Essays on
Social Protection and Redistribution in Latin America

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Dissertation

Anja Gaentzsch

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Contents

Chapter 1

Introduction

Social protection is a key instrument in the reduction of inequality and poverty. In his comprehensive set of policy proposals to tackle rising inequality, Atkinson (2015, p.205 citing Marx et al. (2015)) claims that 'no advanced economy achieved a low level of inequality or relative income poverty with a low level of social spending, regardless of how well that country performed on other dimensions that matter for poverty'.

Poverty reduction strategies in low income countries have traditionally largely neglected social protection and instead focused on greater investment in health, education and other public goods with the expectation that these would increase human capital and thus ultimately lead to poverty reduction. This was despite the experience from the OECD suggesting that taxes and transfers have a significant impact both on redistribution and poverty(OECD, 2015). Only in more recent decades has the role of social protection for development gained more attention (Ravallion, 2016), partly because its potential to enhance economic efficiency received more emphasis (Dercon, 2011). This thesis investigates the contribution that social protection makes to reducing inequality and poverty in the context of the transformation of welfare states in the region of Latin America, with a focus on Peru and the comparison with its regional neighbor Chile.

1.1 Motivation

Beyond moral considerations and normative judgements about the fairness of asset and resource allocation, Dercon (2011) lays out at least three economic reasons for why social protection can enhance overall welfare in society. First, credit constraints hinder individuals to invest in economic activities or assets such as starting a business

or pursuing education. The poor lack the collateral that is needed in financial markets, and social transfers can step in to relax this binding constraint. Theoretical models (Banerjee and Newman, 1993; Dasgupta and Ray, 1986; Bénabou, 1996) are backed by empirical evidence suggesting that credit constraints are a relevant concern in low income countries (Banerjee and Duflo, 2005; Ravallion, 2006; Berg, 2013).

Second, failures in insurance markets account for insufficient protection of the poor from shocks such as illness, employment loss or natural disasters. Coping with these shocks in the absence of insurance leads to asset depletion to maintain consumption, foregone investments and – ex-ante – to lower risk-taking (Dercon et al., 2008). There is substantial empirical evidence that large shocks in the absence of insurance not only deplete physical but also human assets with long-lasting income losses as a consequence. As such, research from Africa shows that individuals affected by famine or droughts continue to earn lower incomes many years after the shock than non-affected groups; similarly children that suffer from malnourishment in childhood continue to suffer from lower height, education and permanent income losses (Dercon et al., 2005; Alderman et al., 2006). The case for social insurance in developing countries is further strengthened by the argument that myopia or hyperbolic discounting affects the poor the most (Banerjee and Duflo, 2011; Deaton, 1992).

Third, these market failures are manifested most strongly in the form of poverty traps. Poverty traps arise in a dynamic setting when the relationship between some indicator of welfare (income, assets, human capital) in time t and $t+1$ is non-convex and s-shaped. In such a setting, multiple equilibria exist and the poor tend to drift towards the low equilibrium in a self-reinforcing process (Sachs, 2005; Banerjee and Duflo, 2011; Dasgupta, 1997). Transfers, if large enough, can help individuals attain a higher equilibrium and thus escape poverty.

It follows that social protection can achieve poverty reduction not only directly (by means of the transfer), but also through increasing economic efficiency (resolving market failures) and encouraging growth (increased productivity and risk-taking) (Dercon, 2011).[1] Theory and empirical evidence further suggest that their redistributive nature may enhance efficiency in resource allocation since high levels of inequality inhibit economic growth (Galor and Zeira, 1993; Cingano, 2014). Nonetheless, these theoretical considerations tell little yet as to which instruments of social protection are best suited to achieve poverty and inequality reduction at a given cost and budget

[1]There are obviously also non-monetary returns to social protection that I do not discuss here but certainly acknowledge. These include improved human development, social emancipation and female empowerment among others. In the case of Peru, it can be further argued that social transfers contribute to state-building efforts in rural regions that were long affected by political violence and alienation.

constraint. The direction chosen by most Latin American economies in recent decades can best be characterized as a combination of expanding targeted cash transfers to poor households, particularly in the form of non-contributory pension and health insurance, and the adoption of large-scale conditional cash transfer (CCT) programmes. The following section will describe the recent trends of welfare state development and inequality in the region in general and Peru in particular, before outlining the contribution of the thesis to this field of research.

1.1.1 Welfare states and inequality in Latin America

Systems of social protection in Latin America have experienced great changes in the past two decades. Social insurance schemes for formal sector employees were introduced in the region from the 1920s onwards, starting in the countries of the Southern Cone (Uruguay, Argentina, Brazil and Chile) and soon spreading further. But for most of the past century, social protection in the region remained largely confined to contributory insurance schemes of comparatively small coverage and generosity (Ferreira and Robalino, 2011). High informality in the labour market coupled with a large agricultural sector of small-scale, often subsistence farming meant that a great part of society was excluded from social protection schemes. This "truncated welfare state" (Ferreira and Robalino, 2011, p. 840) redistributed mainly among the upper half of the distribution. Since the late 1990s, the nature and scope of the welfare state has changed in virtually all countries of the region. A shift away from contributory systems that primarily redistribute along the life cycle towards a much greater reliance on targeted social assistance that aims at vertical redistribution was facilitated by rising social expenditures. With on average 14.5% of GDP, social spending remains, however, low in Latin America compared to other regions.

What are the reasons for such rise of the welfare state in times when much of the industrialized world favoured its retrenchment? The literature identifies several factors, key among them the persistingly high income and wealth inequalities that undermine social cohesion. Political pressure rose after the highly volatile 1980s and '90s, during which the debt crisis threw the region in deep recessions – it is not without reason that the 1980s are commonly referred to as the 'lost decade' of Latin America. The already low public spending was further cut under the premise that macroeconomic stability would spur growth which will eventually trickle down and benefit the poor equally. The experience of soaring poverty and inequality irrespective of growth patterns, however, created sentiments of what Barrientos (2013) termed a *deuda social* – a social debt that had accumulated inter alia as a consequence of the structural adjustment policies

designed to cope with financial debt. There was now a growing sense that if the poor were to wait for the fruits of growth to trickle down eventually, they would have to alter the forces of gravity. Hence, the growing inequalities and the hollowing out of the already small middle class were decisive forces that lobbied for more redistribution. Further, long periods of authoritarian regimes were followed by democratically elected governments that felt a greater need to tackle high levels of poverty (Ferreira and Robalino, 2011; Barrientos, 2014).

According to data from the United Nations Economic Commission for Latin America and the Carribbean (CEPAL)[2], public social expenditure in Latin America has risen from an average 11% of GDP in the year 2000 to 14.5% in 2015[3], which correspond to an average per capita spending of US$ 702 and US$ 1094 respectively (measured in constant prices of 2010) (CEPAL, 2017). This expansion has mainly been channeled through targeted anti-poverty programmes, most prominently among them conditional cash transfers (CCTs), and tax-financed health and pension insurance. At the same time and contrary to the trends observed in Europe and the USA, the continent has seen substantial reductions in poverty and inequality since the turn of the century (Gasparini and Lustig, 2011), although it remains the region with the highest levels of inequality worldwide.[4]

Figure 1.1 illustrates the trends in levels of inequality and poverty between the early 2000s and 2015 for 16 out of the 18 countries (data for Guatemala and Venezuela is incomplete) of the Latin American region: poverty and inequality decreased in all of them, often by substantial levels. Whereas the Gini coefficient in adult equivalent disposable income exceeded 0.5 in most countries, 15 years later it had fallen below that mark everywhere. Three of the 16 countries observed saw a reduction of more than 10 points (Argentina, Bolivia, El Salvador) although others experienced only marginal changes (Costa Rica, Uruguay). Even more impressive were the reductions in the incidence of poverty: the poorest countries counted rates of moderate poverty[5]

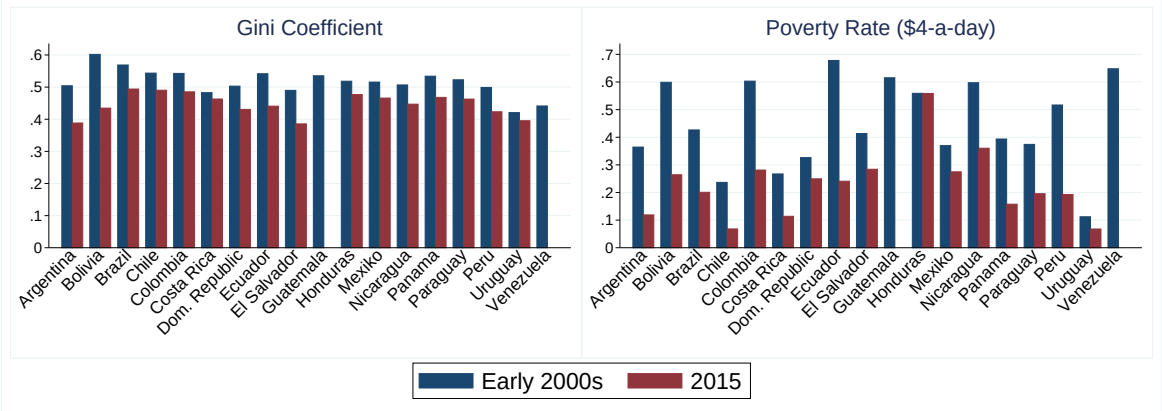
[2]This thesis will refer to the Spanish acronym CEPAL rather than the English acronym ECLAC for the remainder of the text

[3]This refers to the simple average among countries; the population-weighted average stands at 19% (driven by higher spending in Brazil). Regional figures obviously hide considerable heterogeneity in social spending among countries. At the upper end, countries such as Brazil and Costa Rica spend an average of 26% and 24% respectively compared to countries at the lower end such as Ecuador and Guatemala (both under 10%). Peru lies just below the average and Chile just above.

[4]While Latin America displays the highest levels of income inequality in the world, there is a lack of globally harmonized data. In Africa, household surveys rely on consumption rather than income measures. Hence, income inequality there may well be higher than what current estimates suggest (World Bank, 2016).

[5]For the sake of comparability, we measure poverty against the absolute threshold of $4-a-day (in 2011 PPP) and $1.90-a-day as the thresholds proposed by the World Bank to measure moderate (monetary) and extreme (subsistence) poverty in middle-income countries.

Figure 1.1: Trends in inequality and poverty in Latin America between 2000 and 2015



Source: SEDLAC (SEDLAS and the World Bank)
Note: The Gini refers to adult equivalized disposable household income. Poverty is measured against the threshold of $4-a-day (in PPP).

exceeding 60% (Ecuador, Bolivia and Colombia) but succeeded to reduce them by more than half. It is estimated that the region lifted 37 million people out of extreme poverty (measured as $1.90-a-day) between 2002 and 2013, which represents a reduction in the headcount ratio from 13% in 2002 down to 5.4% in 2013 (World Bank, 2016).[6] Nonetheless, with Gini coefficients above 0.4 in most countries (the only exception being Argentina and El Salvador that fall just below this) and poverty levels exceeding 25% in 6 out of the 16 countries that we have data for in 2015, there is still a long way to go. Further, it is unclear whether these distributive changes can be generalized to the top of the distribution given that top and capital incomes are insufficiently represented in household surveys (Alvaredo and Gasparini, 2015; Cornia, 2014).

Peru resembles the regional trend in many ways. It looks back on a history of authoritarian rule with military juntas of different political and economic ideologies that governed the country until 1980, when the first free elections with universal suffrage were held. During the first half of the 1980s, an unfortunate combination of falling export prices, rising debt levels and a series of natural disasters that destroyed crops and infrastructure threw Peru in a deep and prolonged economic crisis. This crisis was further aggravated by violent domestic terrorism. By the early 1990s, real wages and GDP had fallen drastically while inflation skyrocketed to exceed 7000% at its peak in 1991. The country was left virtually bankrupt when a liberalist reform package that – while leading to painful falls in living standards and rising poverty – drastically curbed inflation and eventually contributed to increased investment and growth. The contagion effects of the crises in Asia (1997), Russia (1998) and Brazil (1999) led

[6]This compares to an average reduction in extreme poverty worldwide from 25.3% in 2002 to 10.7% in 2013. The region that achieved the highest reductions of 26 percentage points from almost 30% down to 3.5% was East Asia and Pacific (World Bank, 2016).

to another recession but never threw Peru back into its dismal state of the previous decade.[7]

Quite the contrary: It advanced into the group of upper middle income countries in 2008 after a period of sustained growth that was in large parts fueled by high commodity prices and rising demand from China. Peru's economy relies heavily on exports (copper, gold, zinc and textiles among the main products) and has seen a strong growth of the service sector in the recent decade of growing domestic consumption. Between 2000 and 2016, real GDP per capita almost doubled (despite a population increase of around 20%) and economic growth averaged 4.1% over the same period (INEI, 2016). Its GDP per capita now stands at US $6049 ($12072 in PPP). The achievements in poverty reduction were even more remarkable: while in 2000, 55% of the population fell below the moderate poverty line and 24% below the threshold of extreme poverty, these shares had dropped to 21% and 4% respectively by 2016 (in net terms as measured by national absolute poverty lines)[8]. Other human development indicators also improved significantly: child mortality decreased from 47 deaths per 1000 live births in the year 2000 to 18 in the year 2015, while the share of children under the age of 5 who suffer from chronic malnourishment or stunting decreased from 31% to 14% over the same period (INEI, 2016). The fall in inequality was also substantial and larger than the reduction seen in the region as a whole: the Gini index fell from 0.51 in 2004 to 0.44 in 2014 compared to a decrease in the regional average from 0.55 to 0.52[9] (SEDLAC, 2017). These average figures nonetheless mask substantial heterogeneity: poverty rates in the (rural) highlands and Amazon regions are substantially higher than at the Coast, and rural income inequality, which had previously been lower than urban inequality, surpassed the latter in 2008.

According to the World Bank (2016), approximately 61% of the reduction in poverty that occurred between 2004 and 2014 can be attributed to growth and the remaining 39% to income redistribution between households. During this time, the incomes of the bottom 4 deciles experienced much larger growth rates than the upper 6 deciles (with growth rates of 6.5% among the bottom 4 deciles compared to 4.1% for the whole population). Similarly, around 80% of inequality reduction can be attributed

[7]For a more detailed description of Peru's economic crises and political developments between the 1950s and early 2000s, see Carranza (2012), Pastor and Wise (1992), Wise (1997), (Seawright, 2012).

[8]For a more detailed description of the measurement of national poverty lines, see Chapter 2. The figures from 2000 are not strictly comparable to those of 2016 due to changes in the poverty calculation method that were implemented after 2003. The respective poverty rates in 2004 are 59% moderate poverty and 23% extreme poverty

[9]The figures are based on the SEDLAC (CEDLAS and the World Bank) database that harmonizes data across the region to allow for cross-country comparability. The figures may hence deviate from official statistics reported by country governments.

to equalizing income growth. Public transfers made a comparatively minor contribution to redistribution: estimates attribute only about 10% of overall poverty reduction to social protection (World Bank, 2016). Herrera (2017) shows that between 2004 and 2014, public transfers represented on average only 8.5% of expenditure of the extremely poor and remained relatively stable in shares throughout.

Since its inception, Peru has maintained a rather small welfare state, even by regional comparison. It adopted its first contributory schemes in the 1940s when the second wave of social insurance reforms inspired by the British Beveridge report swept the region, but these schemes never reached the same levels of coverage as they did in Argentina or Uruguay for example. Even before the debt crisis of the 1980s and the massive cuts in public spending that followed, social assistance was negligible and consisted mainly of commodity subsidies on staple foods and energy fuels, and fragmented food aid interventions for narrow target groups (Ferreira and Robalino, 2011). The coverage of public services in rural areas was also minimal – the state was virtually not present in remote regions of the highlands and the Amazon rainforest. With rapid urbanization, the government introduced new social infrastructure investment programmes in the 1990s that mainly focused on installing or upgrading water and sanitation facilities and extending rural road networks. Sometimes, these were tied to public workfare schemes but on the whole, social protection remained fragmented, low-scale and criticized for its clientelist motives (Carranza, 2012).

