Educational inequalities in disability linked to social security coverage among older individuals in five Latin American countries

Philipp Hessel, PhD[1]; Pieter Sayer, MSc[2]; Carlos Ruimallo-Herl[3]

Affiliations:

[1] University of the Andes, Alberto Lleras Camargo School of Government

[2] Oxford University, Department of International Development

[3] Erasmus University Rotterdam, Department of Applied Economics

Corresponding author:

Philipp Hessel, PhD
Associate Professor
Alberto Lleras Camargo School of Government
University of the Andes
Cra. 1 No. 19-27, Bloque Au, Piso 3
111711, Bogotá, Colombia
Tel: 3394949 Ext. 2012
p.hessel@uniandes.edu.co

Abstract

Although Latin American populations are ageing rapidly, many countries have important shortcomings in terms of access to social security coverage. Despite significant improvements regarding access to healthcare, the coverage gap in terms of pensions represents a major challenge for public health and equity in the region. The principal aim of this study was to systematically assess the association between social security coverage and disability among older individuals in five Latin American countries, as well as the extent of existing inequalities and its determinants. To do so we use cross-sectional and comparative data for individuals aged 60 and older in Chile, Colombia, El Salvador, Paraguay and Uruguay from the Longitudinal Social Protection Survey (ELPS). We used multivariate regression to assess the association between disability and healthcare as well as pension coverage. Concentration indices (CI) and an Oaxaca-Blinder decomposition approach were used to assess overall inequalities in disability according to education as well as their components. With the exception of El Salvador, we find significant inequalities in disability disfavoring lower educated individuals. With regards to healthcare, we find no significant association of healthcare coverage with disability in any of the five countries, nor does it explain educational inequalities in disability. However, pension access was associated with lower risks of disability in Chile, Colombia, and Uruguay, and explains a substantial share of educational inequality therein. Whereas significant changes have already been made regarding universal healthcare coverage, the results suggest that expanding access to pensions may not only lead

to improvements in health among older individuals in the region, but also substantially reduce socio-economic inequalities in health and successful ageing.

Keywords

Latin America, Disability, Inequality, Pension, Healthcare

Introduction

Latin America is ageing rapidly as a result of drastic reductions in fertility and continuing increases in life expectancy. Counting only around 40 million individuals aged 65 or above today in the region, the number is predicted to increase to nearly 140 million by the middle of the century (World Bank 2011). Yet, most countries in the region are ill prepared to face the challenges of an ageing population as a result of high poverty rates, high labor informality and low pension coverage. As a consequence, nearly 40 to 50 percent of Latin Americans are likely to reach pensionable age without receiving a contributory pension – a number which in unlikely to improve in the next decades due to persistent low contribution rates in most countries (Flamini et al. 2018, OECD/IDB/The World Bank 2014). Due to the circumstance that pension coverage is particularly low among poorer population groups, as well as the well-established association between socio-economic status (SES) and health (Casas, Dachs and Bambas 2001, de Andrade et al. 2015, Gildner et al. 2016), this trend will likely exacerbate the already high levels of inequality in the region and thus present a major challenge for population health and equity (Lloyd-Sherlock et al. 2012).

The main approach by which Latin American countries have aimed at improving population health and reducing inequalities in access to healthcare among disadvantaged populations has been to increase healthcare coverage (Atun et al. 2015, de Andrade et al. 2015). Despite important variations between countries, most countries in the region have introduced some form of universal healthcare coverage

often through government subsidized benefit plans for poorer individuals. While the extension of healthcare coverage may have led to improvements in population health (e.g. Macinko et al. 2011, Moreno-Serra and Smith 2012, Rasella et al. 2014), evidence suggests that increases in healthcare coverage among poor individuals did not necessarily reduce inequalities in health, for example in the case of Colombia (Arroyave et al. 2013). At the same time, while access to healthcare has long been the primary focus among researchers and policy makers, an increasing number of studies show that higher spending on social policies such as education or pensions leads to significant improvements in population health (Beckfield and Bambra 2016, Reynolds and Avendano 2018), that may have greater impact than spending on healthcare (Bradley et al. 2011, Bradley et al. 2016).

One of the primary aims of recent welfare reforms in Latin America was to reduce not only income inequality, but also inequalities in health and well-being (Atun et al. 2015). However, despite a large body of literature documenting a strong correlation between socio-economic status and health, also in Latin America (Casas, Dachs and Bambas 2001, Fleischer and Diez Roux 2013, Jones, Mitchel and Goza 2014), very little evidence exists on the potential contribution of social protection programs in reducing health inequalities in Latin America. Although some studies show that recent welfare reforms have had a substantial positive effect on income inequality (Levy and Schady 2013, Lustig and Pessino 2014, Lustig et al. 2016), empirical evidence about the relationship between social protection programs and inequality in the region remains scarce. Against this background, the aim of this study was to systematically assess the contribution of social security coverage – in terms of

healthcare as well as pension coverage – to educational inequalities in disability among older individuals in five Latin American countries. To do so, we draw on nationally representative, comparative and ex-ante harmonized survey data from the Longitudinal Social Protection Survey (*Encuesta Longitudinal de Protección Social*, ELPS) in Chile, Colombia, El Salvador, Paraguay and Uruguay.

Recent developments in inequality and social security coverage in five Latin American countries

In the last decades, many of the Latin American countries have implemented comprehensive health and social security reforms. These reforms have taken advantage of the generally favorable economic conditions- related to increased exports revenue- and responded to growing social demands in each of the countries (Atun et al. 2015, Garay 2017, Levy and Schady 2013). Despite the regions heterogeneity, the objectives of these reforms are surprisingly similar: to achieve universal health coverage and to enhance financial well-being of the elderly.

In 2005, Chile implemented one of its most ambitious reforms in recent decades by mandating universal health coverage for forty priority diseases and conditions (Bitran 2013). In practice, this reform guaranteed timely access to quality health care for anyone suffering from the listed conditions regardless of whether they are covered by public or private health insurance. Since 2005, the program has continued to expand and now covers over eighty priority diseases and conditions, many of which are chronic (Atun et al. 2015, Sojo 2006). In the case of social security, Chile's social security system represents one of the first private pension systems in the world (Holzmann 2013). In response to the failings of the private system, the government expanded the solidarity pillar of social security in 2008. This was done by implementing a mean-tested non-contributory pension initially covering the 40% poorest individuals, and the 60% poorest from 2012 onwards (Berstein et al. 2009).

Since then, coverage by the Chilean solidarity pillar has continued to increase, reaching approximately 1.4 million individuals as of 2017 (SAFP 2017).

In the case of Colombia, the largest and most recent health reform comes not from government initiative but rather from a constitutional court ruling. In 2008, the constitutional court upheld the right to health enshrined in the 1991 Colombian constitution and imposed the harmonization of health benefits across the country and income groups (Tsai 2010). In practice, this meant the merger of the so-called contributory (for those with a formal employment) and subsidized insurance scheme for those working either in the informal economy or without sufficient income. Overall, this allowed Colombia to reach near universal health coverage in 2010 when all individuals were at least covered by a basic health care plan (Atun et al. 2015). Similar to the case of Chile, Colombia's largest social security reform in the last decades included the introduction of a solidarity pension fund in 2003 called *Colombia Mayor* (Calvo, Bertranou and Bertranou 2010, Hessel et al. 2018). This reform implemented with the objective of providing social assistance to those with insufficient income or living in extreme poverty. This government-funded program provides a means-tested monthly non-contributory pensions to those individuals that were at most three years from the normal retirement age and eligible according to their economic situation.

