$

$$n\hat{\beta}_0 = \sum_{i=1} y_i - \sum_{i=1} \hat{\beta}_1 x_i$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

$$FOCS_{\hat{\beta}_1}: \sum_{i=1} 2\left(\hat{\beta}_0 + \hat{\beta}_1 x_i\right) x_i - 2y_i x_i = 0$$

$$\sum_{i=1} y_i x_i = \sum_{i=1} \hat{\beta}_0 x_i + \sum_{i=1} \hat{\beta}_1 x_i^2$$

$$\sum_{i=1} y_i x_i = \hat{\beta}_0 \sum_{i=1} x_i + \hat{\beta}_1 \sum_{i=1} x_i^2$$

$$\sum_{i=1} y_i x_i = \left(\bar{y} - \hat{\beta}_1 \bar{x}\right) \sum_{i=1} x_i + \hat{\beta}_1 \sum_{i=1} x_i^2$$

$$\sum_{i=1} y_i x_i = \bar{y} \sum_{i=1} x_i - \hat{\beta}_1 \sum_{i=1} x_i + \hat{\beta}_1 \sum_{i=1} x_i^2$$

$$\hat{\beta}_1 = \frac{\sum (y_i - \bar{y})(x_i - \bar{x})}{\sum (x_i - \bar{x})^2} = \frac{sample\ cov(x, y)}{sample\ var(x)}$$

A.2. Population Least Squares

$$y = \beta_0 + \beta_1 x + \varepsilon$$

$$Population\ Least\ Squares\ Problem:$$

$$\min_{\beta_0, \beta_1} E\left(y - (\beta_0 + \beta_1)\right)^2$$

$$FOCS_{\beta_0}: E(2(\beta_0 + \beta_1 x) - 2y) = 0$$

$$E(y - \beta_0 - \beta_1 x) = 0$$

$$E(y) - \beta_0 - \beta_1 E(x) = 0$$

$$\beta_0 = E(y) - \beta_1 E(x)$$

$$FOCS_{\beta_1}: E(2(\beta_0 + \beta_1)x - 2yx) = 0$$

$$E(xy) - \beta_0 E(x) - \beta_1 E(x^2) = 0$$

$$E(xy) - \big(E(y) - \beta_1 E(x)\big)E(x) - \beta_1 E(x^2) = 0$$

$$\beta_1(E(x^2) - [E(x)]^2) = E(xy) - E(x)E(y)$$

$$\beta_1 = \frac{E(xy) - E(x)E(y)}{E(x^2) - [E(x)]^2} = \frac{cov(x,y)}{var(x)}$$

A.3. Correlation coefficient and sample regression coefficients

$$\hat{\beta}_1 \; in \; terms \; of \; r_{xy}$$

$$r_{xy} = \frac{cov(x,y)}{sd(x)sd(y)}$$

$$cov(x,y) = \sum_{i=1} (y - \bar{y})(x - \bar{x})$$

$$sd(x) = \sqrt{var(x)} = \sqrt{\sum_{i=1} (x - \bar{x})^2}$$

$$sd(y) = \sqrt{var(y)} = \sqrt{\sum_{i=1} (y - \bar{y})^2}$$

$$\hat{\beta}_1 = \frac{\sum(y_i - \bar{y})(x_i - \bar{x})}{\sum(x_i - \bar{x})^2} = \frac{cov(x,y)}{var(x)}$$

$$\hat{\beta}_1 = \frac{cov(x,y)}{var(x)} * \frac{sd(y)}{sd(y)} = \frac{cov(x,y)}{sd(x)sd(y)} * \frac{sd(y)}{sd(x)}$$

$$\hat{\beta}_1 = r_{xy} * \frac{sd(y)}{sd(x)}$$

A.4. Correlation coefficient and population regression coefficients

$$\beta_1 \; in \; terms \; of \; \rho_{xy}$$

$$\rho_{xy} = \frac{cov(x,y)}{sd(x)sd(y)} = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$$