It was only in the early years of this century that Peru started to introduce larger social assistance policies and gradually expanded their coverage. In 2002, the social health insurance *Seguro Integral de Salud* (SIS) was introduced but – similar to the CCT *Juntos* that started in 2005 – initially extended to the most impoverished rural regions of the country only. Both programmes have since expanded and with a coverage rate of almost 50% of the population, SIS is transforming from a targeted anti-poverty programme to becoming a universal health insurance. In 2011, the Ministry of Social Development and Inclusion (MIDIS) was created and shortly after, Peru set up the social *Pensión 65* that currently reaches more than 700.000 elderly without access to contributory pensions[10]. Further social assistance measures that aim to foster livelihoods of the rural poor such as the social investment fund *Foncodes* or public workfare schemes are administered at the regional level. There is a harmonized targeting system which assesses eligibility not solely on the basis of income or wealth but through a multidimensional scoring algorithm.

[10]This compares to a total population of 31.4 million, of which 6.8% are aged 65 or above

1.1.2 Social protection and poverty alleviation

The reforms undertaken in Peru and Latin America more generally are in principle suited to tackle persisting poverty more effectively than the previous social security architecture was prepared to. A greater reliance on non-contributory transfers can better cope with high informality and the at best very limited savings capacities of the poor, while greater efforts of targeting acknowledge the limited fiscal space. Targeting aims to channel scarce resources to the poor and thus generally alleviates poverty at lower expenditure levels than universal benefits. The expansion of social budgets increased the coverage of households at the lower end of the distribution: social expenditures were (and still are) insufficient to help filling the large poverty gaps, regardless of the composition of welfare spending. This is not to say that the latter should be the prime instrument for alleviating poverty – certainly, social protection cannot be a substitute for welfare derived from labour but should rather work as a complement and safety net.

Arguably the most notable innovation in social protection schemes of the region are CCTs. Designed by Brazilian economists to tackle the large incidence of child labour, they were first implemented there on a small scale in 1995 and gained more attention when Mexico adopted its CCT Progresa (later renamed Oportunidades) at national level in 1997. They have since spread to nearly every country of the region and beyond – in fact, the Economist (2010) has described them as 'the world's favourite new anti-poverty device ... in poor and middle-income countries'. CCTs combine the dual objectives of alleviating current poverty and promoting investment into human and productive capital in the longer term. They transfer cash to poor households conditional upon these households making specified investments in their children's education and health. Conditions tied to the transfer usually require children's school enrolment and attendance, as well as regular primary health checks for children and mothers, vaccination and growth monitoring for children under the age of five. Additionally, many programmes integrate mandatory counselling and training sessions for caregivers on child health and nutrition. Typically, transfer payments are made to the mother.

The economic rationale behind CCTs recognizes that – as predicted by theories on poverty traps – current poverty increases vulnerability to future poverty and children growing up in poor households face a higher likelihood to remain poor in adulthood. Tying transfer receipt to the fulfilment of conditionalities can increase cost-effectiveness vis-à-vis an unconditional transfer because conditionalities alter opportunity costs. Poor children in many low-income countries not only enjoy less health

and education because their families cannot afford the direct costs (such as medical service costs, school fees and expenses) but also because children engage in domestic, agricultural and paid work. Investment into the human capital of children is thus suboptimal.

Economically, this might be rational household behavior if returns from schooling in highly informal markets are small or if local schools and clinics are of low quality. In such setting, a social planner might make better use of public resources by investing in social infrastructure and paying unconditional transfers that relax credit constraints of the poor. Adding yet another constraint on behavior to the family's optimization problem can nonetheless be efficient if – as evidence from behavioural economics suggests – myopia and imperfect altruism of parents making decisions on behalf of the child lead to suboptimal investment decisions. In such scenario, the income effect of the transfer affecting the budget constraint is further augmented by the substitution effect of the conditionality. The latter effectively acts as a subsidy and alters relative prices of health or schooling compared to alternative time use of children[11]. These arguments in support of CCTs add to the standard ones of credit constraints, incomplete insurance markets, positive externalities arising from investment into health and education, and the latter being merit goods.

There is a large body of empirical evidence that finds positive effects of CCTs on a range of welfare measures including consumption and poverty (Fiszbein et al., 2009; Stampini and Tornarolli, 2011; Attanasio and Mesnard, 2006), increased use of health facilites and improved health and nutrition (Bastagli et al., 2016; Behrman and Hoddinott, 2005; Gertler, 2004), higher school enrolment and attendance (Skoufias, 2005; Schultz, 2004; Attanasio et al., 2006), and dimensions that were not primary objectives such as empowering women (Barber and Gertler, 2010). There is comparatively less and more mixed evidence on final outcomes such as skills (rather than years of schooling), health status or labor market transitions and returns (Fiszbein et al., 2009; Barham, 2011; Bastagli et al., 2016; Baird et al., 2013). Needless to say, these final outcomes are essential if CCTs are to achieve their objective of reducing the intergenerational transmission of poverty from parents to children and promoting greater equality of opportunity.

[11]For a more extensive discussion of the economic theory behind CCTS, see Chapter 2 in Fiszbein et al. (2009)

1.2 Contribution

This dissertation investigates the impact of the welfare state on various dimensions of poverty and inequality. It reviews the role of different types of interventions and their links to redistributive aims, with a view to addressing questions on the effectiveness of social policy in reaching the poorest parts of society and increasing social mobility within and across generations. Its focus thus lies on equity objectives of the welfare state rather than an analysis of efficiency considerations. It is concerned with the link between social protection and redistribution, without addressing questions of how the design of policies affects aggregate welfare and the behaviour of economic agents in a dynamic setting. With a focus on Peru, it specifically asks the following questions: how much redistribution and poverty reduction does the current tax and transfer system achieve? What impact does Peru's largest social assistance programme, the CCT Juntos, have on educational outcomes of beneficiary children? How much (im)mobility in education and income is there across generations in Peru and Chile? Thereby, it aims to make three distinct contributions to the existing literature on welfare states, poverty and inequality in Latin America. These, alongside a brief description of each empirical chapter, are outlined in the remainder of this section.

The first contribution of my thesis is the detailed analysis of the welfare state in Peru as a country that, starting off from very high levels of poverty and inequality, achieved impressive redistributive gains alongside strong growth rates over a sustained period of time. The analysis of Peru is relevant beyond its own country context as it exemplifies many of the factors of what development economists characterize as a *middle income trap*. This describes a situation where economies, having advanced to a middle-income level, lose their competitiveness as low-cost producers in the face of rising wage rates and thus fail to advance to a high-income status. Structural reasons for this often trace back to a continued reliance on resource-driven growth and the export of primary goods while lacking investment, innovation and productivity increases (Griffith, 2011). Peru is now at a crossroads: its reliance on the primary exporter model, building on foreign investment in the mining and oil sectors and a large pool of low-skilled labour, has performed well in recent decades of strong demand from China and high export prices. Decreasing returns to skills have contributed to growth that benefitted the lower deciles disproportionately and reduced inequality. To further its economic development in the long-run, however, Peru – like many of its regional neighbours – will need to increase investment into skills and productive capacities of its labour force. Social protection plays a key role in this respect. In its multidimensional country review, the OECD in fact recommends to broaden social

inclusion and consolidate its middle class, inter alia through increasing the role of personal income taxation and by expanding fiscal transfers to tackle socioeconomic challenges in all regions of the country (OECD, 2016).

The second chapter of this thesis provides a detailed descriptive analysis of the current social protection architecture in Peru and its redistributive capacities. It quantifies the cross-sectional impact on poverty and inequality that the tax and transfer system has along all stages of intervention. The contribution of this chapter lies in its rigorous efforts to valuate public in-kind health and education services in monetary terms, which are disregarded in conventional distributional analyses that are based on measures of disposable income. Such public services are an important (and often equalizing) source of welfare, which is why the Commission on the Measurement of Economic Performance and Social Progress recommended to adopt measures of extended income in the analysis of inequality (Stiglitz et al., 2009). The analysis links methods to valuate health services that are usually applied in the context of high-income economies with those applied in the analysis of developing economies. It shows that for a country such as Peru, where data on consumption of health services is incomplete, constructing health risk profiles from administrative data sources and thereby estimating an insurance value is a viable alternative to the actual use valuation of public health. The actual use approach is commonly applied in the development economics literature based on the argument that health service coverage and use differ across regions and population groups within a country (Lustig and Higgins, 2013). The more common approach applied in high-income countries is to calculate health insurance values that take account of the notion that risk pooling provides welfare regardless of actual service use (Verbist et al., 2012; Aaberge et al., 2017). The chapter shows that both arguments can be satisfied by incorporating differences in public spending and insurance coverage across regions and population subgroups. The chapter further develops an approach to measure poverty in the framework of an extended income concept.

The analysis finds that the tax and transfer system reduces income inequality from 0.473 in gross market income to 0.406 in extended income, an overall sizeable reduction of almost 7 Gini points. Cash transfers only contribute a 1-point reduction. With almost 4 points, the largest share is attributed to the provision of in-kind services, which are an important source of welfare and a key instrument to foster social mobility. However, they do not tackle monetary poverty or the large disposable income differences across regions. This is one reason for why the reduction in the poverty headcount ratio achieved is modest: monetary poverty in disposable income decreases by 2-3 points while the reduction based on an extended income concept figures at 9 points. The small impact of cash transfers on poverty can be traced to their low volume – they

may thus reduce the poverty gap but not so much the incidence – and to targeting errors. Up to 50% of the income-poor are not reached by transfers. This being said, Peru's targeting system is oriented towards tackling chronic poverty while this analysis, given its cross-sectional approach, does not differentiate between transitory and chronic poverty.

The third chapter evaluates the impacts on educational outcomes of Peru's flagship CCT Juntos as the countries' largest social assistance programme. It uses panel data from the Young Lives survey and a quasi-experimental design to identify the effect of programme participation on school progression and learning outcomes as proxied by scores of standardized vocabulary and math tests. The findings suggest that Juntos has a positive effect on the transition from primary to secondary school and on progression through grades. No statistically significant impact is found on test scores: beneficiary children rather seem to continue lagging behind. This is consistent with criticism of low quality public schooling in Peru: while coverage and attainment have increased, education spending relative to GDP has remained largely unchanged over the past years. CCTs have been criticized for their focus on raising the demand for schooling while neglecting the supply side. In Peru, this criticism is certainly valid: to accommodate growing demand, public schools have increased class sizes and often teach in three daily shifts of no more than five hours each (Morón et al., 2009). Given that attendance at public schools is concentrated among the poor (Yamada and Castro, 2007), this lack of investment into educational quality carries important implications for intergenerational social mobility and equality of opportunity.

The discussion on measuring intergenerational social mobility is the third contribution this thesis makes in Chapter 4, which entails a comparative analysis of mobility patterns in education and income in Peru and Chile. There are few studies of Latin American countries that extend such analysis to the dimension of income, and to our knowledge none for Peru. Empirical evidence for educational mobility across generations suggests that persistence is much stronger than in Europe and North America (Hertz et al., 2007; Gasparini et al., 2017). Economic models of intergenerational mobility predict that socioeconomic status persists across dynasties due to heritable traits and because parents derive utility from investing in their children (Becker and Tomes, 1979; Solon, 1992). Further, returns to investment in offspring increase with parental human capital (Becker et al., 2015). The empirical literature commonly uses a unidimensional proxy for welfare, most likely income or education. From these measures, generalizations regarding other dimensions of social mobility are often made although it is by no means straightforward that trends in income mobility would follow the same trends as educational mobility (Blanden and Machin, 2013). In fact, in a context such

as that of Chile and Peru, where returns to skills have decreased in times of economic growth, they might well move in opposite directions (Becker et al., 2015).

Estimation is complicated by demanding data requirements, even more so in the context of developing economies which often lack longitudinal data that goes back far in time to span at least two generations. Measuring educational mobility is arguably less demanding since many household surveys contain retrospective information on parental education which, unlike income, can be assumed to stay constant throughout adult life. The analysis presented in Chapter 4 suggests that over recent generations, educational mobility has increased in both countries mainly because of the large structural expansion in enrolment and attainment and much less so due to parental education losing its predictive power for own educational achievement. We apply an ordered probit model which confirms our hypothesis that returns to parental education are not constant across the distribution: persistence is strongest at the top. In the estimation of income mobility, we rely on repeated cross-sections and a two-stage cold-deck imputation of parental income. Our estimates are consistent with findings from other countries in the region such as Brazil, Chile and Mexico (Dunn, 2007; Nunez and Miranda, 2007; Torche, 2005), and suggest that income persistence is much higher than in other world regions. Naturally, such analysis is descriptive in nature as it does not model the structural interdependence between parental human, financial and social capital. Nonetheless, descriptive evidence of the association between a parent's and a child's income, education or some other measure of advantage can provide insights on the scale of the phenomenon and provide a starting point for further research on potential causal channels.

Table 1.1 gives an overview of the empirical chapters of this thesis. Each of these is a self-contained research paper, but they are linked by a common underlying question on the role of the welfare state for redistribution. This question is relevant both for reasons of economic efficiency in the presence of market failures and out of a normative concern for redistributive justice.

Table 1.1: Chapter overview

Chapter 2	**Chapter 3**	**Chapter 4**
TITLE		
The distributional impact of social spending in Peru	Do Conditional Cash Transfers raise educational attainment? A case study of Juntos in Peru	More educated, less mobile? Trends in income and educational mobility in Chile and Peru
MAIN RESEARCH QUESTION		
How much income redistribution and poverty reduction does the tax and transfer system achieve in Peru?	What are the impacts of the CCT Juntos on educational outcomes of beneficiary children?	How strong is intergenerational persistence in income and education in Peru and Chile?
METHOD		
Valuation of public services and construction of an extended income approach, descriptive analysis of cross-sectional inequality and poverty measures, decomposition by regions	Quasi-experimental, combined Matching with Difference-in-Difference (MDID) estimation	Descriptive OLS regression with cold-deck imputation of parental income based on repeated cross-sections; ordered probit estimation of educational persistence
DATA		
ENAHO 2014, National Accounts, data from the National Statistics Office and health insurance funds SIS and EsSalud	Young Lives Study (round 1-3 for Peru), Juntos administrative data	CASEN 1996, CASEN 2013, ENAHO 1997, ENAHO 2015
MAIN FINDINGS		
(i) Taxes and transfers reduce inequality by 7 Gini points, in-kind services have the largest impact (4 points) followed by PIT & SSC (2 points) and cash transfers (1 point); (ii) poverty is reduced by 25-30% but up to 50% of the poor are not reached by transfers; (iii) income differentials among regions remain high.	(i) Juntos increases the probabilities of enrolment and finishing primary school by 7 percentage points among secondary school-aged children; (ii) there is a positive effect on the transition to secondary school, which is partly driven by faster progression through grades; (iii) there is no positive impact upon test scores.	(i) Income elasticities range from 0.63-0.67 in Peru and 0.66-0.76 in Chile; (ii) rising average education has raised absolute mobility in Peru (strongly) and Chile (moderately); (iii) top and bottom persistence in education remain high: chances of top persistence are 3 times the average; (iv) upward mobility is more than twice as high in Peru compared to Chile.
OWN CONTRIBUTION		
100%	100%	50% (in co-authorship with Gabriela Zapata Román)

Chapter 2

The distributional impact of social spending in Peru

2.1 Background

Social protection is an effective instrument to address poverty and inequality, and foster socio-economic development (Kenworthy, 2011). The experience of high income countries has shown that the redistributive impact of fiscal policy depends to a large extent on the progressiveness of (targeted) transfers, which account for three quarters of overall redistribution (OECD, 2015). Latin America is a region that has historically been characterized by very high inequality and low levels of social spending. Social insurance funds emerged in the 1920s and had reached high levels of coverage by the 1970s in pioneering countries such as Uruguay and Argentina (Barrientos, 2013). However, until recently social protection systems in most of the region did not go far beyond contributory schemes that extended to formal workers in urban areas while excluding the larger share of the population. Since the turn of the century, an expansion of social assistance in the form of means-tested cash transfers has started to transform welfare states of Latin America. At the same time, inequality and poverty have seen a large decrease in the region, albeit remaining at high levels.