Following the elections of 2009, the new government in El Salvador set out on a comprehensive health care reform with the objective of achieving universal health coverage (Clark 2015). While this reform was built around several pillars, two that were particularly important for the elderly were the elimination of user fees in publicly

provided health services and the establishment of treatment networks to ration care via a referral system (Bossert and Hill 2013, Clark 2015). Despite the aim of the government to expand access to healthcare, there remain substantial coverage gaps, especially in rural areas of the country and among disadvantaged populations (Cortez, Bablumian and Fernandez 2009). El Salvador has also undertaken a comprehensive social security reform, implementing a series of changes that aimed at improving the financial well-being of low-income individuals (Social Security Administration 2017). In combination with other more general changes, the government established a new Solidarity Guarantee Fund that will provide in the coming years cash transfers to those without enough retirement income in their individual accounts, complementing the current minimum pension system covering a minority of the population.

In line with many Latin American countries, in 2008 Paraguay implemented the so-called family health units with the objective of achieving universal health coverage. The latter represented coordinated health care providers with an emphasis on primary health care through consultations, home care, rehabilitation, and health promotion amongst others. The program began with approximately 500 units in 2010, but expanded rapidly to approximately 800 by the end 2016 (Ministry of Public Health and Social Welfare 2015). However, despite the large efforts, the programs' coverage still remains below 50% of the population, with indigenous populations being the hardest to reach (PAHO 2017). Due to its relatively high rate of poverty, the government of Paraguay has set out the reduction of poverty as one of its main goals in the last decades (World Bank 2010). To achieve this, they have

implemented two major cash transfer programs since 2005 (Rofman, Apella and Vezza 2014). The first one, called the Monetary Transfer with Co-responsibility (MTC), was a conditional cash transfer program based on health and education attainment, like *Bolsa Família* in Brazil. The second program, targeted specifically at the elderly, provided from 2010 onwards non-contributory pensions for those over the age of 65 and living in poverty. Both programs have expanded rapidly since their implementation and now represent the backbone of the social protection landscape of the country.

The most recent healthcare reform in Uruguay stems from its recognition of health as a legal right and public good in 2005. As a consequence, in 2008, Uruguay sought to achieve universal health coverage by increasing health care coverage, improving health management, and improving health financing (Cruces and Bérgolo 2013). In practical terms, the government established a network through which all citizens could obtain access to comprehensive care in public and private providers (Atun et al. 2015). As has been the case of most countries, particular emphasis was given to primary care and preventive services that provide great benefits to the elderly. In contrast to the Latin American trend, the social security system in Uruguay has not undergone significant changes since 1996 (Cruces and Bérgolo 2013). At the time, the financial constraints of the system led the government to shift their social security system from a purely pay-as-you-system (PAYGO) to a mixture of PAYGO and individual retirement accounts. Additionally, the age eligibility for the non-contributory pensions, awarded to those with insufficient income, was raised to 70 years old.

Table 1 provides an overview of key characteristics regarding healthcare and social security coverage in these five countries.

Data & Methods

Data

The data for this study came from the Longitudinal Social Protection Survey (ELPS) (Observatorio de Seguridad Social (OSS) 2018). The ELPS is a comparative and ex-ante harmonized survey designed by the Inter-American Development Bank (IADB) and implemented between 2002 and 2015 by the national statistical institutes in five Latin American countries: Chile (2002, 2004, 2006 & 2009), Colombia (2012), El Salvador (2013), Paraguay (2015) and Uruguay (2013). Although originally intended to be a longitudinal dataset, to date only Chile has several waves. In all countries ELPS is based on a representative and random sample of the non-institutionalized population aged 18 years or above, collecting detailed information about demographic and socio-economic conditions as well as access to social protection programs.

For this study we restricted the sample to individuals aged 60 or above. Furthermore, for Chile we only included the 2009 cross-section survey due to its temporal proximity to the other countries' data collections. The total effective sample size was 17,888 individuals, ranging from 5,820 in Uruguay to 2,361 in Paraguay. Pooled statistical analyses were carried out as well as separate evaluations for each

country. For the combined analyses observations were weighted by the total population of each country in order to make the results representative of the relative sizes of these populations.

Variables

Disability

Disability was used as indicator of health status among older individuals as it is considered a key dimension of successful ageing and important predictor of successful engagement with their living environment (Rowe and Kahn 1997). The ELPS questionnaire asks respondents about whether or not they suffer from five distinct types of disability: deafness, blindness, muteness, mental disability and physical disability. Based on the responses to these questions we created a binary variable capturing whether an individual suffered from none or any of those limitations.

Education

The education level question in the ELPS provides detailed information on individuals' highest educational level attained according to the International Standard Classification of Education (ISCED). For the purpose of this study, levels of educational were grouped into four categories: 1) no education, 2) primary education, 3) secondary education or 4) tertiary education. The four categories were

used for the estimation of overall inequalities in health, i.e. the health concentration index (CI). In contrast, the decomposition analyses of health inequalities are based on a dichotomous version of educational levels distinguishing between individuals with either no or primary education and those with either secondary or tertiary education.

Socio-demographic characteristics

The socio-demographic variables considered are age (operationalized by a set of dummy variables for the age-groups 60-64, 65-69, 70-74 and 75 or above), gender and whether or not the respondent is living with a partner (married or in an informal union) as compared to those being either divorced, widowed or living alone. Furthermore, we include a dummy variable capturing whether an individual is currently participating in the labor force or not.

Social security and healthcare coverage

Coverage with health insurance was measured by a dummy variable indicating whether respondents had health insurance or not. Likewise, access to pensions was measured by a dummy variable indicating whether individuals were receiving a pension or not.

Statistical analyses

Concentration curves and indexes

The education-related inequality in disability was measured using the concentration index (CI) as is standard in the literature. The concentration index is defined as double the area between the concentration curve and line of equality (the line where proportions of population and disability are consistent). The curve provides a graphic representation of any disparities between the concentration of population and the concentration of disability at each level of education; the bigger the area between the lines the more inequality on show. If the concentration curve is above the line of equality the concentration index is negative and indicates a greater concentration in the less educated sections of the population. Conversely, if the concentration curve is below the line of equality the concentration index is positive and disability is concentrated in the more educated sections of the population. The disability concentration index is defined as follows:

$$CI(d) = 1 - \frac{\sum_{i=1}^{n}(2\lambda_i - 1)d_i}{n^2\mu_d}$$

where λ_i represents the individual's education-related rank, d_i is whether or not an individual is disabled and μ_d is the proportion of the sample which is disabled (Kakwani Nanak 1980).

Due to the limits imposed on the concentration index by the binary nature of the disability variable the CI does not vary between 1 and -1 but rather between μ-1 and 1-μ. This creates a situation where the interval is dependent on the prevalence of

disability in the sample as a whole and makes direct inter-sample comparison unfeasible (Erreygers 2009). There is a set of corrections that one can make in order to address this bias and allow for inter-sample comparability, each with their advantages and limitations. We follow Kjellsson and Gerdtham (Kjellsson and Gerdtham 2013) and use the Erreygers correction in this paper. The corrected disability concentration index is defined as follows:

$$EI(d) = 4\mu_d(CI(d)) = 4\mu_d - \frac{4\sum_{i=1}^{n}(2\lambda_i - 1)d_i}{n^2}$$

The post-correction concentration indexes (EI) are therefore indicative of how far a society is from a situation where only the 50% most educated of the population are healthy. This is different to the standard CI that indicates how far a society is from a situation where the entire population is equally healthy.