$$\sigma_{xy} = E(xy) - E(y)E(x)$$

$$\sigma_x = \sqrt{\sigma_x^2} = \sqrt{E(x^2) - [E(x)]^2}$$

$$\sigma_y = \sqrt{\sigma_y^2} = \sqrt{E(y^2) - [E(y)]^2}$$

$$\beta_1 = \frac{E(xy) - E(x)E(y)}{E(x^2) - [E(x)]^2} = \frac{cov(x,y)}{var(x)} = \frac{\sigma_{xy}}{\sigma_x^2}$$

$$\beta_1 = \frac{\sigma_{xy}}{\sigma_x^2} * \frac{\sigma_y}{\sigma_y} = \frac{\sigma_{xy}}{\sigma_x \sigma_y} * \frac{\sigma_y}{\sigma_x}$$

$$\beta_1 = \rho_{xy} * \frac{\sigma_y}{\sigma_x}$$

A.5. Intergenerational income elasticity (IGE)

$$\log(Y_i) = \beta_0 + \beta_1 \log(X_i) + \varepsilon$$

$$\log(Y_i) = \log of\ children's\ income$$

$$\log(X_i) = \log of\ parents' income$$

$$\min_{\beta_0,\beta_1} E\big(\log(Y) - (\beta_0 + \beta_1 \log(X))\big)^2$$

$$FOCS_{\beta_0}: E(2(\beta_0 + \beta_1 \log(X)) - 2\log(Y)) = 0$$

$$E(\log(Y)) - \beta_0 - \beta_1 E(\log(X)) = 0$$

$$\beta_0 = E(\log(Y)) - \beta_1 E(\log(X))$$

$$FOCS_{\beta_1}: E(2(\beta_0 + \beta_1 \log(X))\log(X) - 2\log(Y)\log(X))$$

$$E(\log(Y)\log(X)) - \beta_0 E(\log(X)) - \beta_1 E(\log^2(X)) = 0$$

$$E(\log(Y)\log(X)) - \big(E(\log(Y)) - \beta_1 E(\log(X))\big)E(\log(X)) - \beta_1 E(\log^2(X)) = 0$$

$$E(\log(Y)\log(X)) - E(\log(Y))E(\log(X)) + \beta_1 [E(\log(X))]^2 - \beta_1 E(\log^2(X)) = 0$$

$$\beta_1 = \frac{E(\log(Y)\log(X)) - E(\log(Y))E(\log(X))}{E(\log^2(X)) - [E(\log(X))]^2} = IGE; IGE$$

$$= \frac{E(\log(Y)\log(X)) - E(\log(Y))E(\log(X))}{E(\log^2(X)) - [E(\log(X))]^2} * \frac{SD(\log(Y))}{SD(\log(Y))}$$

$$IGE = \rho_{\log(X)\log(Y)} * \frac{SD(\log(Y))}{SD(\log(X))}$$

If IGE=1, there is a total dependence between children's income and parents' income, which equals intergenerational immobility. If IGE=0, there is no dependence relationship between the income of parents and offspring, meaning that there is intergenerational mobility.

A.6. Rank-rank regression

$$R_i = \beta_0 + \beta_1 P_i + \varepsilon$$

$$R_i = Rank\ of\ child's\ income\ children's\ outcome\ distribution$$

$$P_i = Rank\ of\ parents' income\ in\ parents' outcome\ distribution$$

$$\min_{\beta_0,\beta_1} E\big(R-(\beta_0+\beta_1 P)\big)^2$$

$$FOCS_{\beta_0}: E(2(\beta_0+\beta_1 P)-2R)=0$$

$$E(R)-\beta_0-\beta_1 E(P)=0$$

$$\beta_0 = E(R)-\beta_1 E(P)$$

$$FOCS_{\beta_1}: E(2(\beta_0+\beta_1 P)P-2RP)=0$$

$$E(RP)-\beta_0 E(P)-\beta_1 E(P^2)=0$$

$$E(RP)-\big(E(R)-\beta_1 E(P)\big)E(P)-\beta_1 E(P^2)=0$$

$$E(RP)-E(R)E(P)+\beta_1[E(P)]^2-\beta_1 E(P^2)=0$$

$$\beta_1=\frac{E(RP)-E(R)E(P)}{E(P^2)-[E(P)]^2}=\frac{cov(R,P)}{var(P)};\beta_1=\frac{cov(R,P)}{var(P)}*\frac{sd(R)}{sd(R)}=\rho_{RP}*\frac{sd(R)}{sd(P)}$$