Peru resembles the regional trend in many ways. Social insurance funds started to emerge in the 1940s, but never reached the same levels of coverage as the regional neighbours Chile and Argentina did due to the high levels of informality. Throughout the 1980s, Peru's fiscal situation deteriorated rapidly, leaving it a financially broke state in which public services were virtually non-existent in large parts of the country. This economic crisis was fueled by massive political instability and terrorist fighting,

Table 2.1: Poverty and inequality in Peru since 2004

Year	Population (in mio.)	Poverty incidence national	urban	rural	Gini index
2004	27.4	58.7	48.2	83.4	0.49
2009	29.5	33.5	21.3	66.7	0.46
2014	31.1	22.7	15.3	46.0	0.42

Note: Poverty is measured by the moderate poverty threshold of the Peruvian government. The Gini refers to per capita disposable income.

Source: SEDLAC (CEDLAS and the World Bank).

particularly in poor and remote rural areas. The economy started to stabilize again in the mid-1990s and rising tax revenues created fiscal space for a gradual increase of social expenditures. Whilst in the 1990s these were channeled mostly into targeted infrastructure development and food aid, more comprehensive social security programmes such as a non-contributory health insurance and a conditional cash transfer were introduced in 2002 and 2005 respectively. Through their prioritized expansion in poor regions, these social programmes also contribute to state-building efforts.

The country has achieved a sizeable reduction in poverty and inequality in the past two decades, not least as a result of high economic growth that led to its advancement into the group of upper middle income countries[1] in 2008. Nonetheless, Peru is still characterized by a highly unequal distribution of economic resources as typical for the region. Likewise, poverty remains at almost 50% in rural areas and even in urban areas, it exceeds 15%. Table 2.1 shows the trends in inequality and poverty since 2004: poverty has more than halved from almost 59% in 2004 to less than 23% in 2014 while the Gini index decreased from 0.49 to 0.42 over the same time period. Large disparities persist between urban and rural areas, and between geographical regions of the country (INEI, 2015).

Against this background, this paper analyzes the distributional impact of public social spending in Peru and its effectiveness in reducing poverty and inequality. Poverty and inequality are usually measured on the basis of disposable household income. Research has, however, shown that the provision of public services can have a large impact upon inequality and social mobility. Moreover, their distribution may be very different from that of monetary income sources. For this reason, the Commission on the Measurement of Economic Performance and Social Progress (also referred to as the Stiglitz-Sen-Fitoussi Commission) (Stiglitz et al., 2009) explicitly included among

[1]The World Bank classifies countries into low, middle and high income countries. Countries with a GNI per capita between US $4036 and US $12475 fall into the category of upper middle income countries.

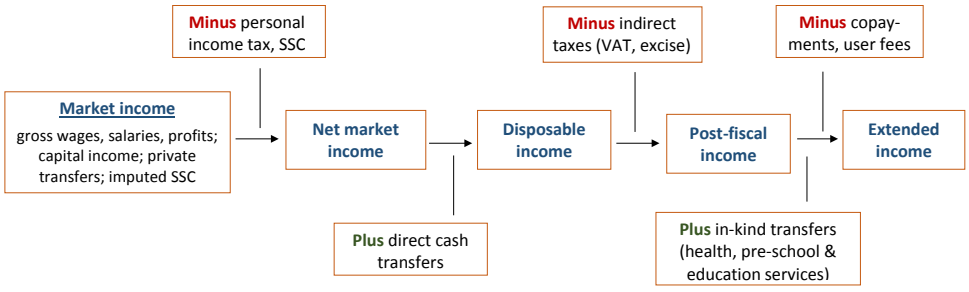
its recommendations to reflect in-kind benefits in household income and consumption measures. This is particularly relevant in the context of developing countries since unequal access to or availability of public services contributes to persistence of poverty among societal groups and regions. An unequal access to health and education services in particular has shown to affect poverty within and across generations (Banerjee and Duflo, 2011). This paper tracks the impact of social protection policies in the framework of an extended income approach that embraces direct cash transfers and in-kind public services on the expenditure side. Accounting for the value of publicly provided in-kind benefits in an extended income concept aims to reflect the contribution these make to the welfare of households and individuals. We also take account of taxation that affects private households and provides the revenue base to finance public expenditure.

The paper is structured as follows: the next section will describe our methodology and the data sources used. The third section introduces the social security system of Peru before the fourth section presents the results from the analysis of the effects of fiscal policy on inequality and poverty. The last section discusses the results and concludes.

2.2 Methods and Data

The aim of this paper is to quantify the impact that the Peruvian welfare state has on poverty and inequality and to assess how effective different interventions are in alleviating povery and leveling living standards. We adopt the approach put forward by Lustig et al (2013) and track the resources available to households along different income concepts. Figure 2.1 illustrates our approach.

Figure 2.1: Methodology: Constructing extended income



Source: Adapted from Lustig and Higgins (2013)

2.2.1 Related Literature

In a comparative study for OECD member countries, Verbist et al. (2012) show that the inclusion of five categories of social public services not only raises households' economic resources by more than 25% on average, with large variation among countries. It also accounts for a reduction of income inequality by between one third and one fifth depending on the inequality index used. These redistributive impacts are stronger among poorer population groups. Spending on in-kind services is on average slightly higher in the OECD than on cash transfers, which underlines the importance of including them in the analysis.

The Commitment to Equity (CEQ) project at Tulane University has devised an extensive methodological guide that outlines the steps of such analysis (Lustig and Higgins, 2013). In a comparative study of six Latin American economies, Lustig et al. (2012) find that direct taxes and targeted cash transfers reduce inequality and poverty significantly in three out of the six countries compared (Argentina, Brazil and Uruguay) while to a far lesser extent in the three remaining countries of the analysis (Bolivia, Mexico and Peru). The small impact in the latter group is mainly due to low overall spending. In all countries under analysis, the redistributive impact of in-kind benefits is relatively large since the provision of public services in health and education comprise a sizable share of overall social spending.

Jaramillo (2013) has undertaken an incidence analysis for Peru based on the same methodology. In his cross-sectional analysis for the fiscal year of 2009, he finds that the redistributive impact of the tax and transfer system in Peru is small: it is associated with a four percentage point decrease in the Gini index (from 0.504 to 0.463) and a reduction in poverty of approximately 1.2 percentage points. This small impact is attributed to the relatively low spending rather than to ineffective targeting. Quite the opposite: social spending overall is progressive, with targeted cash transfers being the most progressive category since they are not linked to formal sector employment (which often excludes the poorest segments of society). Taxes, while being progressive overall, are found to hardly have any impact on inequality.

Their study is based on the fiscal year of 2009, which saw growth figures plummeting compared to the previous and the following years as a consequence of the global financial crisis. Furthermore, overall and social public spending have increased considerably between 2009 and 2014. The creation of the Ministry for Development and Social Inclusion (MIDIS) in 2011 was accompanied by the introduction of new social assistance measures such as a social pension while others expanded regionally. The

aim of this paper is hence to revisit the effects of social protection upon poverty and inequality. Given the high regional diversity in welfare and access to economic opportunities in Peru, the analysis will depart from a national level to analyze whether social policy contributes to equalizing living standards across regions. We built the analysis upon the methodology provided by CEQ (Lustig and Higgins, 2013) in large parts but depart from it in the valuation of public services and draw upon Verbist et al. (2012) and Aaberge et al. (2017).

2.2.2 Constructing income concepts

As Figure 2.1 illustrates, the analysis traces gross household income before fiscal intervention to extended income, taking into account direct and indirect taxes, social security contributions (SSC), cash transfers and public services. Gross income takes into account income earned through labour or self-employment, capital income and rents, imputed income from owner-occupied housing, bonus and in-kind payments from employers, transfers from abroad and imputed values of self-consumed self-production such as subsistence farming. We move to net market income by deducting personal income taxes (PIT) as well as health and pension contributions. The latter are not treated as deferred income but instead as a government transfer given the large subsidy the scheme receives from the general budget (we conduct a sensititvity analysis where pensions are treated as market income, see panel V2 in table A.2.3).

We add direct government transfers to arrive at disposable income. Under direct transfers we group income received from cash transfers as well as imputed values of food items received. Food items have a well-defined market value and substitute private spending (Lustig and Higgins, 2013), hence they are included under direct rather than in-kind transfers. The largest cash transfers are the means-tested conditional cash transfer (CCT) Juntos and the social pension Pensión 65. Also included are receipts from contributory pensions, income-tested scholarships that aim to broaden access to higher education for youngsters from poor families, vouchers distributed to poor families for buying cooking gas and other public cash transfers reported in the household survey.

Inequality and poverty within a society are usually measured on the basis of disposable income. We move further to subtract indirect taxes paid by households in the form of value-added tax (VAT) and excise taxes[2] and thus arrive at post-fiscal income. Finally, we add the value of public services that households receive in early

[2]For simplicity, we group excise and value-added taxes together and refer to them as VAT for the remainder of the analysis.

childhood care, education and health.

The analysis incorporates only spending directed at individuals and whose beneficiaries can be identified (both in principle in the sense that an individual use is possible, and in practice in the sense that the survey includes information on actual use). This means that collective spending such as research and development or social infrastructure investment is left out of the analysis. Also left out are measures that are directed at individual beneficiaries but where these cannot be identified in the survey. Section 3 below describes in more detail the types of transfers included in the analysis. Table A.2.1 compares information on transfer receipt and tax payments in the ENAHO with official figures from national accounts and MIDIS beneficiary registers.

We aggregate income at the household level and assume that resources are pooled and shared among its members. To make comparisons across heterogenous households and adjust for differences in their needs, the use of equivalence scales is universally acknowledged. Equivalence scales assign different weights to household members to account for economies of scale within the household that arise since resources are shared. This is particularly important when measuring the incidence of poverty as families with children, especially larger ones, may appear non-poor when looking at equivalized income but fall below the poverty threshold when looking at per capita household income. The application of the same equivalence scales for cash and in-kind benefits is, however, debated. Public services such as education cannot be shared among household members and certain population groups have a greater need for services. Children are a case in point: while they are assigned a comparably low weight in OECD scales based on the argument that they consume fewer basic goods, they have higher needs for education than adults.

Aaberge et al. (2010) propose a needs-adjusted equivalence scale, which is a weighted average between the modified OECD scale and an empirically derived scale that accounts for individual needs of public services. For the case of Norway, they derive the latter by looking at differences in group-specific spending on public services at the municipal level. Such approach has the advantage that it can flexibly adjust for different target groups and services, and that it does not depend on absolute spending levels but rather relative ones measured against a specified reference group. However, it it is arguably based on the assumption that current public spending is optimal in the sense that it satisfies the needs of the population. For a middle income country such as Peru, which displays large regional heterogeneity in welfare and in administrative capacity to deliver public services, this seems not a practical solution.

We hence adopt a more pragmatic solution and apply a combined scale put for-

ward by Aaberge et al. (2017). The modified OECD scale is applied to monetary incomes while a per capita scale is applied to in-kind benefits based on the argument that no economies of scale arise from the latter. The two are combined into a single scale[3], which is subsequently applied along all income concepts. The analysis is based on a cross-sectional rather than a lifetime perspective. Hence, when interpreting the results, one must bear in mind the demographic structure of Peru, which is characterized by a fairly young population.[4]

2.2.3 Valuating public services

Valuating public services is a challenging task that cannot do without relying on various assumptions. The first question that arises is how to express the value of services in monetary terms, given that we only observe public expenditure and that these services are commonly not traded on the market. We follow Verbist et al. (2012) and rely on a production cost approach that is based on two premises: (i) production costs are a proper reflection of the value that services provide to users; and (ii) services are delivered efficiently and no waste is incorporated into production costs. While these may be strong assumptions, the alternative – estimating the actual value that users attribute to services – arguably relies on even stronger assumptions and high data demands. In the case of pre-primary childcare services and education, production costs derive from average spending per student per department by educational level (Figure A.2.1 in the appendix) net of registration and matriculation fees. These costs are allocated to households that report making use of public childcare and education services. To relax the assumption that expenditures provide an accurate reflection of service value and given that household surveys often underestimate incomes, we follow Lustig and Higgins (2013) and scale their value so that the ratio between in-kind education services and mean disposable income in our sample equals that of total education spending and national disposable income in national accounts.[5]

The valuation and allocation of health services is more complex. While we also rely on production costs to assess service value, a crucial question is what exactly we want to define as the service consumed – the actual medical services consumed by individuals who happen to need them, or the risk sharing that insurance provides?

[3]To aggregate the two scales into one, their individual contribution is weighted by the ratio between needs for disposable and extended income. This weight is derived from the mean ratio between cash and non-cash income income in extended income.

[4]Approximately 46% of the population are below the age of 25 while only 6.6% are aged 65 or above (INEI, 2016).

[5]The scaling factor is 0.92 and thus has no large effect.

Valuating the actual use ignores differences in needs and attributes a higher welfare to an ill person under medical treatment than to a healthy person with equal disposable income. By valuating the benefits from insurance instead, we allocate the premium of publicly provided health insurance to households covered. It thus acknowledges the fact that individuals receive a benefit from the risk-pooling of insurance regardless of their actual service use. The drawback is that such approach cannot take account of differences in quality and coverage of health services. In Peru, a significant share of individuals covered by insurance report not using public health despite illness due to factors such as the large distance to the nearest facility, a lack of money or trust in doctors.

We opt for the insurance value approach for two reasons. From a pragmatic viewpoint, the information contained in the survey about the use of medical services is incomplete in the sense that only low-frequency services such as surgery and child delivery are surveyed with a 12-month recall period while higher frequency needs such as general check-ups have a recall period of 3 months or only 4 weeks. Information about health insurance affiliation, on the other hand, is complete. From a conceptual angle, the assumption that needs for health insurance are comparable across the population (conditional on certain risk factors) is arguably less strong than assuming that someone who needs intensive medical care and thus receives a transfer is better off in terms of income than someone who does not see a doctor in a given year. Estimating an insurance value is complicated by the fact that private health insurance is scarce in Peru and only available for services not covered by public insurance. Public insurance offers voluntary affiliation for non-target populations, but its pricing does not vary by risk group and thus hardly provides an actuarial reflection of costs. We thus rely on detailed costing studies from both health insurance funds in combination with health use statistics from administrative records to calculate insurance premiums that vary by insurance fund, age, gender and department. Details on the method of calculation are provided in Appendix 2.C. We provide a sensitivity analysis that values services according to actual use. We construct actual use values by imputing annual use based on information about quarterly and monthly service use by individuals. Analogue to cash income sources, we assume that the value of services consumed by the household equals the weighted sum of services consumed by its members.

2.2.4 Data sources

The main data source is the 2014 version of the Peruvian National Household Survey, shortly referred to as ENAHO (*Encuesta Nacional de Hogares*). It is an annual house-

hold survey of approximately 31.700 households covering all regions of the country that holds a rich set of information on demographics, income sources of all household members aged 14 and above, consumption and expenditure as well as use of health and education services for all household members. Additionally, data on consolidated government expenditure is drawn from the National Accounts as well as from the Integrated Financial Management System (SIAF) of the Ministry of Economy and Finance, the Ministry of Education's Statistics Unit (ESCALE) and the two public health insurance funds *Seguro Integral de Salud* (SIS) and *EsSalud*. The MIDIS makes available detailed information on the number of beneficiaries of targeted cash transfer programmes that is used for consistency checks on information about transfer receipt in the ENAHO (see Table A.2.1).