Inequality decomposition

The decomposition of the concentration index allows one to determine if and how much the aforementioned demographic, socioeconomic and social security variables contribute to any demonstrated health inequality. Due to the discontinuous nature of education levels an Oaxaca decomposition was used with the education groups grouped into ‘lower education’ (primary or less) and ‘higher education’ (secondary or more) (Oaxaca 1973). The decomposition determines the prevalence of disability in each group and then estimates how much of the difference between these can be explained by the chosen social dimensions and how much of the difference remains

unexplained. The results from the Oaxaca decomposition can be interpreted as follows. If, for example, employment accounts for 2% of the inequality then education-related health inequalities would have been 2% lower if each education group had the same proportion of employed individuals (Wagstaff et al. 2007).

Results

Descriptives

Table 2 shows the sample overview for all five countries combined, weighted by population size, as well as separately. Overall, about half of the total sample is female (48%). Around 30% of individuals aged 60 or above in the five countries included are employed. However, this number varies significantly between countries. Whereas in Chile and Uruguay only around 18% of older individuals are employed, the share of older individuals participating in the labor force is substantially higher in Colombia (35.5%), Paraguay (25.8%) and El Salvador (33.3%). Comparing employment rates among all individuals aged 60 or above with those of older individuals with less than secondary education, Table 2 shows that the former do not differ substantially. Only around half of older individuals in the five countries currently live with their married or non-married partner, while the other half is either divorced, widowed or living alone. On average, within the five countries, 18% of individuals have no formal education, whereas 53.7% have completed primary education. Among its peers Chile and Uruguay stand out as the country with the highest share of older individuals having completed secondary education (32.9% in Chile and 27.3

in Uruguay), a number that is substantially lower in Colombia (17%), Paraguay (10.7%) and El Salvador (9.6). Among these cohorts and among all five countries the share of individuals with tertiary education is relatively low, with only Colombia (10.7) and Uruguay (11.9%) where more than 10% of older individuals are tertiary educated.

Weighted by population size, on average 13% of older individuals suffer from a disability. Colombia has the lowest share of older individuals reporting a disability (7.7%) compared to the other five countries, whereas Chile (19.1%), Paraguay (17.4%), El Salvador (25.8%) and Uruguay (16.7%) have a substantially higher prevalence. Table 2 also shows the prevalence of disability among individuals with only lower education, i.e. those with less than secondary education. As the table shows, in all countries mean prevalence of disability is higher among lower educated individuals than the average among all individuals aged 60 and above. The difference in terms of net prevalence is particularly large in Chile where 29% of lower educated individuals suffer from a disability, compared to 19.1% among all older individuals. Also in Uruguay, the difference in disability prevalence between lower educated (26.6%) and the average (16.7%) is substantial. In the remaining countries, Colombia, Paraguay and El Salvador, disability prevalence among lower educated is not substantially different than the average across all educational levels.

Table 2 also shows coverage with social security in terms of healthcare and pensions. Coverage with health insurance is generally high, with on average 84% of older individuals being covered in the five countries. Chile (98.6%), Colombia (94.9) and Uruguay (98.4) have reached near to 100% of healthcare coverage among older

individuals. However, coverage remains substantially lower in Paraguay (30.7) as well as El Salvador (18.8), with both countries having notable coverage gaps in terms of healthcare access. What stands out is that in Chile (99.6%), Colombia (91.5%) and Uruguay (98.2), coverage with health insurance is equally high among lower educated than compared to general population aged 60 or above. In term of access to pensions, less than 30% of older individuals in the five countries receive a pension. Chile (55%) and Uruguay (61.7%) stand out with a comparatively higher share of older individuals receiving a pension. However, only 20.5% of older individuals in Colombia, 8% in Paraguay and 13.2% in El Salvador receive a pension. Table 2 also highlights the existing inequality with regard to pension access according to education in Colombia, Paraguay and El Salvador, where only 7%, 2% and 4% respectively receive a pension at ages 60 or above. In contrast, in Chile and Uruguay access to pensions is relatively equal when comparing the share of individuals with lower education receiving a pension with that among the general population aged 60 and above.

Regression

Table 3 shows the results of a set of multivariate logistic regressions assessing the association between disability, socio-demographic characteristics and social security coverage. As the results show, we find no evidence that having health insurance influences the likelihood of suffering a disability among individuals aged 60 or above. This remained the same in supplementary analysis, when omitting the

variable concerning pension receipt (Appendix Table 1). Similar conclusions were also reached when using self-reported health instead of disability reports, which is usually more sensitive to healthcare access (Appendix Table 2). In contrast, the results show that pension receipt and disability are significantly associated. According to the population weighted model including all five countries, older individuals receiving a pension had 41% lower odds of reporting a disability (OR=0.59, p-value=<0.000) compared to those not receiving a pension. The results for the individual country analysis show a strong and significant negative association between pension receipt and disability reports in Chile (OR=0.44, p-value=<0.000), Colombia (OR=0.76, p-value=0.001) and Uruguay (OR=0.75, p-value=<0.000). However no such association is found in Paraguay (OR=0.61, p-value=0.051) and El Salvador (OR=1.04, p-value=0.827).

Health Inequality

Table 4 shows the health concentration index (CI) for inequalities in disability prevalence related to education levels for all countries, weighted by population size, and separately for each country. As the table shows, the CI is negative in all countries, thus indicating that disability prevalence is disproportionately concentrated among individuals with lower education. With the exception of El Salvador, the CI's are significant at the 95% level of confidence. Among the five countries included Uruguay, with a CI of -0.123, has the highest degree of inequality,

closely followed by Chile with a CI of -0.078. Paraguay has the lowest level of educational inequality in disability with a CI of -0.051.

Table 4 also shows the values of the CI corrected by mean levels of disability prevalence between countries, in order to make them more comparable. The corrected CI values show that Chile and Uruguay remain the two most unequal countries among the five countries being compared, but shift positions. As before, Table 4 shows no significant disability inequalities in El Salvador related to education.

Figure 1 further provides evidence of this by showing the concentration curves from Table 4. As discussed above, in all countries but El Salvador, the graphs indicate that prevalence of disability is concentrated among individuals with lower educational levels since the empirical distribution of disability is above the 45-degree line of equality.

Decomposition

Table 5 shows the results of the Oaxaca decomposition of disability by educational achievement, distinguishing between individuals with lower (none or primary education) and higher education (secondary or tertiary education). The results show that in none of the countries coverage of health insurance was significantly associated with educational inequalities in disability. In contrast, the receipt of pension income was significantly associated with educational inequalities of disability reporting in Chile, Colombia, and Paraguay. This suggests that educational

inequalities of disability would have been substantially lower if lower educated groups benefited from the same levels of access to pensions as higher education individuals. Overall, the pooled analysis suggest that inequality in disability would be 73% lower if lower and higher educated individuals had the same pension coverage. El Salvador was not included in the decomposition analyses as no significant disability inequality according to education existed (Table 4). Looking at each country independently, the results show that educational inequalities in disability would have been 37% lower in Chile, 51% lower in Colombia, and 31% lower in Paraguay with equivalent access to pension coverage in low and high education groups. No significant contribution of pension coverage to educational inequalities in disability existed in Uruguay.