Given that both parents' and child's ranks follow the same distribution, both have the same variance, therefore, the same standard deviation.

$$\beta_1=\rho_{RP}$$

If β_1=1 there is a dependence relationship between the rank that the parents occupy in the distribution and the rank of the child, meaning that there is intergenerational immobility. If β_1=0 the rank of the child does not depend on the rank of the parents, which implies that there is intergenerational mobility.

A.7. : Table of Data used in Section 4

countryname	IGP cohort 1980	GINI 2010	GINIp (1980)	GINIc (1980)	Urban population (% of total) 2010	Poverty headcount ratio at $1,90 a day (2011 PPP) (% of population) 2010	Government expenditure on education, total (%GDP) 2010	Crude Divorce Rate (2005) UN	Compulsory education, duration (years) 2010
Armenia	0,56	30,00	0,13	0,16	63,44	1,9	3,2	0,8	11
Australia	0,27	34,70	0,11	0,09	85,18	0,5	5,6	2,6	10
Austria	0,43	30,30	0,15	0,13	57,40	0,5	5,7	2,4	9
Bangladesh	0,73	32,10	0,63	0,38	30,46	19,6			5
Belarus	0,34	28,60	0,11	0,09	74,67	0	5,2	3,1	9
Belgium	0,34	28,40	0,23	0,11	97,65	0,2		2,9	12
Bulgaria	0,65	35,70	0,17	0,14	72,30	2	3,9	1,9	9
Canada	0,29	33,60	0,11	0,08	80,94	0,2	5,4		10
China	0,56	43,70	0,33	0,23	49,23	11,2		1,4	9
Colombia	0,55	54,70	0,40	0,20	77,96	7,7	4,8		10
Croatia	0,51	32,40	0,18	0,13	55,16	1,2	4,2	1,1	8
Cyprus	0,23	31,50	0,19	0,11	67,55	0	6,6	1,8	10
Czech Republic	0,44	26,60	0,08	0,09	73,26	0	4,1	3,1	9
Denmark	0,23	27,20	0,15	0,15	86,80	0	8,6	2,8	9
Ecuador	0,57	48,70	0,32	0,23	62,69	5,6	4,5	0,9	15
Egypt, Arab Rep0,	0,48	31,50	0,73	0,26	43,02	3		0,9	9
Estonia	0,39	32,00	0,10	0,10	68,09	0,7	5,5	3	9
Ethiopia	0,83	33,20	0,81	0,63	17,32	33,5	4,5		8
Finland	0,25	27,70	0,15	0,10	83,77	0	6,5	2,6	9
France	0,26	33,70	0,23	0,11	78,37	0	5,7	2,5	10
Georgia	0,49	39,50	0,11	0,10	55,54	12,2		0,4	9
Germany	0,32	30,20	0,11	0,11	76,97	0	4,9	2,4	13
Greece	0,34	34,10	0,19	0,09	76,29	1		1,2	10
Guinea-Bissau	0,69	50,70	0,77	0,62	40,11	67,1	1,9		9
Hungary	0,63	29,40	0,15	0,13	68,91	0	4,8	2,5	13
Iceland	0,29	26,20	0,13	0,10	93,57	0,2	7,2	1,9	10
Indonesia	0,49	36,40	0,42	0,20	49,91	15,7	2,8		9
Ireland	0,39	32,30	0,19	0,10	61,54	0,5	6	0,8	10
Israel	0,20	42,60	0,24	0,10	91,83	0,2	5,5	1,6	13