2.3 The welfare state in Peru

Social government expenditures have risen in Peru over the past two decades, but they are still below the Latin American average and that of upper middle income countries.[6] Table 2.2 gives an overview of the government budget in 2014. The state collected revenues amounting to 22.2% of GDP while total spending reached 21.5% of GDP. With 17% of GDP, the great bulk of revenues were drawn from taxes, and these again were mainly collected through value-added tax (8.8% of GDP) and income tax (7% of GDP, of which 1.9% of GDP were collected from natural persons). Non-tax revenues of 5.2% of GDP include social security contributions (2.2% of GDP), oil and mining royalties among others (Central Bank Peru, 2014). On the expenditure side, 10% of GDP or 44.8% of total spending are dedicated to social sectors. These comprise the sectors of education (3.5% of GDP), health (2.3% of GDP), social assistance (1% of GDP), and social security (2.3% of GDP). The classification of social spending this study adopts is according to Martínez and Paz Collinao (2010).[7]

Table 2.3 gives some descriptive indicators of our sample by income quintiles. It shows that the top quintile earns more than 13 times as much as the bottom quintile and that inequality is higher at the upper end of the distribution. The amount of reported public cash transfers (including income from contributory pensions) varies by around 15% between the bottom four income quintiles, while it is considerably higher

[6] In 2014, Peru's social expenditure was 10% of GDP and 49% of public expenditure compared to the average for Latin America and the Caribbean (19 countries) of 13.5% respectively 51% (CEPAL).

[7] The UN Economic Commission for Latin America and the Caribbean (CEPAL) provide a methodology for the classification of social spending in Latin America that includes: education, health and sanitation, social assistance and social protection, social housing and related infrastructure development.

Table 2.2: Government finances in 2014

	PEN	US$
GDP (Mio.)	574 880	189 710
GDP per capita	18 656	6 157
Population	31.1 Mio.	
As % of GDP		
Total Revenue		22.2
1. Tax revenues		17.0
2. Non-tax revenues		5.2
Total Government Spending		22.6
1. Primary spending		21.5
2. Debt service		1.1
As % of	*Public Spending*	*GDP*
Social Spending	44.8	10
1. Education	15.5	3.5
2. Health	10.3	2.3
3. Social Assistance	4.5	1
4. Social Security	10.3	2.3
5. Other	4.2	0.9

Source: National Institute of Statistics and Informatics (INEI), Ministry of Economy and Finance, National Bank of Peru.

in the top quintile. The poorest are concentrated in rural areas, are much less educated and more likely to belong to an indigenous group. The bottom quintile is more likely to be affiliated to public health insurance. The following sections will outline the basic architecture of the Peruvian welfare state policies in more detail.

2.3.1 Revenues: Personal income tax, contributions and VAT

As typicial for low and middle income countries, Peru has a very low PIT collection rate: PIT revenues only amount to 1.9% of GDP. This is due both to weak collection capacities and by design. The Tax Code exempts income from work of up to PEN 26,600 from PIT, this threshold exceeds even mean earnings. Capital income and dividends are subject to much lower rates of 6.25% and 4.1% respectively. Furthermore, there is a high degree of informality in the Peruvian economy: ILO estimates suggest that 69% of non-agricultural employment is in the informal sector (ILO, 2014). This high degree of informality also affects social insurance: Peru has contributory health and pension schemes that are mandatory for dependent workers only. The public pension

Table 2.3: Descriptive statistics by income quintiles, 2014

Income quintile	**1**	**2**	**3**	**4**	**5**	**Total**	**N**
Annual net income	2 208	5 502	8 894	13 430	29 420	11 890	116075
Income from cash transfers	550	473	506	542	808	576	116075
Share urban	39%	75%	89%	94%	97%	79%	116075
Household members	4.9	5.0	4.9	4.8	4.4	4.8	116075
Age in years	33.2	30.9	31.7	32.7	35.9	32.9	116075
Years of education	4.2	6.1	7.6	8.9	10.8	7.5	110914
Indigenous mother tongue	42%	31%	24%	19%	15%	26%	116059
Has health insurance	79%	66%	61%	60%	63%	76%	116014
In education	29%	29%	27%	26%	24%	27%	116010

Notes: Income refers to annual adult equivalent income (OECD modified scale) in PEN (PPP conversion rate of 1.515, source: OECD Stat) - hence an average total annual net income of PEN 11890 corresponds to PPP $7848. Cash transfers include targeted social assistance, public pensions, food aid, vouchers for cooking gas. Indigenous mother tongue includes Aymara, Quechua, other native language. Health insurance refers to the non-contributory Seguro Integral de Salud (SIS) and the contributory EsSalud.
Source: Own calculations based on ENAHO 2014.

scheme can optionally be substituted by a private one that is subject to the same contribution of 13% of gross salary as the public National Pension System (SNP by its Spanish acronym). The contributory health insurance EsSalud described further below is financed by a premium of 9% of gross salary which is borne by the employer. VAT is levied at a rate of 19% but collection falls 33% below its potential according to estimates of the International Monetary Fund (IMF). Overall, the IMF estimates that tax efforts in Peru reach only 53% of potential revenue (Lipinsky et al., 2015).

The ENAHO records the amount of taxes paid on income from dependent work, but not on income from independent work or capital. We thus simulate PIT tax liability according to the Tax Code. We further assume that the incidence of contributions to EsSalud falls on the employer given the large informal labour force that formal workers have to compete with. We thus include both contributions to pension and health insurance in gross market income. To estimate the amount of VAT paid by each household, we rely on the rich information about consumption expenditure that records not only items bought, but also their place of purchase. We thus calculate the share of VAT in total consumption expenditure, applying differential rates according to the Tax Code and assuming that small, informal establishments do not levy VAT.[8] Analogue to the procedure described in section 2.2.3, we scale the value of VAT paid by a factor that sets the ratio between the share of VAT paid and disposable household

[8]The Tax Code exempts basic food items, children's books and notebooks, public transport (except railway and airway), and cultural events from VAT, and applies higher rates to alcohol and tobacco. We regard mobile vendors (operating by trycycle or van) as informal. Additionally, we regard bakeries and small market stalls operating in the jungle and above 2500 metres altitude as informal since the Tax Code exempts establishments that are located above 2500 metres from paying taxes.

income equal to that in national accounts.

2.3.2 Social assistance

Peru's *National Strategy for Development and Social Inclusion: Include to Grow* (MIDIS, 2014) under the MIDIS summons the range of social assistance programmes along the life-cycle of the poor. These comprise of direct cash-transfer programmes for different target groups, food assistance and other in-kind provision of goods and services as well as infrastructure investment such as electrification and sanitation programmes. Often, these social programmes are available in certain regions of the country only, either because these were identified as most in need, up-scaling is planned over a period of several years, or because they run under the responsibility of regional governments.

The largest direct cash transfers targeted to poor households include the conditional cash transfer (CCT) Juntos, the old-age pension scheme Pensión 65, and the post-secondary scholarship fund Beca 18. Juntos pays a bi-monthly support of 200 PEN to needy families with children if these children attend school regularly and complete mandatory health checks, while Pensión 65 offers 125 PEN monthly to the elderly aged 65 plus that are classified as poor and not covered by the contributory system. Beca 18 offers higher education scholarships to secondary school graduates from poor families based on merit that cover tuition fees, living costs and book allowances. Food assistance programmes have previously been rather fragmented but efforts to bundle them were implemented more recently. The largest one is the school feeding programme Qali Warma, while smaller ones include food banks and nutritional aid directed at certain risk groups.[9] We can identify transfer receipt of these interventions and thus include them in the analysis. In total, spending on social assistance represents 4.5% of total government spending or 1% of GDP. While the Development Strategy also incorporates a range of measures to promote economic opportunities for the poor, these are not included here since the economic rather than the social objectives define their design[10].

[9] Qali Warma distributes breakfast and lunch to school children in districts reaching a certain poverty and malnutrition threshold. Food banks are bundled under the Complementary Nutrition Programme (Programa de Complementación Alimentaria), and Glass of Milk (Vaso de Leche) targets nutritional aid at risk groups such as children under 5, pregnant women and the poor elderly.

[10] These are in particular the fund FONCODES, which aims to improve market access for impoverished rural farmers and home-producers, and the public works programmes Work Peru (Trabaja Perú) and Youth to Work (Jovenes a la Obra).

2.3.3 Health

Approximately 78% of Peru's population is covered by health insurance, whereby two public schemes exist. The contributory scheme EsSalud operates own health facilities, which are mostly located in urban centers. EsSalud covers around a quarter of the population. The Seguro Integral de Salud (SIS) is a subsidized, means-tested health insurance targeted at the poor and covers around 49% of the population. Only a very small fraction (less than 2%) of these pay a reduced premium while the vast majority is fully subsidized. Families covered by the SIS receive health services free at the point of use in public facilities located throughout the country under a comprehensive benefit plan called PEAS[11]. PEAS is also the minimum standard that EsSalud has to guarantee. Non-insured can receive treatment in public facilities but are charged fees that cover the variable costs of their treatment. Out-of-pocket expenditures are high in Peru (government expenditures make up approximately 60% of total health expenditure, see Francke (2013)). This results partly from incomplete coverage of health insurance but also from co-payments for services that are either not covered by PEAS or experience rationing due to chronic underfunding of the SIS. Even though hardly used in practice, both SIS and EsSalud offer the option of voluntary, fee-based affiliation for the non-poor and informal workers. Francke (2013) attributes the reason for this low take-up of voluntary insurance to the fact that many Peruvians are still relatively unfamiliar with insurance products.

In expenditure terms, the health budget is divided into individual and collective health spending. Collective health receives 8% of total health spending and includes programmes such as epidemiology and risk control, while individual health consumes over 73% and includes all those measures that are directed at health service provision and medical treatment. This analysis does not include collective spending but focuses on spending that can be attributed to individual use.

2.3.4 Education

The education system in Peru is divided into basic, technical and higher education. Basic education is mandatory and free in public facilities and comprises early childhood care (up to 3 years), primary (6 years) and secondary (5 years) education. Compliance is, however, not enforced and large differences in secondary school enrolment rates exist between urban and rural areas and between poor and non-poor households, partly due

[11]PEAS is the Spanish acronym for Essential Health Insurance Plan (Plan Esencial de Aseguramiento en Salud).

to low coverage in remote rural areas. Pre-school facilities are also insufficient in parts of the country. With almost 70%, the bulk of spending in education goes towards the basic level. Tertiary education spending amounts to 18% and mainly goes towards university education, while only a small share is dedicated to technical education or other forms of post-secondary training. Private education plays a large role primarily in urban areas and ENAHO holds information about type of school visited and school fees paid.

2.3.5 Other social expenditure

Further social spending categories include housing and sanitation, which together make up less than 1% of GDP. These comprise measures to improve infrastructure in informal settlements and install or upgrade sanitation infrastructure in rural and urban areas. Since we cannot identify whether individual households benefitted from such services, this spending is not included in the analysis.

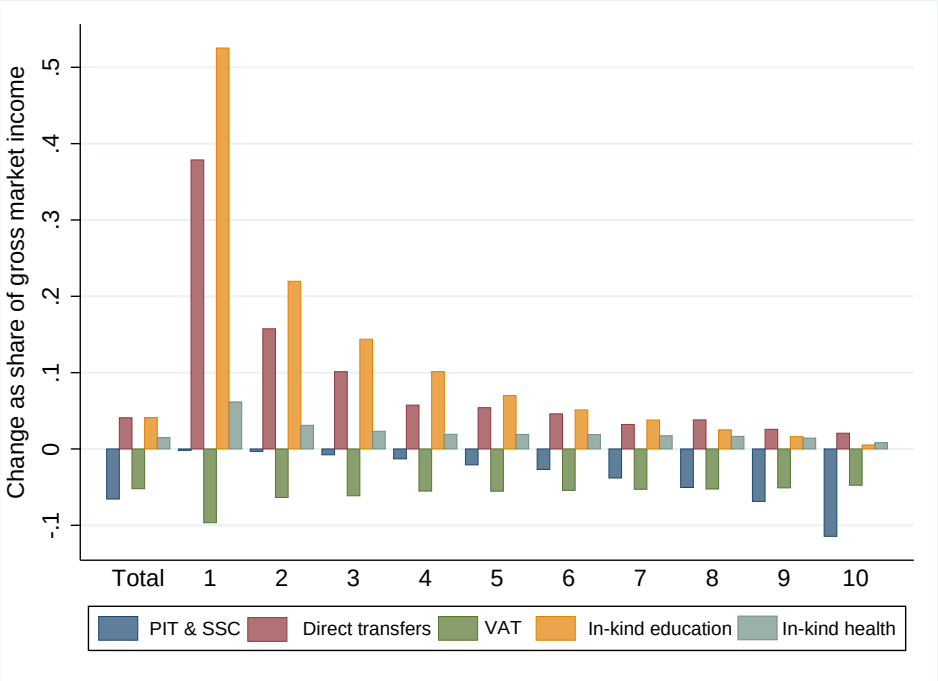
2.4 Results

Figure 2.2 plots the redistributive impact of taxes and transfers by income decile, whereby we measure impact as the change in income relative to each decile's initial gross market income (i.e. a non-anonymous approach where individuals are followed according to their initial rank in the distribution (Verbist et al., 2012)). A first look conveys a strongly progressive tax and transfer system: the bottom five deciles are net recipients of public social spending while the upper deciles are net payers. Particularly the two lower deciles experience a strong rise in living standards: extended income is almost twice as high as initial gross market income for the poorest decile and increases by approximately a third for the second decile. On the other end, transfers represent less than 5% of gross income in the upper two deciles while their share of taxes reaches 8-11%. The average impact for the whole population is slightly negative.

The highest redistributive impact is achieved by in-kind transfers: education benefits represent about half the average gross income of the lowest decile, whereas health benefits are less substantive. This can be explained by higher overall public spending on education compared to health, the fact that poorer deciles use public education much more than higher deciles, and that they also have more children that make use of education facilities but have a relatively low health risk factor. Cash transfers represent a large share of 16-38% of initial gross income in the lower two

deciles while they hardly play a role at the upper end of the distribution. PIT is negligible up to the fifth decile but even in the richest one, it only taxes away around 11% of gross income. Unsurprisingly, VAT burdens lower income groups more although they spend a large share of their budget on basic food items, which are exempt.

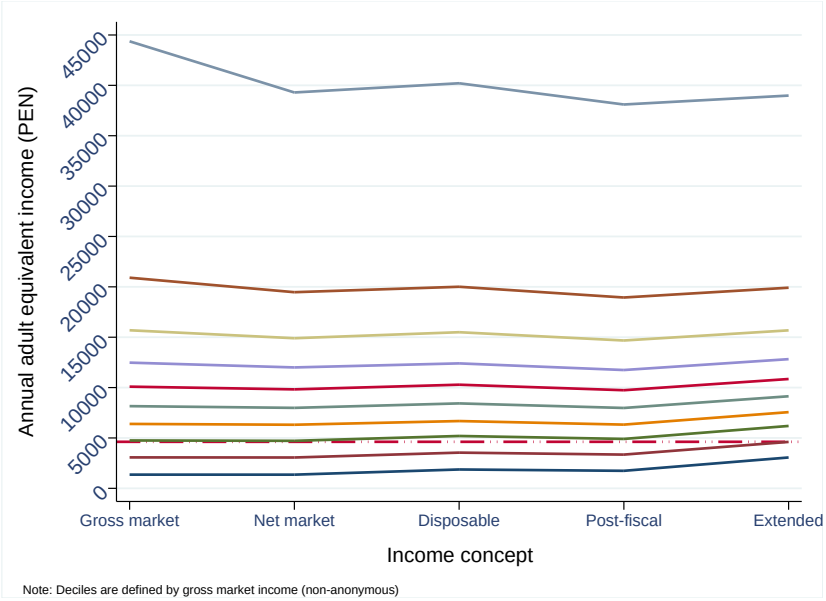
Figure 2.2: Redistributive impact by decile



Source: Own estimates based on ENAHO 2014

Obviously, these are relative impacts that are measured against each decile's average income. The same amount of transfer thus means a lot more for a poor individual than a rich one. Given the high levels of income inequality, the picture looks different when we look at redistribution in absolute amounts. Figure 2.3 compares mean incomes by decile along our sequence of income concepts. Although income of the bottom decile almost doubles, the distance between deciles remains relatively stable. The top two deciles experience a net reduction in extended income compared to gross but the change in levels seems not very substantive. The figure further shows that the distance between deciles increases at the top, suggesting that inequality is larger in the upper half of the distribution. The dotted red line represents the relative povery threshold measured as 50% of median disposable income. It follows the third decile closely and only falls slightly below it in disposable income. This illustrates that the incidence of relative poverty remains largely unaffected by redistribution through direct taxation and transfers, but falls when we look at an extended income concept.