Discussion

Summary

The principal aim of this study was to systematically analyze the association between social security coverage and disability among older individuals in five Latin American countries, and quantify educational inequalities in disability and their components. Using representative data from the Longitudinal Social Protection Survey (ELPS) the results suggest that access to health insurance was not significantly associated with

disability in Chile, Colombia, El Salvador, Paraguay or Uruguay. In contrast, in Chile, Colombia and Uruguay those receiving a pension at ages 60 or above had significantly lower risks of suffering from a disability compared to those not receiving a pension. In all countries, with the exception of El Salvador, disability prevalence was disproportionally concentrated among lower educated individuals. Furthermore, whereas differential access to health insurance between lower and higher educated individuals was not significantly associated with inequalities in disability in any country, access to pensions does explain a substantial part of inequality in disability in Chile, Colombia and Paraguay.

Interpretation

The finding that healthcare coverage was not significantly associated with health, in principal, contradicts results of studies showing that expansions of healthcare access in different Latin American countries have led to improvements in population health. For example, several studies have shown that the expansion of primary healthcare in Brazil resulted in reductions of infant mortality (Macinko, Guanais and de Souza 2006), cardiovascular disease mortality (Rasella et al. 2014) as well as unnecessary hospitalizations among adults (Macinko et al. 2010, Rasella et al. 2014). Furthermore, studies in different low- and middle-income countries, using longitudinal data as well as experimental or quasi-experimental methods, have shown that increasing access to healthcare led to improvements in population health (Moreno-Serra and Smith 2012), reductions in out of pocket spending on healthcare

(Miller, Pinto and Vera-Hernández 2013), especially benefiting poorer segments of the population (Gupta, Verhoeven and Tiongson 2003). However, whether health insurance by itself improves health remains debated (Gruber 2008, Moreno-Serra and Smith 2012), with some studies findings no effects on health or patterns of service use, for example after the introduction of publicly subsidized health insurance in China (Lei and Lin 2009) or Mexico (King et al. 2009). Also, to our knowledge, studies evaluating the health effects of healthcare coverage in low- and middle-income countries to date have mainly focused on health outcomes of children or those in working age. In consequence, the findings of those studies may not necessarily apply to older individuals. Although strictly correlational, the results of this study suggest that increasing access to health insurance alone may not lead to health improvements, in the form of reduced disability, among older individuals in the five Latin American countries included. Although speculative, reasons for the lack of significant association between access to health insurance and disability outcomes may relate to known barriers in access of healthcare services among older and vulnerable individuals (Lloyd-Sherlock 2000) and low levels of health literacy (Parker, Ratzan and Lurie 2003). Finally, there may be limits to which healthcare can effectively reduce limitations related to specific disabilities included in this study, such as deafness, blindness or muteness.

A related, yet different, question is why access to health insurance does seemingly not affect health inequalities with regard to disability. While one would expect that the introduction and vast expansion of public health insurance, that primarily benefited poorer individuals, would have reduced health inequalities, this might not

necessarily be the case. For example, in Colombia, despite the introduction and rapid expansion of publicly financed health insurance for poor individuals, educational disparities in mortality did not decrease (Arroyave et al. 2013). Reasons for the latter likely relate to the circumstances that many primary causes of mortality and possibly disabilities, not only in Colombia but also in many other Latin American countries, are not directly amenable to healthcare, for example due to high mortality related to accidents and external causes (Arroyave et al. 2014). Furthermore, the extent to which an expansion of public health insurance de facto reduces inequalities in health is not only contingent on health trends among those with lower SES, but equally on health trends among those with higher SES. For example, in the case of Colombia, after the introduction of publicly subsidized healthcare and despite significant reductions in mortality among individuals with lower SES, mortality rates among those with higher SES declined at an even faster pace, potentially related to a growing gap in earnings during the same period (Arroyave et al. 2014), thus nullifying a potential effect of the policy on inequalities. Similarly, also in Thailand and Canada, despite the introduction of universal healthcare coverage, large disparities in healthcare service use remained (Katz and Hofer 1994, Suraratdecha, Saithanu and Tangcharoensathien 2005). Taken together, the results of this study not only echo findings from these studies, but also the argument that healthcare access alone does not likely reduce SES-related inequalities in health on the one hand, and on the other hand the evidence that substantial inequalities in health exist even in many high-income countries with longstanding and comprehensive universal health insurance (Adler et al. 1993).

The findings of this study suggest that pension receipt is associated with lower risks of reporting a disability in Chile, Colombia and Uruguay. This resonates with the wealth of evidence that more material resources, such as higher income is, are consistently associated with better health, also among older individuals in Latin America (Alvarado et al. 2008, Palloni, Pinto-Aguirre and Pelaez 2002, Smith and Goldman 2007, Zunzunegui et al. 2009). Evidence also suggests that lack of social protection has negative effects on well-being in Colombia (Hurtado, Hessel and Avendano 2016). However, the exact role of pensions as a determinant of health among older individuals in low- and middle-income countries remains underexplored and inconclusive (Lloyd-Sherlock et al. 2012). Nevertheless, some studies of Latin American countries have shown that access to pensions among disadvantaged older individuals can have positive effects on healthcare service use as well as health, including disability (Aguila, Kapteyn and Smith 2015, Galiani, Gertler and Bando 2016, Hessel et al. 2018). These potentially positive effects on health, however, have been shown to depend on a number of circumstances, such as the extent to which financial resources are shared among household members, the availability and quality of healthcare services as well as barriers in accessing those services for disadvantaged and older individuals (Lloyd-Sherlock et al. 2012). Although pension receipt was associated significantly with lower risks of suffering from a disability in Chile, Colombia and Uruguay, no significant relationship was found in Paraguay (although significant according to the 90% level of confidence with a p-value of 0.051 for the association between pension receipt and disability) or El Salvador. The lack of statistical significance in those two countries may also be

related to the small share, and thus number of cases, of individuals receiving a pension. At the same time, the lack of a significant association between pension receipt and disability risk in both countries may also be due to the fact that co-residence rates in both countries are among the highest in the region in both countries (OECD/IDB/The World Bank 2014). Also, El Salvador has one of the lowest pension replacement rates for low-income earners among its Latin American peers (OECD/IDB/The World Bank 2014).

Whereas health insurance coverage does not explain a significant share of educational inequalities in disability, differential access to pensions does explains a substantial share of educational inequalities in disability, at least in in Chile, Colombia and Paraguay. In general, this finding appears to be in line with emerging evidence showing that higher spending on social policies, including pensions, is associated with significant positive effects on population health on the one hand (Beckfield and Bambra 2016, Reynolds and Avendano 2018), and studies suggesting that higher social spending is associated with lower inequalities in health (Álvarez-Gálvez and Jaime-Castillo 2018). Furthermore, evidence also suggests that social spending in the form of supply-side interventions may be a more important determinant of population health than demand side interventions in the form of healthcare access (Bradley et al. 2011, Bradley et al. 2016). In Latin America in recent decades the focus of policy makers has clearly been on supply side interventions in the from of increased healthcare coverage among poor individuals. Demand side interventions in the form of increasing access to pensions has only really become a focus relatively recently in most countries in the region. Most

countries in Latin America have made significant investments in demand side interventions in the form of so-called conditional cash transfers targeted at poor families and their children (Fiszbein and Schady 2009). In comparison, the implementation and expansion of so-called social or non-contributory pensions aimed at poor older individuals is more recent and incomplete, with large shares of older individuals still without social security at older ages. As a result, comprehensive social security coverage for older individuals – understood as "public actions taken in response to levels of vulnerability, risk, and deprivation which are deemed socially unacceptable within a given polity or society" (Conway, De Haan and Norton 2000) – remains incomplete (Lavinas 2015). However, the results of this study suggest that demand side interventions in the form of increasing access to pensions among individuals with lower SES may lead to important reductions in health inequalities among older individuals.