Italy	0,38	34,70	0,19	0,11	68,33	1,2	4,4	0,8	12
Jordan	0,28	33,70	0,40	0,14	86,09	0,1		1,8	10
Kazakhstan	0,35	28,00	0,10	0,09	56,83	0,1		2,1	9
Korea, Rep0,	0,21	32,00	0,16	0,06	81,94	0,5			9
Kyrgyz Republic	0,37	30,10	0,14	0,12	35,31	4,1	5,8	1,2	9
Latvia	0,43	35,00	0,11	0,10	67,84	1,7	5,1	2,8	11
Lesotho	0,29	54,20	0,99	0,77	66,76	59,7			10
Lithuania	0,34	33,60	0,12	0,09	24,80	1,5	5,3	3,3	7
Madagascar	0,68	42,40	0,45	0,35	31,94	78,5			5
Malawi	0,54	45,50	0,77	0,39	15,54	71,7	3,5		8
Mexico	0,45	45,30	0,37	0,20	77,82	4,2	5,2	0,7	11
Moldova	0,48	32,10	0,13	0,11	42,62	0,5	9,1		9
Mongolia	0,29	33,10	0,26	0,15	67,57	0,8	4,6	0,6	12
Montenegro	0,60	28,90	0,13	0,12	64,14	0		0,8	9
Nepal	0,89	32,80	0,66	0,47	16,77	15	3,6		
Netherlands	0,32	27,80	0,18	0,11	87,13	0	5,6	2	13
Norway	0,31	25,70	0,14	0,13	79,10	0	6,7	2,4	10
Pakistan	0,76	29,80	0,60	0,39	35,00	8,3	2,3		12
Panama	0,53	51,60	0,34	0,21	65,14	4,5		0,9	11
Peru	0,45	45,50	0,40	0,18	76,43	5,5	3,8		12
Poland	0,38	33,20	0,16	0,11	60,89	0	5,1	1,8	10
Portugal	0,59	35,80	0,18	0,18	60,57	0,2	5,4	2,2	12
Romania	0,72	35,50	0,18	0,16	53,83	4,5	3,5	1,5	10
Russian Federation	0,42	39,50	0,12	0,10	73,69	0,1		4,2	9
Rwanda	0,66	47,20	0,51	0,39	16,93	62,3	4,9		6
Sao Tome and Principe	0,79	30,80	0,34	0,33	64,95	32,3	9,7		6
Serbia	0,48	29,00	0,17	0,14	54,99	0,2	4,6	1	8
Slovak Republic	0,47	27,30	0,11	0,11	54,69	0,5	4,1	2,1	10
Slovenia	0,38	24,90	0,12	0,12	52,66	0	5,6	1,3	9
South Africa	0,23	63,40	0,40	0,13	62,22	16,5	5,7	0,7	9
Spain	0,34	35,20	0,36	0,15	78,44	0,7	4,8	1,7	10
Sweden	0,25	27,70	0,16	0,09	85,06	0,5	6,6	2,2	9
Switzerland	0,40	32,60	0,15	0,16	73,61	0	4,9	2,9	11
Thailand	0,39	39,40	0,31	0,16	43,86	0,1	3,5	1,4	9
Tunisia	0,54	35,80	0,68	0,31	66,66	2	6,3		9
Tuvalu	0,52	39,10	0,21	0,14	54,80	3,3			8
Ukraine	0,44	24,80	0,11	0,10	68,60	0		3,9	11
United Kingdom	0,20	34,40	0,22	0,12	81,30	0,2	5,8	2,6	11
United States	0,34	40,40	0,12	0,09	80,77	1	5,4	3,6	12
Vanuatu	0,49	37,60	0,36	0,29	24,46	13,1			
Vietnam	0,55	39,30	0,28	0,16	30,42	4,2	5,1		9
West Bank and Gaza	0,39	35,30	0,24	0,16	74,15	0,2	6,7		10
Zambia	0,45	55,60	0,28	0,52	39,36	64,4			7

Source: Own elaboration with data from GDIM (2018), World Bank (2019), UN (2009).