Figure 2.3: Mean Income by decile



Source: Own estimates based on ENAHO 2014

2.4.1 Redistribution along income concepts

To quantify the reduction in inequality, we compare three different inequality measures: the Gini index, the P90/10 decile ratio and the P40 share. While the Gini index has many advantages apart from its ease of interpretation[12], it is also sensitive to changes in the middle of the distribution (Atkinson, 1970). We thus further report the decile ratio and P40 share as two easily interpretable measures that focus on the ends of the distribution. Table 2.4 reports the results. Overall, the Gini index sees a reduction of almost 7 percentage points from 0.473 in gross income to 0.406 in extended income. According to Atkinson (2015), we can set a benchmark of at least 3 percentage points change in the Gini coefficient in order for it to be substantive enough to be felt by society. By this benchmark, the decrease in inequality observed here is substantive. However, when we look at the contribution of the different fiscal interventions, we notice that the reduction in inequality is driven by in-kind benefits: they contribute almost two thirds to the overall reduction. Direct transfers contribute only approximately 1 percentage point while direct taxes and social security contributions contribute almost 2. This is indicative not only of the small transfer amounts that social assistance programmes pay, but also of the relatively high value of public education and health when compared to the incomes of the poor. While this underlines again the importance of including services in the analysis, it also raises questions on the role of service quality,

[12]These are in particular its mean and scale independence, population size independence, and Pigou-Dalton transfer sensitivity.

Table 2.4: Changes in inequality along income concepts

Indicator	Gross	Net	Disposable	Post-fiscal	Extended
Gini	0.473	0.454	0.446	0.447	0.406
P90/10	11.39	10.54	9.39	9.46	6.67
P40 share	12.2%	13.0%	13.5%	13.4%	15.9%
Urban only (N: 77 819)					
Gini	0.430	0.410	0.404	0.406	0.374
P90/10	7.13	6.54	6.29	6.43	5.19
P40 share	15.0%	15.9%	16.2%	16.1%	17.9%
Rural only (N: 38 256)					
Gini	0.469	0.459	0.429	0.434	0.355
P90/10	9.60	9.42	7.37	7.62	4.98
P40 share	12.7%	13.0%	14.8%	14.5%	18.7%

Note: Figures refer to adult equivalent income of 2014 (combined scale).
Source: Own estimates based on ENAHO 2014.

a discussion we will return to further below.

Contrary to what has been found for other countries in the region, notably Brazil (Lustig and Higgins, 2013), subtracting VAT has no adverse impact on inequality. This is likely a consequence of the high level of informality and lack of enforcement as described above. Table A.2.4 in the Appendix reports bootstrapped standard errors of the estimated Gini coefficients: they confirm that changes in the Gini are small and only statistically significant when we move from gross to net income, and when we move to extended income.

The two other inequality measures confirm the trend indicated by the Gini index: The P90/10 ratio measures the ratio between the income of the 90th percentile and the 10th percentile while the P40 share states the share in total income that is held by the bottom 40%. Departing from gross income, a household in the 90th percentile earns almost 12 times as much as a household in the 10th percentile. This ratio decreases to below 10 in disposable income, but only sees a more substantive change when looking at extended income, where the ratio is at 6.7. Similarly, the income share held by the bottom 4 deciles accounts for 12% in gross incomes, almost 14% in disposable income and 16% in extended income. Comparing the changes in the P90/10 ratio with the changes in the P40 share suggests that a substantive share of redistribution takes place in the upper half of the distribution.

The upper panel of Table 2.4 measures average changes at the national level. As illustrated above, large inequalities persist between urban and rural areas in Peru[13].

[13]The classification of urban and rural adopted here is according to ENAHO: an area with more

Looking at these areas separately shows that overall inequality is much higher in rural areas. At the same time, the reduction in inequality achieved is also higher there: the Gini index sees a decrease of more than 10 percentage points. In contrast, the reduction experienced in urban areas figures at only 5.5 percentage points. Again, the largest share can be attributed to in-kind benefits: they account for 8 (rural) and 3 (urban) percentage points. Cash transfers on the other hand have hardly any impact in urban areas while they represent a 3 points reduction in rural areas. By design, a number of social assistance programmes (most notably the CCT Juntos) are primarily targeted at rural areas. Direct taxes and social security contributions hardly play a role there and even in urban areas, they contribute only 2 points and are statistically not significant. In fact, only the reduction through in-kind services is statistically significant there, in rural areas the reduction through cash transfers also is (see Table A.2.4).

The P90/10 ratio and the P40 share confirm both the lower level of inequality in urban areas and the smaller change achieved by fiscal intervention. In urban areas, the only substantive change is achieved by in-kind benefits. In rural areas, cash transfers also play a significant role although in-kind benefits are far more significant. Tables A.2.2 and A.2.3 report a range of sensitivity analyses to test the assumptions we made in the definition of the income concepts. In particular, we test whether our results are robust to using a per capita scale rather than equivalized income (Table A.2.2), shifting the incidence for EsSalud contributions entirely onto the employer, treating contributory pensions as deferred income rather than a transfer, and adopting an actual use valuation for public health services (Table A.2.3). Results hardly change: using a per capita scale unsurprisingly leads to a higher estimated Gini and a slightly lower redistributive impact of transfers (about 1.5 percentage points in gross and 2 points in disposable and extended income compared to the benchmark analysis), but trends are largely similar. The same can be said for the other robustness checks, shifting health contributions entirely to the employer affects the Gini in gross income by less than half a percentage point and valuating health services by actual use has a slightly stronger redistributive impact but these differences are not statistically significant (compare Table A.2.4).

2.4.2 Inequality between regions

The above analysis has shown that when splitting the sample into rural and urban households, changes in the Gini within these subgroups cease to be significant along most of the stages of fiscal intervention with the only consistent exception being the

than 2000 inhabitants counts as urban.

impact of public services. This suggests that differences between regions must be significant. We hence decompose overall inequality into its shares that can be explained by differences between regions as opposed to within them. A main advantage of the Gini index is its ease of interpretation. However, it cannot easily be decomposed whereas the Theil index, which belongs to the family of general entropy measures, has convenient properties for such analysis.

Peru's landscapes divide society in many ways: the coast as the most prosperous region is more densely populated, has better infrastructure and higher average income. The highlands and jungle regions in turn are less accessible, have a higher share of indigenous population as well as higher rates of poverty and informalization. Table 2.5 thus decomposes overall inequality into inequality within and between four geographic regions for gross income and extended income respectively. Comparing income and population shares across them illustrates the large differences: the highlands are the poorest region, followed closely by the jungle while incomes are more than twice as high in the capital Lima. Lima is not only the richest region but also has the lowest inequality. Relative income shares of each region hardly change between gross and extended income, although the Theil index of within-group inequality decreases in all of them. The lower panel of Table 2.5 thus compares the contribution of within and between group inequality along all income concepts. As discussed above, overall inequality decreases along income concepts but the share of between group inequality hardly changes until we move to extended income. The ratio of within to between group inequality remains rather stable throughout and moves between 5.6 and 6.1. In other words, inequality within the respective regions contributes over 80% to overall inequality while the variation between them contributes less than 20%. Figure A.2.2 plots the densities of log incomes and illustrates that mean levels are much lower in the highlands and the jungle, and that the dispersion there is much wider. Redistribution decreases this dispersion slightly.

Summing up so far, the analysis suggests that the overall reduction in inequality of almost 7 Gini points achieved by the tax and transfer system is substantive, but it is largely driven by the contribution of public services. These make up a relatively large share of income in the lower deciles. The contribution of taxes and cash transfers is much smaller and not always statistically significant. This is largely due to the low transfer volumes: these may be sufficient to reduce mass in the bottom tail of the distribution and thus decrease inequality, but not by very much. The tax and transfer system hardly reduces the large inequality between regions – most of the reduction in inequality happens within them. The next section turns the focus on the bottom of the distribution to examine whether the welfare state reduces poverty effectively.

Table 2.5: Inequality of gross and extended income within regions

Region	Income share	Population share	Mean income	Group Theil
Gross market income				
Coast	21.0%	23.2%	11 494	0.278
Highlands	22.4%	32.3%	8 815	0.476
Jungle	9.3%	13.0%	9 133	0.467
Lima	47.4%	31.5%	19 115	0.315
Extended income				
Coast	21.1%	23.2%	11 707	0.209
Highlands	23.9%	32.3%	9 530	0.307
Jungle	9.6%	13.0%	9 575	0.331
Lima	45.4%	31.5%	18 537	0.243
Theil decomposition of income inequality by regions				
	All obs. Theil	Theil between	Theil within	Ratio
Gross market	0.416	0.058	0.357	6.124
Net market	0.378	0.055	0.324	5.896
Disposable	0.363	0.055	0.308	5.604
Post-fiscal	0.367	0.055	0.311	5.645
Extended	0.304	0.044	0.259	5.840

Note: Figures refer to annual adult equivalent income, ENAHO 2014.
Source: Own estimates based on ENAHO 2014.

2.4.3 Poverty

Poverty can be measured in various ways: high income countries usually rely on relative measures that set the threshold at 50% or 60% of median income whereas in low and middle income countries, absolute poverty – or the ability to meet the most basic needs – is still a concern. Peru adopts an absolute poverty line that is calculated based on the methodology of Ravallion (2016, Ch.4), where two components are derived from expenditure data of a reference population. The first is a nutritional component that specifies the costs of regional food baskets that satisfy a minimal energy intake (extreme poverty). The second is a non-food component that is derived by multiplying the extreme poverty line with the inverse of the Engel coefficient (i.e. the share of food spending in overall spending of a specified reference population). Summing these two components gives the moderate poverty line.[14] Assessing our income concepts against

[14]Peru calculates the two components based on consumption spending (including consumption from self-production) of the reference population (the 20th to 40th percentile in 2010 when the current methodology was adopted, and approximately the 10th to 30th percentile of the population in 2014). The minimum caloric intake is based on recommendations of the World Health Organization and the Food and Agricultural Organization that are adapted to Peruvian population parameters. Consumption spending data determines the costs of regional food baskets and the Engler coefficient, which is the share of food expenditure in total expenditure. Poverty lines are updated yearly by revising the

these thresholds bears two challenges: poverty lines already take the differences in needs for caloric intake and non-food expenditure into account by construction, equivalising income will thus underestimate poverty. Second, the poverty lines do not account for public services that are provided free of charge and where hence no expenditure is observed. To solve the first one, we measure the incidence of absolute poverty based on per capita income rather than adult equivalent income[15]. The second one is more demanding: we calculate an extended poverty line that is consistent with the approach Peru uses for calculating its monetary poverty lines.[16] That is, we observe consumption of the reference population that includes the costs for public services in health and education. We define the needs for education and health in accordance with Peruvian legislation that stipulates mandatory schooling up to complete secondary education and aims to guarantee access to basic health care for all. We thus derive a third component for service costs that we add to the monetary poverty line in order to arrive at an extended one. We report results for these official poverty lines and our extended threshold below.

We calculate two poverty measures that belong to the group of Foster-Greer-Thorbecke poverty metrics: the headcount ratio, also known as FGT0, and the poverty gap index, or FGT1 (Foster et al., 1984):

$$P_\alpha(y,z) = \frac{1}{N}\sum_{i=1}^{g}\left(\frac{z-y_i}{z}\right)^\alpha \tag{2.1}$$

where $y = income$, $z = poverty\ line$, $g = 1$ if $y < z$ and $g = 0$ if $y \geq z$. When $\alpha = 0$, we simply count the share of the population below the poverty threshold (FGT0), while setting $\alpha = 1$ calculates the mean shortfall of the population from the poverty line and thus takes account of the depth of poverty (FGT1). We use these for estimating absolute poverty, and additionally estimate the incidence of relative poverty measured as 50% of adult equivalent median income. We adopt a fixed (rather than a floating) relative poverty measure that is pegged against the median of extended income. Figure 2.4 reports the results. The first point to notice is that our headcount ratio of absolute poverty is higher than official estimates of the National Institute of Statistics (INEI): it exceeds moderate poverty by 4 percentage points and extreme

costs of food baskets and adapting the reference population to take into account the drop in poverty over past years. For a detailed description of Peru's poverty threshold calculation method, see INEI (2015).

[15]We have alternatively scaled absolute poverty lines up by the mean ratio of the per capita household weight and the equivalence weight of the same reference population as the calculation of poverty lines is based on. Results do not differ from the more pragmatic approach of using per capita income.

[16]I would like to thank Francisco Ferreira from the World Bank Research Department for his recommendation to develop such approach.

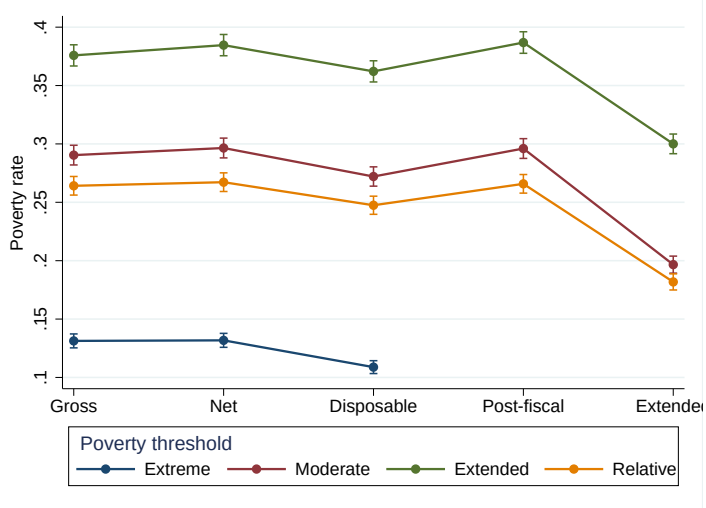
poverty even by 6 points. This is explained by the fact that INEI uses consumption as a measure of welfare while we compute income poverty. In the lowest decile of the income distribution, consumption is on average higher than income. Among the consumption poor, between 18 and 20% of overall consumption is reported to have been a private gift or donation, paid for in-kind, or not paid for and the household does not remember who paid for it. Our income measure counts items that have been self-produced or received as a public transfer, but not those from private donations.[17]

Our relative income poverty measures come very close to consumption poverty. The poverty estimates are different in levels but follow the same trend: poverty is slightly lower in disposable income than in market income (statistically not significant when measured by a relative and an extended threshold) but only drops noticeably when extended income is considered. This being said, using an extended poverty line leads to higher poverty estimates of 30% in extended income compared to the conventional approach of measuring moderate poverty in disposable income, which yields 27%. Extreme poverty or the inability to meet basic needs only experiences a slight reduction and is still at 10% in disposable income. The difference between income and consumption poverty (the latter reaches 4.3% according to official estimates by the Peruvian government), which results from the high share of consumption that comes from gifts and donations, suggests that private redistribution reaches the poor more effectively than public redistribution. Figure A.2.3 shows that trends do not differ much by regions although levels differ markedly. In the highlands and the jungle, almost 20% of the population experience extreme poverty in disposable income and around 39% experience moderate poverty. This compares to an incidence of 2% of extreme poverty and 14% of moderate poverty in Lima as the richest area of the country. Extreme poverty experiences the strongest decline in the highlands where it is also highest to begin with.

The headcount ratio simply counts the number of people falling below a given threshold but does not weigh in how poor these actually are or how unequal income is distributed within the group of poor. The poverty gap estimates how large on average the gap is between current poverty levels and a poverty-free society, measured as the average per capita shortfall in income of the population as a share of the poverty line. A high poverty gap thus indicates that there is more mass at the very bottom of the distribution while a small gap means that many of the poor are closely below the threshold and comparatively less redistribution would lift them above it. Hence, based

[17] There are less than 10 households that report zero income in gross and disposable aggregates. We drop these from the analysis.