One finding that is worth considering is that educational inequalities in disability, despite being significant in all countries except for El Salvador, are relatively modest when comparing the CI and concentration curves, that are close to 0, i.e. the line of equality. This is surprising given the very high inequalities in income in all countries. Part of the explanation for this circumstance may be that, in this cohort of older individuals, about half of individuals only have primary education, and around 20% having less than primary education. However, for example in Chile or Uruguay, more than 30% of older individuals have completed secondary or tertiary education. In fat, the two countries were found to have the largest inequalities in disability related to education among its peers included in this study. In contrast, in Colombia, Paraguay

and El Salvador, where between 14% to 26% of older individuals have secondary or tertiary education, higher educated individuals have very a similar prevalence of disability compared to their lower educated (none or primary) counterparts. Although speculative, a potential part of the explanation may stem from the circumstance that individuals included in thus study (born between 1911 and 1955) did witness major socio-economic change and upheavals, including two world wars, military dictatorships (e.g. in the case of Chile, Colombia, Uruguay and Paraguay), civil wars (e.g. in Colombia and Paraguay) as well as economic crises. As a result, quality of live and living standards for a majority of the population was likely poor for large parts of the 20th century (Thorp 1998), thus increasing frailty and disability in later-life by operating though multiple deprivations at earlier life (Alvarado et al. 2008, Monteverde, Noronha and Palloni 2009). With regard to health and disability, those historical upheavals may have taken their toll to a comparable degree to both lower as well as higher educated individuals, thus contributing to the circumstance that the prevalence of disability does not differ substantially according to education in some countries.

Limitations

Despite several strengths, some limitations of this study should be noted. First, despite a reasonably large sample size for each country, the number of individuals with access to healthcare or pensions is rather small in El Salvador and Paraguay. As a result, the regression and decomposition analyses with regard to those two

variables for those two countries may be underpowered and contributed to the insignificant results. Second, this study relied on education as indicator of SES. Although it would have been of general interest to assess inequalities with regard to income, there exist important difficulties in measuring income among older individuals, especially due to high labor informality and large income differences related to participation or not in the labor market. Third, disability was used as indicator for health among older individuals. Although the latter is an important determinant of successful ageing, results for disability do not necessarily apply to other health outcomes. Fourth, the results of the decomposition analyses depend on the validity of the related regression model. Neither of both has a causal interpretation, and thus only reveals existing associations between the dependent and independent variables included in the analyses.

Conclusions

Latin America is one of most unequal regions in the world. Rapid population ageing and substantial coverage gaps in terms of social security among older individuals among most countries will likely exacerbate existing inequalities. This process also represents a significant challenge for population health and equity given that a large share of older individuals will lack adequate resources to economically maintain themselves. Access to healthcare undoubtedly is an important social right and evidence suggests that the introduction and expansion of universal healthcare has contributed to improvements in population health in Latin America. However, there

remain doubts about the effectiveness in reducing health inequalities. Despite limitations, this study suggests that investments in social security in the form of pensions may result in important reductions in health inequality among older individuals.

References

Adler, Nancy E, W Thomas Boyce, Margaret A Chesney, Susan Folkman and S Leonard Syme. 1993. "Socioeconomic Inequalities in Health: No Easy Solution." *JAMA* 269(24):3140-45.

Aguila, Emma, Arie Kapteyn and James P Smith. 2015. "Effects of Income Supplementation on Health of the Poor Elderly: The Case of Mexico." *Proceedings of the National Academy of Sciences* 112(1):70-75.

Alvarado, Beatriz E, Maria-Victoria Zunzunegui, Francois Béland and Jean-Marie Bamvita. 2008. "Life Course Social and Health Conditions Linked to Frailty in Latin American Older Men and Women." *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 63(12):1399-406.

Álvarez-Gálvez, Javier and Antonio M Jaime-Castillo. 2018. "The Impact of Social Expenditure on Health Inequalities in Europe." *Social Science and Medicine* 200:9-18.

Arroyave, Ivan, Doris Cardona, Alex Burdorf and Mauricio Avendano. 2013. "The Impact of Increasing Health Insurance Coverage on Disparities in Mortality: Health Care Reform in Colombia, 1998–2007." *American Journal of Public Health* 103(3):100-06.

Arroyave, Ivan, Alex Burdorf, Doris Cardona and Mauricio Avendano. 2014. "Socioeconomic Inequalities in Premature Mortality in Colombia, 1998–2007: The Double Burden of Non-Communicable Diseases and Injuries." *Preventive Medicine* 64:41-47.

Atun, Rifat, Luiz Odorico Monteiro De Andrade, Gisele Almeida, Daniel Cotlear, Tania Dmytraczenko, Patricia Frenz, Patrícia Garcia, Octavio Gómez-Dantés, Felicia M Knaul and Carles Muntaner. 2015. "Health-System Reform and Universal Health Coverage in Latin America." *The Lancet* 385(9974):1230-47.

Beckfield, Jason and Clare Bambra. 2016. "Shorter Lives in Stingier States: Social Policy Shortcomings Help Explain the Us Mortality Disadvantage." *Social Science and Medicine* 171:30-38.

Berstein, Solange, Pablo Castañeda, Eduardo Fajnzylber and Gonzalo Reyes. 2009. "Chile 2008: A Second-Generation Pension Reform." *Superintendencia de Pensiones de Chile*.

Bitran, Ricardo. 2013. "Explicit Health Guarantees for Chileans: The Auge Benefits Package."

Bossert, T. and E. Hill. 2013. "Análisis De La Política Pública De Salud En El Salvador." Vol.: FUSADES.

Bradley, Elizabeth H, Benjamin R Elkins, Jeph Herrin and Brian Elbel. 2011. "Health and Social Services Expenditures: Associations with Health Outcomes." *BMJ Quality & Safety* 20(10):826-31. doi: 10.1136/bmjqs.2010.048363.

Bradley, Elizabeth H, Maureen Canavan, Erika Rogan, Kristina Talbert-Slagle, Chima Ndumele, Lauren Taylor and Leslie A Curry. 2016. "Variation in Health Outcomes: The Role of Spending on Social Services, Public Health, and Health Care, 2000–09." *Health Affairs* 35(5):760-68.

Calvo, Esteban, Fabio M Bertranou and Evelina Bertranou. 2010. "Are Old-Age Pension System Reforms Moving Away from Individual Retirement Accounts in Latin America?". *Journal of Social Policy* 39(2):223-34.

Casas, Juan Antonio, JN Dachs and Alexandra Bambas. 2001. "Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants." *Equity and health* 8:22-49.

Clark, Mary A. 2015. "The New Left and Health Care Reform in El Salvador." *Latin American Politics and Society* 57(4):97-118.

Conway, Tim, Arjan De Haan and Andy Norton. 2000. "Social Protection: New Directions of Donor Agencies." Paper for the DFID-ODI Inter-Agency Seminar on Social Protection. Easthamstead Park.

Cortez, Rafael, Isabella Bablumian and Danilo Fernandez. 2009. "Extension of Health Services Coverage in El Salvador: The Rhessa Project Experience."

Cruces, Guillermo and Marcelo Bérgolo. 2013. "Informality and Contributory and Non-Contributory Programmes. Recent Reforms of the Social-Protection System in Uruguay." *Development Policy Review* 31(5):531-51.

de Andrade, Luiz Odorico Monteiro, Alberto Pellegrini Filho, Orielle Solar, Félix Rígoli, Lígia Malagon de Salazar, Pastor Castell-Florit Serrate, Kelen Gomes Ribeiro, Theadora Swift Koller, Fernanda Natasha Bravo Cruz and Rifat Atun. 2015. "Social Determinants of Health, Universal Health Coverage, and Sustainable Development: Case Studies from Latin American Countries." *The Lancet* 385(9975):1343-51.