Figure 2.4: Poverty headcount ratio along income concepts



Source: Own estimates based on ENAHO 2014

on equation 2.1, we now compute the FGT1 as:

$$P^k(y^l, z^k) = \frac{1}{N} \sum_{i=1}^{g} \left(\frac{z^k - y_i^l}{z^k} \right) \tag{2.2}$$

where superscript k refers to extreme, moderate, or extended poverty, and superscript l refers to a disposable or extended income concept. Table 2.6 reports the poverty gap index – the FGT1 – for the three absolute poverty measures, whereby extreme and moderate poverty are calculated on the basis of disposable income and the last on the basis of extended income. The poverty gap in extreme poverty is much smaller because fewer people are poor, it would hence cost less to eradicate this form of poverty than others. To calculate these purely arithmetic costs of eradicating poverty, we multiply the monetary value of the poverty line by the poverty gap to arrive at the per capita cost in the population. To then arrive at the mean per poor transfer needed, we simply divide the former by the headcount ratio.

Table 2.6 shows that a gap of 3.8% on a monthly threshold of extreme poverty of PEN 161[18] means an average lumpsum payment of PEN 6.1 per capita per month to pay for closing the gap – each poor individual would in turn need to receive on average PEN 56.2 per month. The aggregate shortfall is less than 0.5% of GDP and hence around half of what Peru currently spends on social assistance. This is obviously a static exercise, it assumes perfect targeting, disregards transaction costs and inequality

[18] Our calculations refer to the national poverty lines as calculated by the INEI. The World Bank reports figures based on internationally comparable poverty lines of $3.20-a-day and $5.50-a-day (2011 PPP terms), which estimate the FGT1 for Peru in 2014 at 3.5% ($3.20-a-day) respectively 9.5% ($5.50-a-day) (World Development Indicators).

Table 2.6: The poverty gap index (FGT1) for absolute poverty measures

	FGT1	Std. error	Mean threshold	Per person transfer	Per poor transfer	Shortfall % of GDP
Extreme	3.79%	0.0012	161	6.1	56.2	0.39%
Moderate	10.22%	0.0020	303	31.0	113.9	1.99%
Extended	9.60%	0.0018	370	35.6	118.5	2.28%
Population	31 271 Mio.		GDP	574 880 (Mio PEN)		N: 116075

Note: Absolute poverty thresholds are expressed as means because they vary regionally. Figures refer to monthly income. FGT1 is calculated based on equation 2.2. The per poor transfer is calculated by multiplying the per person transfer with the poverty headcount ratio.
Source: Own estimates based on ENAHO 2014.

among the poor. It is hence not a reflection of the actual costs that governments would accrue to achieve poverty eradication. The figure merely serves to put the depth of poverty in relation to current income and transfer levels. The gaps in moderate and extended poverty are higher by construction because the thresholds are around twice as high as for extreme poverty and more people fall below it. The per poor transfer to eradicate moderate poverty is on average PEN 114, and slightly higher at PEN 119 to eliminate extended poverty (we disregard here that eliminating poverty in an extended income approach is obviously not possible through mere cash transfers since equivalents of public services are not always available in the private market). While the aggregate costs sum to around 2% of GDP, the per poor transfer is only slightly higher than what targeted assistance pays to the poor: the CCT Juntos pays on average PEN 100 per month per family regardless of family size and is hence not primarily designed as an income transfer to combat poverty. Pensión 65 pays a monthly PEN 125 to the poor elderly and can thus lift the average poor out of poverty. This illustrates that targeting is a crucial factor for reducing poverty, but so is the level of transfers that reach the poor. We will look at these questions in the following section.

2.4.4 Targeting of transfers

Targeting assistance to the poor bears two central challenges: identifying who is poor, and overcoming barriers to actually reaching them through social assistance. We look at two types of targeting errors in Figure 2.5: inclusion error defined as the share of beneficiaries that are non-poor, and exclusion error defined as the share of poor that do not receive benefits. We proxy eligibility by falling below the moderate poverty threshold in net income (i.e. pre-transfer) and meeting relevant eligibility criteria

according to type of benefit[19]. Obviously these are not the targeting criteria used by the social assistance administration and cannot be interpreted as a failure to reach the specified target population, but rather as an error in targeting assistance to the *income* poor. We also disregard that there is churning among the poor: our income measure counts the transitory poor as well as the chronic poor.

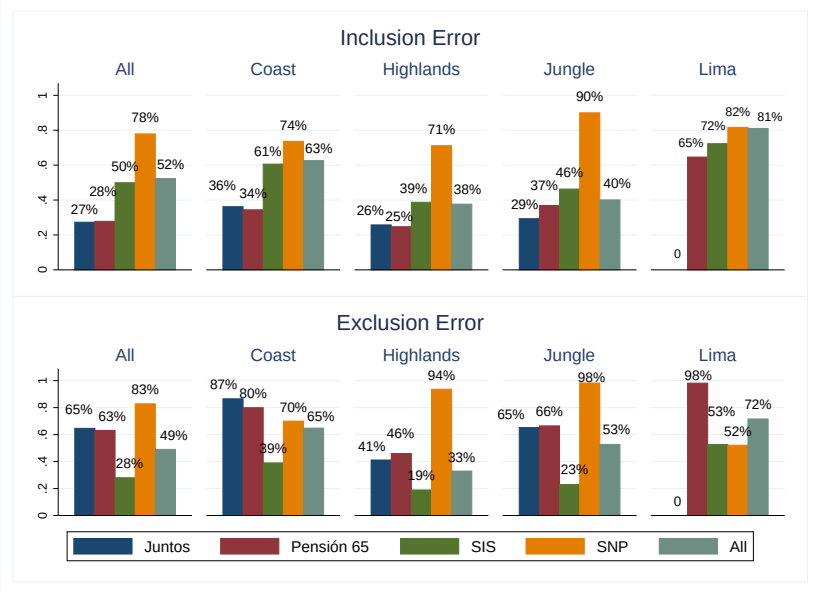
We consider the four larger social assistance programmes and additionally an indicator for whether a household receives any type of direct transfer from one of these four programmes or smaller and more fragmented ones such as school feeding programmes. SNP refers to transfers from contributory pension insurance and is hence not a transfer targeted to the poor. We include it nonetheless because contributory pensions are partly tax-financed. Inclusion error ranges around 27% for Juntos and Pensión 65 - more than a quarter of beneficiaries do not fall below the moderate poverty threshold. This can be due to various reasons: the targeting criteria of Peru's Household Targeting System (SISFOH) are multidimensional and incorporate income and consumption levels but also housing conditions, assets and the number of illiterate household members. Such multidimensional proxy-means test is more likely to identify vulnerability to chronic poverty than a one-time income measure that we use is. Further, there is no regular review of eligibility status: once a household is classified as poor, this status is only reviewed upon request by the household or upon decision by the municipal administration. Hence, a family can graduate out of poverty but continue to receive transfers nonetheless. In the case of SIS, certain risk groups such as pregnant women are eligible for enrolment regardless of poverty status. The interpretation of the inclusion error measured here hence needs to take these factors into account.

What seems more striking is the scale of exclusion error: Juntos and Pensión 65 fail to reach almost 65% of the population whose incomes fall below the moderate poverty line and meet the demographic eligibility criteria. There are various possible explanations beyond the fact that we target by a different type of poverty than SISFOH: non-take up may be a choice that weighs transaction costs against benefits[20], there are administrative barriers such as the requirement to present birth certificates for all household members and being registered, lack of information, or geographical targeting that precludes poor who live in non-poor districts. The latter is noticeable when we look at the regional variation in exclusion: the poor regions of the highlands have been

[19]These are: having children below the age of 14 for Juntos, being aged 65 or above while not receiving a contributory pension in the case of Pensión 65, and not being enrolled in EsSalud in the case of SIS.

[20]In the case of Juntos, transaction costs are related to meeting conditionalities, other benefits may entail transaction costs such as the time investment into getting classified by SISFOH, travelling to the nearest town with a bank to withdraw the transfer, obtaining necessary documentation among others.

Figure 2.5: Targeting error by region



Source: Own estimates based on ENAHO 2014

prioritized for early stages in the rollout of Juntos and Pensión 65, while other regions of the coast and the jungle are incorporated only gradually. Exclusion error for these targeted programmes is hence lowest in the highlands, while it is highest for SNP since employment is largely informal there. A range of interventions, most notably Juntos and school feeding programmes are not administered at all in Lima and other larger cities. Contrary, in the poorest districts of the country individual targeting is not applied and households can enroll without having a household SISFOH classification. By and large it seems clear, however, that if social protection aims to reduce risk and vulnerability, increasing spending is necessary but not sufficient. It also needs to reach a larger share of the poor.

The poverty gap index suggests that reducing poverty substantially may be possible with relatively small shares of GDP if transfers are targeted well. We hence calculate the potential reduction in poverty and inequality that could be achieved through raising the level and coverage of social assistance. The results presented in Table 2.7 are purely illustrative, they do not account for transaction or administrative costs nor any behavioural changes. They further rely on the assumption that resources are shared within the household even though benefits such as pensions may be individually targeted (an assumption that is supported by empirical evidence (Duflo, 2000)). We consider four scenarios: (i) tripling the transfer amount of Juntos and Pensión 65 for all existing beneficiary households, (ii) extending coverage of Juntos and Pensión 65 under the given rules to all moderately poor that fulfil demographic eligibility cri-

teria (thus completely eliminating exclusion error), (iii) introducing a universal child allowance of PEN100 per month for every child under the age of 15 in addition to existing benefits if any, (iv) combining scenario 3 with an additional targeted component of an adult equivalent (OECD modified scale) transfer of 200 PEN per household member to households in moderate poverty.

The pure monetary costs range from 0.6 to 1.8% of GDP and would thus represent a sizeable increase compared to current social assistance spending of 1% of GDP (which includes administrative costs). However, simply relying on existing policies – with Juntos and Pensión 65 being the largest targeted transfers that focus on families and the elderly – will not make substantial achievements in addressing poverty and inequality even if benefit levels are tripled. Extending coverage to the excluded target group at the given low transfer levels will achieve more poverty reduction at the same cost. Scenario 3, a universal transfer that would cost about three times as much as the first two proposals, has a lot higher impact, especially on extreme poverty. Although the tight budget constraints of low and middle income countries may be an argument against universal benefits, they are often less costly to administrate. Combining such intervention with a targeted supplement achieves the highest poverty impact. This scenario pays on average higher amounts to the poor than the poverty gap suggests would be needed to fully close the gap, nonetheless around 17% remain poor (including 2.7% absolutely poor). This reflects the fact that the poverty gap does not take inequality among the poor into account - the average-needed transfer may lift some of the poor well above the poverty line and leave others just below it. The reduction in Gini inequality is below two percentage points in all cases and reflects the high inequality at both ends of the distribution that would necessitate much greater redistributive efforts.

Table 2.7: Raising social protection spending

	GDP	Point reduction			Post-transfer incidence		
	share	Ext. Pov.	Mod. Pov.	Gini	Ext. Pov.	Mod. Pov.	Gini
Scenario 1	0.58%	3.36	3.48	0.82	7.5%	23.8%	43.8
Scenario 2	0.56%	3.41	5.63	0.84	7.5%	21.6%	43.8
Scenario 3	1.66%	7.05	8.35	1.39	3.8%	18.9%	43.2
Scenario 4	1.84%	8.18	10.62	1.68	2.7%	16.6%	42.9

Notes: Ext. Pov. refers to the headcount ratio of extreme poverty and Mod. Pov. refers to the headcount ratio of moderate poverty.
Source: Own estimates based on ENAHO 2014.

2.4.5 Reforming the welfare state

A question that cannot be avoided when discussing a possible expansion of the welfare state is why the current system is largely neutral in distributional terms (excluding in-kind benefits). Several political economy factors may help to explain the current status quo. First, we cannot detach welfare spending from revenue generating capacities. The tax system relies largely on indirect taxes and has a historically low PIT that contributes little to redistribution and raises comparatively low revenues (less than 2% of GDP) that would finance higher expenditure. The weak political representation of large parts of society creates little pressure to raise PIT progression or broaden its base. Coupled with this is an explicit aim to avoid fiscal illusion: strong central rules avoid debt financing of expenditure. Given the experience of the hyperinflation of the late 1980s and early 1990s, there is a broad consensus among policymakers for pursuing macroeconomic stability.

Second, constraints in administrative capacities further challenge the effective implementation of redistributive policies. While an administration reform that began in the mid-1990s strengthened those public agencies that are key for maintaining macroeconomic stability, other public institutions, including those that administer social policies, still lag behind. Limited administrative capacities and high staff turnover thus challenge the effectiveness of public spending to address poverty and inequity (World Bank, 2012). Particularly at the regional and municipal level, authorities lack administrative capacities to spend allocated budgets (Morón et al., 2009). The decentralization reform that started in 2001 established 25 regional governments but fell short of consolidating these into macro-regions as planned. Smaller regions thus struggle to build effective governments. Further, some regions hold natural resources that are a source of tax revenues while others do not. The canon system in Peru, which stipulates that regions where natural resources are extracted receive part of the proceeds, creates tensions between rich and poor regions in the absence of a significant fiscal equalization mechanism.

Third, the long history of authoritarian government and the weak political party system that lacks any strong regionally based movements is responsible for a large detachment of policymakers from vulnerable groups and a low overall trust in public institutions. The first free elections with universal suffrage were held only in 1980 in Peru, but political power remains highly concentrated and unstable. Representative institutions such as the Congress are weak – Congress has, in fact, no power to amend the Executive's annual budget proposal and the citizen-to-member ratio is the highest among Andean countries (Morón et al., 2009). Social sectors thus have few powerful

advocates, even though more than three quarters of the population regard the current levels of inequality as unjust or very unjust (Latinobarómetro, 2013). These factors help to explain why Peru's tax and transfer system has a relatively small redistributive impact even by regional comparison. Political pressure for reform seems weak although the increasing problem of public safety, which appears a primary concern of the population in opinion surveys and is associated with high levels of inequality, may strengthen preferences for more redistribution in the future (Herrera, 2017).

2.5 Discussion

Weak social safety nets often coincide with low levels of income and high inequality while the tax and transfer system of advanced welfare states such as the Scandinavian ones reduces inequality in disposable income by 16 to 20 Gini points (OECD, 2017b). This paper has analyzed the impact of public social spending in Peru for the fiscal year of 2014 upon inequality and poverty. By way of linking aggregate government finance statistics to micro-level household data from the ENAHO, it has traced the effect of fiscal policy along different concepts of household income. It has included in the analysis personal income taxes, social security contributions and consumption taxes on the revenue side, and public cash transfers and social in-kind benefits on the expenditure side. Given that the values of publicly provided services are not readily observable, we have imputed them based on expenditure data from administrative sources. Incorporating in-kind benefits into the analysis adds an important dimension since inequality is often assessed based on disposable income while publicly provided services constitute a large share of social spending, in particular in countries like Peru that dedicate a fairly small share of public spending towards direct social assistance.

The results are mixed. The reduction in inequality that the tax and transfer system achieves is moderate: it reduces the Gini coefficient by around 7 percentage points. The largest effect, in fact more than half, is achieved through the provision of public services. This is because the value of public services is high in relation to the incomes of the lower decile and because the rich are more likely to opt for private services, especially in education. Nonetheless, we must interpret the results with caution: they are obviously based on assumptions about the valuation of public services, and about the relation between production costs and the value services provide to citizens. Although our results are robust to different specifications and account for regional variation in expenditure on public service provision, this can only incompletely address questions regarding service quality. More research is needed into estimating the

quality frontiers of public services and what these imply for their valuation in middle income countries such as Peru.