Erreygers, Guido. 2009. "Correcting the Concentration Index." *Journal of Health Economics* 28(2):504-15.

Fiszbein, Ariel and Norbert R Schady. 2009. *Conditional Cash Transfers: Reducing Present and Future Poverty*: World Bank Publications.

Flamini, Valentina, Misael Galdamez, Frederic Lambert, Mike Li, Mr Bogdan Lissovolik, Rosalind Mowatt, Jaume Puig, Mr Alexander D Klemm and Mauricio Soto. 2018. *Growing Pains: Is Latin American Prepared for Population Aging?*: International Monetary Fund.

Fleischer, Nancy L and Ana V Diez Roux. 2013. "Inequities in Cardiovascular Diseases in Latin America." *Revista Peruana de Medicina Experimental y Salud Publica* 30(4):641-48.

Galiani, Sebastian, Paul Gertler and Rosangela Bando. 2016. "Non-Contributory Pensions." *Labour Economics* 38:47-58.

Garay, Candelaria. 2017. *Social Policy Expansion in Latin America*: Cambridge University Press.

Gildner, Theresa E, Melissa A Liebert, Benjamin D Capistrant, Catherine D'Este, J Josh Snodgrass and Paul Kowal. 2016. "Perceived Income Adequacy and Well-Being among Older Adults in Six Low-and Middle-Income Countries." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*:gbw145.

Gruber, Jonathan. 2008. "Covering the Uninsured in the United States." *Journal of Economic Literature* 46(3):571-606.

Gupta, Sanjeev, Marijn Verhoeven and Erwin R Tiongson. 2003. "Public Spending on Health Care and the Poor." *Health Economics* 12(8):685-96.

Hessel, Philipp, Mauricio Avendano, Carlos Rodríguez-Castelán and Tobias Pfutze. 2018. "Social Pension Income Associated with Small Improvements in Self-Reported Health of Poor Older Men in Colombia." *Health Affairs* 37(3):456-63.

Holzmann, Robert. 2013. "Global Pension Systems and Their Reform: Worldwide Drivers, Trends and Challenges." *International Social Security Review* 66(2):1-29.

Hurtado, David A, Philipp Hessel and Mauricio Avendano. 2016. "The Hidden Costs of Informal Work: Lack of Social Protection and Subjective Well-Being in Colombia." *International journal of public health* 62(2):1-10.

Jones, Antwan, Danielle Mitchel and Franklin Goza. 2014. "Lifecourse Socioeconomic Status and Cardiovascular Illness in Latin America." *Current Sociology* 62(7):1055-78. doi: 10.1177/0011392114537003.

Kakwani Nanak, C. 1980. *Income Inequality and Poverty: Methods of Estimation and Policy Applications*: Oxford University Press.

Katz, Steven J and Timothy P Hofer. 1994. "Socioeconomic Disparities in Preventive Care Persist Despite Universal Coverage." *JAMA* 272(7):530-34.

King, Gary, Emmanuela Gakidou, Kosuke Imai, Jason Lakin, Ryan T Moore, Clayton Nall, Nirmala Ravishankar, Manett Vargas, Martha María Téllez-Rojo and Juan Eugenio Hernández Ávila. 2009. "Public Policy for the Poor? A Randomised Assessment of the Mexican Universal Health Insurance Programme." *The Lancet* 373(9673):1447-54.

Kjellsson, Gustav and Ulf-G Gerdtham. 2013. "On Correcting the Concentration Index for Binary Variables." *Journal of Health Economics* 32(3):659-70.

Lavinas, Lena. 2015. "Latin America: Anti-Poverty Schemes Instead of Social Protection." Vol. 7. *Contemp. Readings L. & Soc. Just.*

Lei, Xiaoyan and Wanchuan Lin. 2009. "The New Cooperative Medical Scheme in Rural China: Does More Coverage Mean More Service and Better Health?". *Health Economics* 18(S2):S25-S46.

Levy, Santiago and Norbert Schady. 2013. "Latin America's Social Policy Challenge: Education, Social Insurance, Redistribution." *Journal of Economic Perspectives* 27(2):193-218.

Lloyd-Sherlock, Peter. 2000. "Old Age and Poverty in Developing Countries: New Policy Challenges." *World Development* 28(12):2157-68.

Lloyd-Sherlock, Peter, Nadia Minicuci, John Beard and Somnath Chatterji. 2012. "Social Protection and Preventing Illness in Developing Countries: Establishing the Health Effects of Pensions and Health Insurance." *International social security review* 65(4):51-68.

Lustig, Nora and Carola Pessino. 2014. "Social Spending and Income Redistribution in Argentina During the 2000s:The Increasing Role of Noncontributory Pensions." *Public Finance Review* 42(3):304-25. doi: 10.1177/1091142113505193.

Lustig, Nora, Luis F. Lopez-Calva, Eduardo Ortiz-Juarez and Célestin Monga. 2016. "Deconstructing the Decline in Inequality in Latin America." Pp. 212-47 in *Inequality and Growth: Patterns and Policy: Volume Ii: Regions and Regularities*, edited by K. Basu and J. E. Stiglitz. London: Palgrave Macmillan UK.

Macinko, James, Frederico C Guanais and Maria de Fatima Marinho de Souza. 2006. "Evaluation of the Impact of the Family Health Program on Infant Mortality in Brazil, 1990–2002." *Journal of Epidemiology and Community Health* 60(1):13-19.

Macinko, James, Inês Dourado, Rosana Aquino, Palmira de Fátima Bonolo, Maria Fernanda Lima-Costa, Maria Guadalupe Medina, Eduardo Mota, Veneza Berenice de Oliveira and Maria Aparecida Turci. 2010. "Major Expansion of Primary Care in Brazil Linked to Decline in Unnecessary Hospitalization." *Health Affairs* 29(12):2149-60.

Macinko, James, Veneza B De Oliveira, Maria A Turci, Frederico C Guanais, Palmira F Bonolo and Maria F Lima-Costa. 2011. "The Influence of Primary Care and Hospital Supply on Ambulatory Care–Sensitive Hospitalizations

among Adults in Brazil, 1999–2007." *American Journal of Public Health* 101(10):1963-70.

Miller, G, D Pinto and M Vera-Hernández. 2013. "Risk Protection, Service Use, and Health Outcomes under Colombia's Health Insurance Program for the Poor." *American economic journal. Applied economics* 5(4):61-91.

Ministry of Public Health and Social Welfare. 2015. "Información Sobre Aps En Paraguay." Vol.

Monteverde, Malena, Kenya Noronha and Alberto Palloni. 2009. "Effect of Early Conditions on Disability among the Elderly in Latin America and the Caribbean." *Population Studies* 63(1):21-35.

Moreno-Serra, Rodrigo and Peter C Smith. 2012. "Does Progress Towards Universal Health Coverage Improve Population Health?". *The Lancet* 380(9845):917-23.

Oaxaca, Ronald. 1973. "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review* 14(3):693-709.

Observatorio de Seguridad Social (OSS). 2018, "Encuesta Longitudinal De Protección Social (Elps)". (http://www.observatorioregional.net/es/datos-es/).

OECD/IDB/The World Bank 2014. *Pensions at a Glance: Latin America and the Caribbean*. Paris: OECD Publishing.

PAHO. 2017, "Health in the Americas: Paraguay" *Health in the Americas*. Retrieved May 3rd, 2018 (https://www.paho.org/salud-en-las-americas-2017/).

Palloni, Alberto, Guido Pinto-Aguirre and Martha Pelaez. 2002. "Demographic and Health Conditions of Ageing in Latin America and the Caribbean." *International Journal of Epidemiology* 31(4):762-71. doi: 10.1093/ije/31.4.762.

Parker, Ruth M, Scott C Ratzan and Nicole Lurie. 2003. "Health Literacy: A Policy Challenge for Advancing High-Quality Health Care." *Health Affairs* 22(4):147-53.

Rasella, Davide, Michael O Harhay, Marina L Pamponet, Rosana Aquino and Mauricio L Barreto. 2014. "Impact of Primary Health Care on Mortality from Heart and Cerebrovascular Diseases in Brazil: A Nationwide Analysis of Longitudinal Data." *BMJ* 349:g4014.

Reynolds, Megan M and Mauricio Avendano. 2018. "Social Policy Expenditures and Life Expectancy in High-Income Countries." *American Journal of Preventive Medicine* 54(1):72-79.

Rofman, Rafael, Ignacio Apella and Evelyn Vezza. 2014. *Beyond Contributory Pensions: Fourteen Experiences with Coverage Expansion in Latin America*: World Bank Publications.

Rowe, John W and Robert L Kahn. 1997. "Successful Aging." *The gerontologist* 37(4):433-40.

SAFP. 2017. "Numero De Beneficiarios Pension Basica Solidaria." Vol. Chile: Superintendencia de Pensiones,.

Smith, Kimberly V and Noreen Goldman. 2007. "Socioeconomic Differences in Health among Older Adults in Mexico." *Social Science and Medicine* 65(7):1372-85.

Social Security Administration. 2017. "International Update." Vol. United States: Social Security Administration,.

Sojo, Ana. 2006. *Health Benefits Guarantees in Latin America: Equity and Quasi-Market Restructuring at the Beginning of the Millennium*, Vol. 51: United Nations Publications.

Suraratdecha, Chutima, Somying Saithanu and Viroj Tangcharoensathien. 2005. "Is Universal Coverage a Solution for Disparities in Health Care?: Findings from Three Low-Income Provinces of Thailand." *Health Policy* 73(3):272-84.

Thorp, Rosemary. 1998. *Progress, Poverty and Exclusion: An Economic History of Latin America in the 20th Century*. Washington D.C.: Inter-American Development Bank.

Tsai, Thomas C. 2010. "Second Chance for Health Reform in Colombia." Elsevier.

Wagstaff, Adam, Owen O'Donnell, Eddy Van Doorslaer and Magnus Lindelow. 2007. *Analyzing Health Equity Using Household Survey Data: A Guide to*

Techniques and Their Implementation. Washington D.C.: World Bank Publications.

World Bank. 2010. "Paraguay Poverty Assessment: Determinants and Challenges for Poverty Reduction." Vol. Washington, D.C.: World Bank.

World Bank. 2011. "Population Aging: Is Latin America Ready?" Vol. *Direction in Development.* 0821384694. Washington D.C.: World Bank.

Zunzunegui, Maria-Victoria, Beatriz-Eugenia Alvarado, François Béland and Bilkis Vissandjee. 2009. "Explaining Health Differences between Men and Women in Later Life: A Cross-City Comparison in Latin America and the Caribbean." *Social Science and Medicine* 68(2):235-42.

Table 1: Overview of pension and healthcare systems in five Latin American countries

	Healthcare			Pension				
	Coverage % (public)	Coverage % (private)	Coverage % (other)	Gross replacement rates (for men) (%)		Share of bottom two quintiles receiving pension (%)	Social pension	
				Average earners	Low earners		Eligibility age (males / females)	Benefit / income per capita (%)
Chile	74	16	10	44	60	53	65	12
Colombia	51	39	5	71	103	5	57/52	4
Paraguay	30	1		104	104	6	65	29
El Salvador	98	2		47	93	4	70.00%	12
Uruguay	25	75		53	53	81	70	22

Notes: Information was retrieved from "OECD/IDB/The World Bank (2014), Pensions at a Glance: Latin America and the Caribbean, OECD Publishing, Paris" and 'WHO/PAHO (2012), Health in the Americas, Pan American Health Organization, Washington, DC".

Table 2: Sample Overview

Variable/Country	All countries		Chile		Colombia		Paraguay		El Salvador		Uruguay	
	% all	% among lower educated	% all	% among lower educated	% all	% among lower educated	% all	% among lower educated	% all	% among lower educated	% all	% among lower educated
Disabled (yes)	12.97	15.61	19.10	28.99	7.77	9.72	17.45	18.98	25.86	26.87	16.68	26.58
Education												
None	18.10		8.95		20.52		11.61		40.12		3.81	
Primary	53.66		52.50		51.82		73.57		46.32		56.94	
Secondary	19.68		32.94		16.97		10.67		9.55		27.32	
Tertiary	8.56		5.61		10.69		4.15		4.02		11.92	
Age group												
60-64	28.86	24.90	27.11	20.69	30.84	26.93	26.09	23.97	27.44	25.60	21.20	16.18
65-69	23.87	23.18	24.16	23.85	23.90	23.05	24.69	24.71	23.17	23.12	21.98	18.52
70-74	19.16	20.58	19.91	20.84	18.87	21.05	20.25	20.09	17.55	17.85	20.09	20.64

75+	28.11	31.35	28.83	34.62	26.39	28.97	28.97	31.23	31.84	33.43	36.74	44.65
Female (yes)	0.48	0.49	52.50	53.40	42.83	43.27	56.46	56.69	58.36	60.13	60.84	59.45
Living with partner (yes)	0.51	0.49	58.33	54.62	50.95	49.46	49.77	49.43	41.92	40.31	42.59	38.80
Employed (yes)	0.30	0.31	18.48	13.09	35.55	36.68	25.79	23.92	33.32	32.55	17.32	13.35
Health insurance (yes)	0.84	0.72	98.64	99.64	94.91	91.55	30.71	14.96	18.81	5.44	98.42	98.20
Pension receipt (yes)	0.28	0.12	55.06	52.90	20.49	7.04	8.13	2.19	13.22	4.02	61.77	59.46
N	17,888		3,084		3,460		2,361		3,163		5,820	

Notes: Data came from the Encuesta Longitudinal de Protección Social (ELPS). Information for all five countries is weighted by population size. The group of individuals with lower education refers to those individuals with either none, primary or secondary education. With partner refers to those individuals being either married or living within an informal relationship, in contrast to individuals being either single, divorced/separated or widowed.

Table 3: Multivariate Logistic Regression of Disability on Socio-Economic Characteristics in Five Latin American Countries

	All countries		Chile		Colombia		Paraguay		El Salvador		Uruguay	
	OR	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value	OR	p-value
Age	1.34	<0.000	1.16	0.001	1.56	<0.000	1.34	<0.000	1.2	<0.000	1.49	<0.000
Female (yes)	0.77	<0.000	0.71	0.001	0.78	0.021	0.75	0.018	0.83	0.061	1.26	0.005
Living with partner (yes)	0.96	0.515	0.85	0.092	1.19	0.098	0.84	0.108	0.82	0.026	0.81	0.008
Employed (yes)	0.45	<0.000	0.29	<0.000	0.52	<0.000	0.46	<0.000	0.57	<0.000	0.48	<0.000
Health insurance (yes)	1.16	0.144	1.03	0.927	1.25	0.258	0.83	0.169	1.15	0.386	1.01	0.979
Pension (yes)	0.59	<0.000	0.44	<0.000	0.76	0.001	0.61	0.051	1.04	0.827	0.75	<0.000
Country (ref.: Colombia)												
Chile	3.08	0.000										
El Salvador	4.64	0.000										
Paraguay	2.49	0.000										
Uruguay	2.55	0.000										

OR=odds ratio

Notes: Results are from a multivariate logistic regression of a binary variable indicating whether an individual suffers from a disability on covariates. Results for all five countries combined are weighted by population size. Data came from the Encuesta Longitudinal de Protección Social (ELPS).