The analysis has shown that high inequality in living standards between regions in the country remains and is hardly tackled by public expenditure. Even though social assistance is targeted to the poorest regions, this is insufficient to meaningfully reduce the large welfare gaps between the impoverished highlands and jungle regions vis-à-vis the relatively wealthy coast. This also becomes evident when focusing on the lower end of the distribution. While Peru has reached remarkable achievements in reducing poverty by more than half in the past two decades, more than a quintile of the population continues to live in poverty. The current social protection architecture is ill-suited to tackle this. Before accounting for the value of public services, direct transfers contribute by less than 2 percentage points or less than 10% to poverty reduction. Public services have a much larger impact upon the poor and reduce extended poverty by almost 9 percentage points or approximately a quarter, but obviously these will not address extreme poverty that describes a situation where individuals cannot meet their most basic needs. Thus, unless transfers to poor households are expanded significantly in volume and coverage, social safety nets will not tackle vulnerability. This would necessitate both a larger budget and a greater effort of reaching the poor that are so far excluded.

There are several limitations to this study. First and foremost, it focuses only on a one-dimensional monetary measure of welfare. It thus ignores other objectives of social assistance that aim to achieve results in the medium to long term. Peru's flagship CCT Juntos in particular is an example of an intervention that pursues dual goals: poverty reduction and human capital accumulation. It aims at building productive capacities and reducing the intergenerational transmission of poverty. Further, it aims at inducing behavioural changes in child-rearing that will help to improve child health. These impacts are not factored into such analysis. On a more general level, the study does not model any behavioral or equilibrium effects and thus treats as a counterfactual merely gross market income as observed before intervention. In the real world, however, it is hardly plausible that economic agents do not react to tax and transfer policies and adjust their labour supply or consumption decisions. Further, the coverage of fiscal policy is incomplete and covers only social spending that can be attributed directly to individual use. It looks at average effects of the current system but does not provide clues about marginal changes in government policies, such as what would happen to the income distribution if policy were to change. Finally, the analysis takes the observed levels of inequality and poverty as exogenously given and examines how tax and transfer policies may or may not change them. It provides little explanations for the underlying

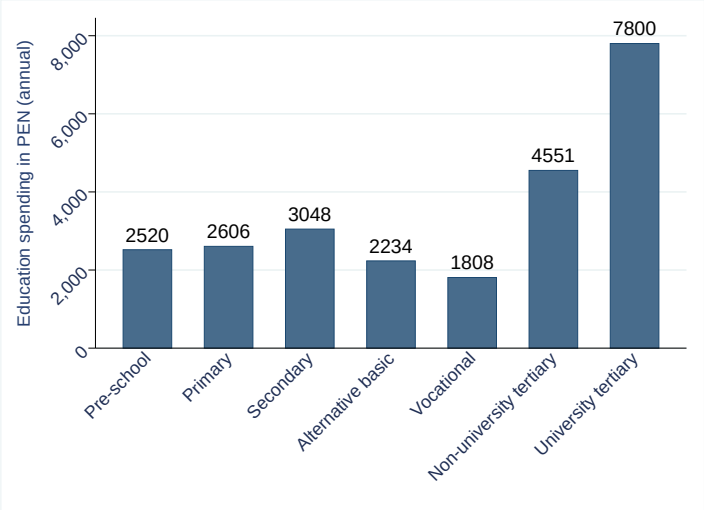
factors that determine the starting point from where the fiscal system takes off. These questions of political economy are, however, crucial when it comes to reforming the welfare state. We have discussed three main factors that help to explain the relatively weak redistributive capacities of the state, without yet linking them to specific policies or the lack thereof. These points remain subject for further research.

Despite these limitations, we can conclude that the system of social protection in Peru is not close-knit but rather leaves a large share of the population insufficiently protected from social risk and vulnerability. Peru has made great advances in reducing poverty and inequality over the past two decades, but these were also the times of high commodity prices and rising exports that induced a growth pattern that was shared across the distribution. In less favourable macroeconomic conditions, sustained poverty reduction and redistribution will likely necessitate a stronger welfare state.

Appendix

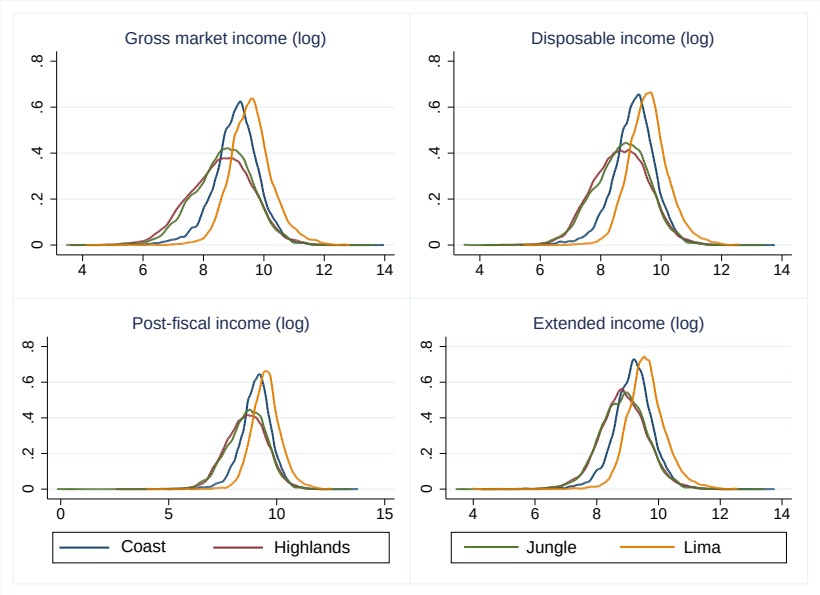
2.A Graphs

Figure A.2.1: Annual education spending per student by schooling level in 2014



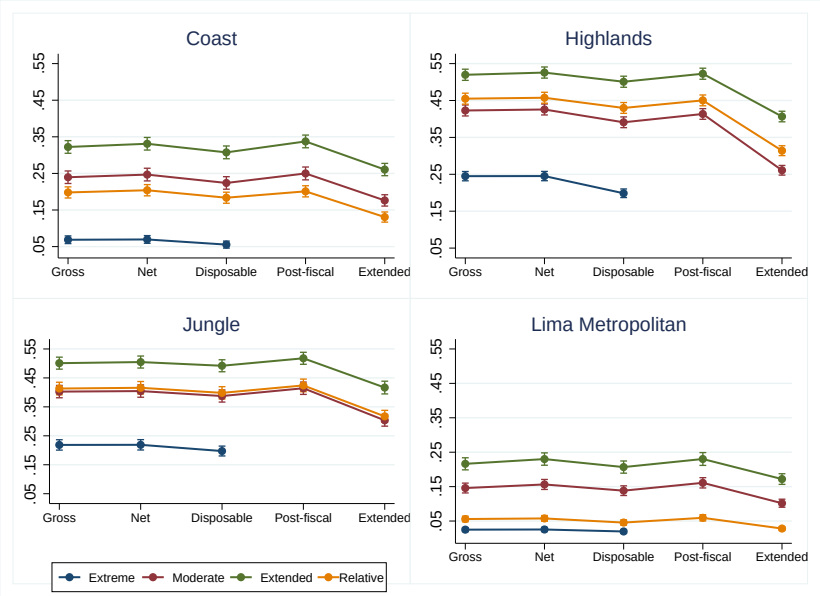
Source: Ministry of Education Peru (2014).

Figure A.2.2: Densities of log income by regions



Source: Own estimates based on ENAHO 2014

Figure A.2.3: Poverty headcount ratio by regions



Note: The bars indicate the 95% confidence intervals.
Source: Own estimates based on ENAHO 2014

2.B Tables

Table A.2.1: Tax and benefit receipts in ENAHO and administrative accounts

Social assistance				
	Unit	**Admin.data**	**ENAHO**	**Ratio**
Juntos	Households	755 556	739 899	97.9%
Pensión 65	Individuals	450 000	432 230	96.1%
Beca 18	Individuals	11 419	13 111	114.8%
Revenues				
	Unit	**Nat.accounts**	**ENAHO**	**Ratio**
PIT	Mio. PEN	10 894	8 260	75.8%
SSC	Mio. PEN	12 513	9 017	72.1%
VAT	Mio. PEN	28 732	14 035	48.8%

Note: PIT payments include capital and rent taxation and is simulated according to the Tax Code. Social security contributions (SSC) include contributions for the health fund EsSalud and the pension fund SNP. VAT (only domestic included here) is simulated from consumption spending and scaled by a factor of 2.02 (see section 2.3.1).
Source: Own calculations based on ENAHO 2014, National Accounts, MIDIS.

Table A.2.2: Changes in inequality along income concepts (Annual per capita income)

Indicator	**Gross**	**Net**	**Disposable**	**Post-fiscal**	**Extended**
Gini	0.489	0.470	0.464	0.465	0.425
P90/10	12.08	11.20	9.99	10.08	7.11
P40 share	11.7%	12.4%	12.8%	12.7%	15.1%
Urban only (N: 77 819)					
Gini	0.446	0.427	0.423	0.424	0.393
P90/10	7.68	7.02	6.91	6.97	5.63
P40 share	14.3%	15.1%	15.3%	15.2%	17.0%
Rural only (N: 38 256)					
Gini	0.485	0.475	0.448	0.453	0.369
P90/10	10.46	10.18	8.08	8.39	5.01
P40 share	12.1%	12.4%	14.0%	13.7%	18.4%

Note: Figures refer to annual per capita household income of 2014.
Source: Own estimations based on ENAHO 2014.

Table A.2.3: Sensitivity of changes in inequality along income concepts

Indicator	Gross	Net	Disposable	Post-fiscal	Extended
V2: Public pensions treated as deferred income					
Gini	0.472	0.454	0.446	0.447	0.406
P90/10	11.55	10.67	9.39	9.46	6.67
V3: EsSalud contributions borne fully by employer					
Gini	0.469	0.454	0.446	0.447	0.406
P90/10	11.07	10.54	9.39	9.46	6.67
V4: Health in-kind benefits valuated by actual-use approach					
Gini	0.473	0.454	0.446	0.447	0.400
P90/10	11.39	10.54	9.39	9.46	6.29
V5: Public pensions as income, EsSalud borne by employer, health as actual use					
Gini	0.468	0.450	0.442	0.443	0.395
P90/10	11.21	10.35	9.10	9.17	6.10

Note: Figures refer to adult equivalent income of 2014 (combined scale). The specification of income concepts follow our benchmark analysis in all points except for the one described for each specification.
Source: Own estimations based on ENAHO 2014.

Table A.2.4: Confidence intervals of estimated Gini coefficients from table 2.4

	Gini	Std. Err.	95% CI		N
Gross	0.4730	0.0056	0.4618	0.4842	116059
Net	0.4541	0.0050	0.4442	0.4639	116059
Disposable	0.4458	0.0047	0.4366	0.4551	116064
Post-fiscal	0.4471	0.0048	0.4376	0.4567	116056
Extended	0.4063	0.0055	0.3954	0.4173	116056
Urban areas					
Gross	0.4296	0.0058	0.4181	0.4410	77803
Net	0.4098	0.0052	0.3995	0.4202	77803
Disposable	0.4042	0.0052	0.3938	0.4146	77808
Post-fiscal	0.4056	0.0056	0.3945	0.4167	77712
Extended	0.3743	0.0054	0.3635	0.3851	77806
Rural areas					
Gross	0.4691	0.0081	0.4529	0.4852	38256
Net	0.4589	0.0073	0.4443	0.4735	38256
Disposable	0.4289	0.0077	0.4135	0.4443	38256
Post-fiscal	0.4338	0.0075	0.4190	0.4487	38219
Extended	0.3549	0.0066	0.3418	0.3680	38250

Note: Standard errors have been estimated through bootstrapping (100 replications).
Source: Own estimations based on ENAHO 2014.

2.C Constructing health insurance values

To construct the value for public health insurance, we rely on information about the costs and usage of different health services from detailed actuarial studies for SIS (SIS, 2015) and EsSalud (Grushka, 2016). The studies calculate the actuarial costs of coverage under the benefit plan PEAS defined in the Law on Universal Health Insurance (AUS). EsSalud additionally covers a range of economic benefits that cover the events of incapacity, maternity, nursing and funeral support. Although detailed information on health use by age, gender and type of service are available, the studies report only average costs per affiliate. To differentiate premiums by risk groups, we calculate relative risk factors for population subgroups and multiply these with the average premium per affiliate.

In a first step, we calculate health cost profiles that differ by gender and age group (5-year brackets up to age 80, and a group of age 80+). We combine information on the average number of cases per health service by subgroup with average costs per service for the year 2014. Clients of SIS receive services from public health posts and clinics that are operated by the decentralized Ministry of Health (MINSA), where SIS contracts the services from. MINSA has the largest network of facilities that are located throughout the country. EsSalud in turn operates own clinics and health facilities that are mainly located in cities and departmental capitals, since EsSalud provides insurance to formal sector workers which mainly reside in urban centers (Giedion et al., 2014). Health costs are available for 6 types of services (consultation, emergency, hospitalization, surgery, preventive care, hemodialysis and in the case of EsSalud additionally benefits related to incapacity, maternity, nursing support and funeral support) that differ by department in the case of SIS. We thus obtain cost profiles by age and gender. These cover medical costs of the insurance but not administrative or other non-service costs. We calculate risk factors as the ratio between subgroup medical cost profile and average medical cost per affiliate. We apply this risk factor to the average total cost (i.e. medical plus administrative) per affiliate to arrive at the insurance value. In short, the insurance value is defined as:

$$IP_{g,a,d} = (\sum_{i=1}^{k} HS_{g,a})(P_{k,d})(\frac{TotalCost}{ServiceCost}) \tag{2.3}$$

Where IP stands for insurance premium, the subscripts g, a, and d stand for gender, age group and department respectively, HS stands for the number of k types of health services used that differ by price P and in the case of SIS by department. *Total Costs* refer to total insurance cost per affiliate while *Service Cost* refer only to the

share of total costs that accrue to medical service provision. For ease of notation, we drop the superscript for the two different health insurance schemes since we apply the same formula to both with the exception that the EsSalud premium does not differ by department d.

The average cost per affiliate calculated by the insurance funds is priced at PEN 529 by EsSalud and PEN 360 by SIS. Our insurance premiums range from between PEN 150 to PEN 1600 for EsSalud and between around PEN 60 and PEN 1600 for SIS depending on the individual risk group (the average spending per affiliate is very low in some departments compared to others). For both schemes, the average costs calculated by the funds are below what they charge individuals that opt to insure voluntarily with either scheme. EsSalud charges annually between PEN 768 for an individual and PEN 2736 for a household of four. SIS charges between PEN 468 for an individual and PEN 1380 for a family of four. This discrepancy may be due to various reasons. A higher premium may be a way of generating revenues: SIS has been seriously underfunded since its inception, and recent legislatory changes undermine the financial sustainability of EsSalud, too (OECD, 2017a). In practice, voluntary insurance is only used by less than 2% of the population. Another reason may be that inefficiencies are built into the pricing mechanisms of insurance policies but not into the costing of individual services.

So far, the calculated insurance value relies on the assumption that PEAS is implemented as stipulated by law. In practice, however, SIS is seriously underfunded. Its funding comes from general taxation and its budget is established in negotiation with the Ministry of Economy and Finance (MEF) as part of the annual budgetary process. While SIS has calculated a mean expected cost of PEN 360 per year, its average expenditure per affiliate only reached PEN 71 in 2014 (OECD, 2017a), hence a mere 20%. The funding shortage results in service rationing, informal fees and (illegal) copayments (Francke, 2013). To account for this discrepancy, we scale down the insurance value accordingly. Since we lack disaggregated expenditure by department, we assume service rationing to affect all affiliates proportionately.

Chapter 3

Do Conditional Cash Transfers Raise Educational Attainment? A Case Study of Juntos in Peru

3.1 Background

Conditional cash transfers (CCT) are among the largest social assistance programmes in many Latin American countries. CCTs are targeted transfers to poor households that are conditional upon beneficiary families making pre-specified investments into the education and health care of their children. Typical CCTs require that school-aged children of beneficiary households are registered in school and attend classes while younger children and pregnant or lactating women need to attend regular health checks. As such, these programmes combine an immediate objective of poverty alleviation with a long-term one of enhancing intergenerational social mobility through promoting human capital investment.