Table 4: Concentration Indices of Educational Inequalities in Disability in Five Latin American Countries

	Concentration index (CI)			Post-correction concentration index (EI)	
	CI	p-value	95% confidence interval	EI	95% confidence interval
All countries	-0.078	0.000	-0.103, -0.054	-0.054	-0.070, -0.037
Chile	-0.110	0.000	-0.147, -0.073	-0.084	-0.112, -0.056
Colombia	-0.087	0.004	-0.146, -0.027	-0.027	-0.045, -0.008
Paraguay	-0.051	0.007	-0.087, -0.014	-0.036	-0.061, -0.010
El Salvador	-0.008	0.609	-0.04, 0.023	-0.008	-0.041, 0.024
Uruguay	-0.123	0.000	-0.151, -0.095	-0.082	-0.101, -0.064

CI=concentration index; EI=Post-correction concentration index

Notes: Results for all countries combined are weighted by population size. The post-correction concentration index (EI) was calculated by applying the so-called Erreygers correction that adjusts the concentration indexes by differences in mean levels of disability prevalence in each country.

Table 5: Decomposition of Educational Inequality in Disability in Five Latin American Countries

	All countries			Chile			Colombia		
	Coeff.	% explained	p-value	Coeff.	% explained	p-value	Coeff.	% explained	p-value
Age	0.01293	72.7	<0.000	0.00421	12.3	0.215	0.01256	64.6	<0.000
Female (yes)	-0.00026	-1.4	0.323	-0.00132	-3.9	0.206	-0.00031	-1.6	0.313
Living with partner (yes)	0.00020	1.1	0.714	0.00128	3.8	0.389	-0.00058	-3.0	0.389
Employed (yes)	0.00075	4.2	0.180	0.01747	51.2	<0.000	-0.00157	-8.1	0.008
Health insurance (yes)	-0.00003	-0.2	0.980	-0.00012	-0.3	0.669	-0.00049	-2.5	0.431
Pension (yes)	0.01296	72.9	<0.000	0.01260	36.9	<0.000	0.00983	50.6	0.036
Country (ref.: Colombia)									
Chile	-0.01197	-67.3	<0.000						
Paraguay	0.00564	31.7	<0.000						
Uruguay	-0.00246	-13.8	<0.000						
Explained	0.02	55.39		0.03	51.84		0.02	71.31	

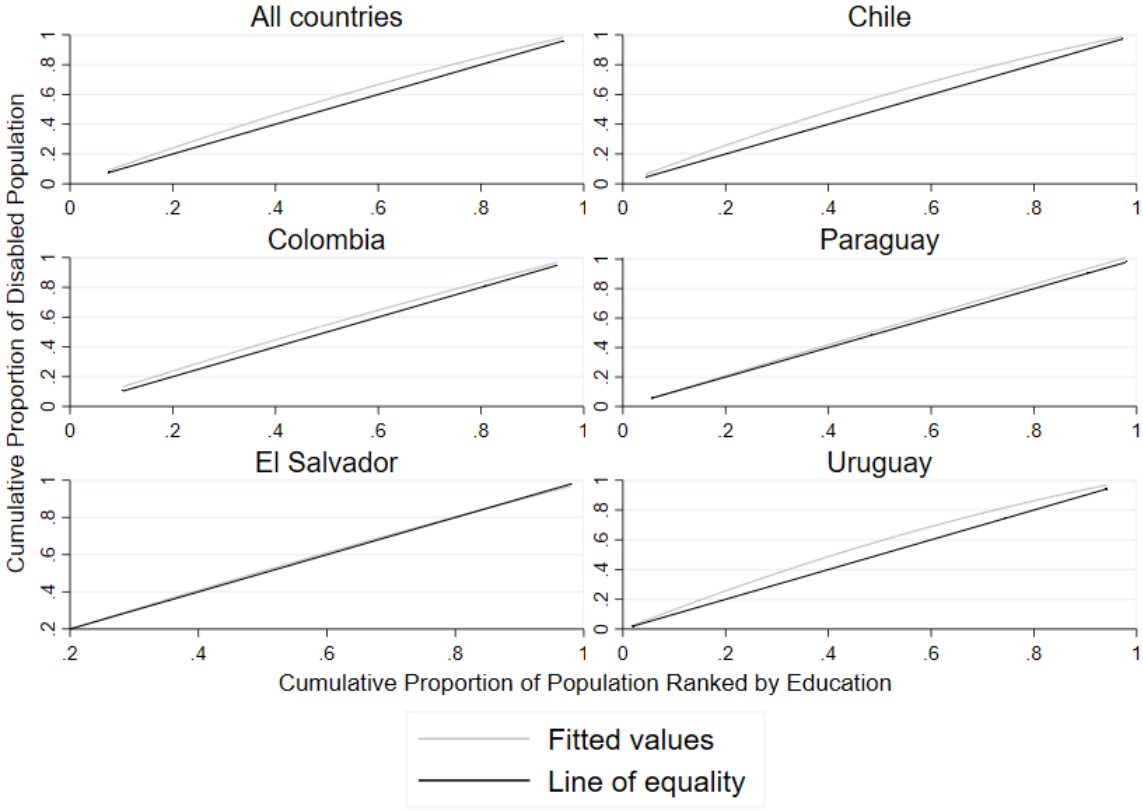
Table continued on next page.

	Paraguay			Uruguay		
	Coeff.	% explained	p-value	Coeff.	% explained	p-value
Age	0.01799	33.6	<0.000	0.02866	77.0	<0.000
Female (yes)	-0.00065	-1.2	0.679	-0.00109	-2.9	0.324
Living with partner (yes)	0.00059	1.1	0.561	0.00282	7.6	0.043
Employed (yes)	0.01193	22.3	0.003	0.00667	17.9	0.002
Health insurance (yes)	0.00941	17.6	0.151	0.00000	0.0	0.967
Pension (yes)	0.01656	30.9	0.025	0.00019	0.5	0.896
Explained	0.06	87.24		0.04	47.82	

Coeff.= linear regression coefficient

Notes: Data came from the Encuesta Longitudinal de Protección Social (ELPS). Information for all five countries is weighted by population size. El Salvador was omitted from the decomposition analysis as there existed no significant educational inequality in disability (see Table 4).

Figure 1. Inequalities in Disability according to Education in Five Latin American Countries as Shown by the Concentration Curves



Notes: Data came from the Encuesta Longitudinal de Protección Social (ELPS). Information for all five countries is weighted by population size. The concentration curve graphically shows the distribution of health (in this case disability) according to educational levels. If all individuals would have the same risk of suffering from a disability irrespectively of their educational level, the concentration curve would be a 45-degree line, also known as line of equality. If the empirical (fitted) line is above the line of equality, this indicates that poor health (i.e. disability prevalence) is more concentrated among individuals with lower levels of education. For further details please refer to the methods section of the paper.