Peru started its CCT programme *Programa Nacional de Apoyo a los más Pobres Juntos* (National Programme to Support the Poorest Together), shortly referred to as Juntos, in 2005. This paper aims to evaluate its impact upon educational outcomes, specifically asking whether Juntos raises the educational attainment of beneficiary children. The analysis encompasses both the effect on the demand for education services in terms of participation, as well as the impact upon learning outcomes that may result from it. While better learning outcomes are not an explicit objective of the programme itself, CCTs implicitly build on the assumption that more schooling for children from poor families enhances social mobility in later life. Arguably, in order to reach this

Table 3.1: Net school enrolment rates in 2014 by region and poverty status

	Mean	**Extreme poor**	**Non-poor**	**Rural**	**Urban**
Primary	92.9	92.9	93.3	93.2	92.7
Secondary	82.9	66.2	86.5	74.5	86.7
Tertiary	64.7	9.6	75.9	29.7	75.4

Note: The net enrolment rate refers to the percentage share of enrolled children of the official age group for a given level of education out of the total of this age group. The category tertiary includes all form of post-secondary education.

Source: Ministry of Education Peru (2014)

long-term objective, skills acquisition and enhanced learning are crucial determinants alongside mere school participation.

The paper is structured as follows: this first section gives a brief introduction to theoretical considerations behind CCT programmes and the specific set-up of Juntos in Peru. The second section provides a literature review before introducing the data in the third section. The fourth section explains the identification strategy, while the fifth section outlines the empirical estimation results. The last section concludes.

3.1.1 The rationale behind CCTs

In the development policy debate, CCTs have been hailed as a promising lever to tackle under-investment into human capital through a demand-side intervention. Little investment into human capital – in particular health and education – can reinforce poverty traps and foster an intergenerational transmission of poverty (Fiszbein et al., 2009). Although in the bulk of countries where CCTs operate, public primary and secondary education is free of charge, large inequalities in school enrolment and completion rates among income groups persist. Table 3.1 shows that this is also the case in Peru, where net enrolment at primary level is almost balanced (average net enrolment of 92.9 respectively 93.3% for those classified as non-poor by the Peruvian government versus those classified as extremely poor) but significant disparities exist at the secondary level (86.5 versus 66.2%, respectively) (Ministry of Education Peru, 2014).

CCTs aim to tackle this by effectively subsidizing education through lowering its opportunity costs. Hence, a conditional transfer works through two channels: the transfer provides additional income to the household and thus relaxes a budget constraint, while the conditionality lowers the price of schooling relative to alternative time uses of children. This paper aims to investigate the overall impact of Juntos upon educational outcomes of beneficiary children.[1] Specifically, it addresses the following

[1] This overall impact may result from an income and/or substitution effect. Empirically, it is difficult

two questions:

1. What has been the impact of Juntos upon school participation?

2. Can programme participation be linked to impacts upon cognitive skills?

Juntos began to operate in Peru in the second half of 2005. Starting on a small scale in some of the poorest regions of the country, it has since been rolled out to cover more than 750.000 households in nearly 60% of the country's districts. The programme targets beneficiaries in eligible districts via a proxy-means test that takes into account demographic and socio-economic criteria. The conditionalities that the household has to meet in order to receive the cash transfer of PEN 200 bimonthly per family (Peruvian Nuevo Soles, amounting to approximately $304 in PPP terms[2]) are outlined in Table 3.2. Eligible families must comprise at least one member under 18 years of age or pregnant, and have lived in the district of enrolment for a minimum of six months before receiving a transfer. Children under the age of 6 have to attend regular health checks and receive vaccinations, while school-aged children between 6 and 14 have to be enrolled in school and attend a minimum of 85% of the classes. Pregnant or lactating women need to undergo pre- and post-natal health examinations. The uniform scheme as such is rather simple when compared to other CCTs in the region that differentiate transfer amounts for example by the number of children in the household (as for example in Colombia) or pay an education premium to girls and for advancing to higher grades (as for example in Mexico).

Table 3.2: Juntos conditionalities

Target group	**Conditionality**	**Benefit**
Children under 6 years	Attendance of regular health checks (CRED), vaccinations	100 Soles per month per family ($152 (PPP))
Children aged 6-14 years	School attendance of at least 85% of the classes	
Pregnant and young mothers	Pre- and post-natal health checks	

to decompose any overall impact into an income and substitution effect unless through a randomized controlled trial that features both a conditional and an unconditional transfer, or with a structural model that estimates the parameters determining demand for schooling. Such decomposition, which would be insightful in order to assess for example the benefits of a conditional programme over an unconditional one against the costs that compliance monitoring creates, goes beyond the scope of this paper.

[2]The PPP conversion rate is based on the data provided by the International Comparison Group (ICP) 2011 of the World Bank Group (PPP conversion rate of 1,521).

3.2 Literature review

CCT programmes in Latin America have been subject to numerous empirical impact evaluations. Broadly, these can be grouped into four categories (see Fiszbein et al. (2009), Appendix B). The first one comprises evaluations of smaller scale pilot programmes that are based on random assignment. Examples are CCT programmes in Nicaragua and Honduras, where random assignment to treatment and control groups has worked well while attrition was low. Maluccio and Flores (2005) provide an impact evaluation of the Nicaraguan CCT *Red de Protección Social* using experimental design. The second category is also based on experimental design methods but studies larger scale programmes, thus raising fewer questions on external validity. The most prominent example is certainly Mexico's *Prospera*[3] programme which has been evaluated on many accounts. Evaluations include for example Skoufias (2005) who associates the CCT with more years of schooling and improved nutrition for poor children as well as better health outcomes for children and adults. Schultz (2004) has evaluated later stages of the programme in rural areas, where no control groups had been established anymore. Using a matching design combined with first-difference regression analysis, he concludes that the programme has a positive effect on schooling; this effect is largest for children in the age group of transition from primary to secondary school.

The third category draws on studies where randomization was not possible or the control group was biased for various reasons. These studies use a regression discontinuity design (RDD): transfer eligibility is often determined by means-testing, where households falling below a certain poverty threshold are selected into the treatment group. RDD compares outcomes for households just below this cut-off point (treatment group) with those just above the threshold (control group). Oosterbeek et al. (2008) have used this approach to evaluate the *Bono de Desarrollo Humano* (BDH) programme in Ecuador. Since there was a significant amount of non-eligible households just above the threshold that received transfers nonetheless, the authors additionally use an instrumental variable to control for this bias. They conclude that the programme had a positive effect on school enrollment for very poor households. The fourth category uses a quasi-experimental design with difference-in-difference estimation, sometimes combining it with matching. For Colombia's CCT *Familias en Acción*, Attanasio et al. (2005) find that the programme has increased household consumption as well as school attendance of secondary school children for eligible children within the household. However, it has had no effect on ineligible siblings living in the same

[3]At the start in 1997, the Mexican CCT programme was called Progresa, it then changed its name to Oportunidades in 2002 and was recently rebranded as Prospera. For simplification, this paper refers to the programme only as Prospera.

household.

The objective of CCTs is to promote long-term investment into the human capital of children from impoverished households. To date, there are few studies that focus on learning outcomes rather than enrolment or school attendance rates. Baez and Camacho (2011) find no impact on test scores in Colombia, and Behrman et al. (2011) reach a similar result in Mexico when comparing long-term beneficiaries with short-term ones. The relative scarcity of evaluations of learning outcomes is mainly due to the lack of available data on cognitive skills or test scores of children. This paper wants to make a contribution by evaluating the impact of Peru's Juntos on the educational attainment of beneficiary children as measured by children's progression through grades, the likelihood of passing critical transition points and their performance in standardized tests. It falls into the fourth category and, while relying on survey data, uses a similar empirical approach as Attanasio et al. (2005) do.

To my knowledge, there is only one study that investigates Juntos' impacts on cognitive skills: Andersen et al. (2015) study the impacts of Juntos upon nutritional and anthropometric scores as well as language development and grade attainment among young children aged 7-8 years, and find no effect on the latter. Impacts upon anthropometric scores varied by gender and programme exposure. Perova and Vakis (2012) evaluate the welfare and schooling effects of Juntos using instrumental variable estimation and find that the programme has weak but positive effects on consumption, poverty reduction and the use of health services. With regards to educational outcomes, the authors find that Juntos has no effect on enrolment while it does raise school attendance. Effects increase with the length of programme exposure. Jaramillo and Sanchez (2011) focus on nutritional outcomes among children aged 0 to 5 years and find that Juntos reduces the incidence of chronic malnutrition among beneficiary children significantly, with a positive effect again attributed to length of exposure. Escobal and Benites (2012) find positive impacts upon household welfare and consumption and a negative impact upon child work, but no significant effect upon child nutrition. Other evaluations of Juntos focus on the programme's impact upon social engagement (Camacho, 2014) and labour supply decisions (Fernandez and Saldarriaga, 2014).

3.3 Data

The paper draws upon panel data from Young Lives, an international study of childhood poverty in four countries that tracks 12.000 children over a 15-year period.[4] The Peruvian sub-sample follows two cohorts of children since 2002 and covers more than 2.700 households, for which three survey waves were available at the time of writing (2002, 2006/07, 2009). Since the survey's objective is to provide information on childhood poverty and wellbeing, the sampling strategy is not fully random but rather oversamples poor areas. Within the chosen sentinel sites, the selection of households was at random (for a detailed overview of the sampling methodology, see Escobal and Flores (2008). The younger cohort children were aged 6-18 months at the beginning of the study in 2002 and had reached a mean age of 8 by 2009, while the older cohort children were 7-8 years old in 2002 and around 15 years in 2009. Approximately 17% of the sample lived in Juntos beneficiary families in the last survey round. Table 3.1 summarizes the basic structure of the Peruvian Young Lives Panel.

Table 3.1: Structure of the Young Lives Panel

	Younger cohort			**Older cohort**			**Siblings**		
Round	2002	2006/07	2009	2002	2006/07	2009	2002	2006/07	2009
N	2052	1963	1943	714	685	678	3915	4792	4408
Juntos	0	90	360	0	23	76	0	470	1565
Mean age	1.00	5.33	7.91	7.98	12.35	14.93	8.32	9.41	9.29
Boys	1027	990	980	386	368	362	2004	2412	2238
Girls	1025	973	963	328	317	316	1911	2380	2170

Source: Own calculations from Young Lives Peru Round 1-3.

While the Young Lives study focuses on these selected cohort children, a vast amount of data is also collected for siblings and other household members. It includes information on the socio-economic living conditions of the household, food and non-food expenditure, parental background and social capital, child health and anthropometry as well as children's school attendance, test outcomes and time use. In addition, I have access to geographical data from the Juntos administration, in particular the geographic poverty score that was used to select eligible districts in 2005 and to determine the timing of further roll-out.

This study will focus on an early expansion phase of Juntos, namely the years up to 2009. During these early years, Juntos was rolled out to prioritized districts gradually so that it is still possible to compare treated districts with similarly poor dis-

[4]Young Lives is coordinated by the University of Oxford and its partner institutions in the study countries Peru, Ethiopia, India, Vietnam.

tricts that were not yet incorporated into the programme. The panel survey comprises an extensive section on livelihoods, income and consumption, which features several questions on Juntos participation[5] through which I can identify treated households. In terms of impacts, the analysis will look at school enrolment and progression through grades in a first step. Young Lives records for each year and each child within the household whether s/he was enrolled, in which type of school and the last grade completed. Since I do not observe children at the end of their school career, the analysis will give me an indication of progress through school and compliance with the regular age-for-grade rather than final years of schooling. This is a relevant question for Peru, because late enrolment and temporary school suspension are a widespread phenomenon in rural areas[6]. In particular, the transition from primary to secondary school thus becomes a critical point with higher risk of drop-out. Beyond the Young Lives cohort children, my sample also includes their (half-) siblings if they were born to the same mother and lived in the same household in both survey rounds.

In a second step, the analysis will focus on cognitive skills and learning outcomes. Young Lives administers a range of tests covering numerical and receptive vocabulary skills to the cohort child and selected siblings. For the purpose of this study, the Peabody Picture and Vocabulary Test (PPVT) and a math test will be used[7]. The PPVT is a widely used test that was originally developed in 1959 in English language but has later been adapted to Spanish for Latin America (PPVT-R, for detailed information see Cueto and León (2012)). It measures receptive vocabulary skills by presenting, in increasing order of difficulty, pictures to the child who has to choose the word that best matches them. The measures correspond to the highest item reached out of a total of 125 items for the Spanish version, hence younger children tend to score lower on average by design. The test, which is untimed and norm-referenced, has been adapted to Quechua as the most widely used indigenous language in Peru by a panel of experts. The math test slightly differed between survey wave 2006/07 and 2009 because of the age differences and the need to increase difficulty. In 2006/07, the younger cohort (aged 4-5 years) was administered a 15-item-test of basic numeric concepts[8] while the older cohort (aged 11-12 years) completed a more difficult 10-item subset of

[5]While survey wave 2009 contains a direct question on Juntos participation during the past 12 months, I have to reconstruct this for the second wave. This is possible because wave 3 contains enrolment date and information on transfer suspension and programme exit.

[6]According to UNICEF (2008), an average of 41% of children aged 12-15 are in a school grade that does not correspond to their age, the figure being as high as 60% in rural areas.

[7]Young Lives administers several other tests, however, these were either not continued through both survey wave 2 and 3, or they were changed such that they are not comparable over time.

[8]This refers to the quantitative subtest of the Cognitive Developmental Assessment (CDA) developed by the International Evaluation Association (IEA) to assess the cognitive development of 4-year olds. For more information, see Cueto et al. (2009).

Table 3.2: Outcomes (child-level) by treatment status in 2009

	Non-Juntos		**Juntos**		**Difference**	
	Mean	N	Mean	N	Points	t-stat
Enrolled	0.93	4074	0.95	1095	-0.01	-1.27
Highest grade	4.43	4074	4.17	1095	0.26	2.32
Age-for-grade	-0.55	4074	-0.27	1095	-0.28	-7.99
Primary complete	0.40	4074	0.34	1095	0.06	3.68
In secondary	0.29	4074	0.23	1095	0.05	3.59
PPVT raw score	72.39	2102	50.08	442	22.31	19.03
Math raw score	14.74	2069	10.33	420	4.42	14.92

Source: Own calculations from Young Lives Peru Round 3.

the Trends in International Mathematics and Science Study (TIMMS) of 2003, testing basic numerical operations. In 2009, both cohorts took a test comprised of a 20-item arithmetic operations section and a second section testing quantitative and number notions (9 items for the younger cohort) respectively algebra and geometry (10 items for the older cohort)[9]. The tests were timed and no aids such as calculators or books were allowed.

The siblings did not participate in the math test (by survey design), while they did take the PPVT in the third round as long as they were at least 4 years old. For this reason, the analysis of learning outcomes will focus on the smaller sample of Young Lives cohort children only. Further, it is important to note that these are no school tests, but were administered as part of the Young Lives survey. This means that children were tested regardless of their school enrolment status, and test conditions were comparable across regions. Table A.3.1 summarizes the outcomes that will be analyzed, while Table 3.2 reports descriptive statistics for these outcomes for the post-treatment round of 2009. It shows that a high proportion of children in both groups is enrolled in school, while more than half are still in primary school, and about a third of children from non-beneficiary households compared to about one fourth from beneficiary households attend secondary school. The mean child has completed fourth grade. On average, this seems to be in line with their age. In terms of scores on the PPVT and math tests, beneficiary children tend to score significantly lower than their peers from non-Juntos families. These figures refer to the whole sample of children before matching and include families from urban areas including the province of Lima as well as more remote rural areas.

[9]The tests used were a combination of the TIMMS study 2003 referred to above and selected items from national testing programmes. For more details, see Cueto et al. (2009).

3.4 Identification strategy

The impact that Juntos participation has on educational outcomes of beneficiary children can be expressed as the additional benefit that an individual gains from participating in Juntos compared to the outcome in case of his or her non-participation. The fundamental problem of any evaluation is that we cannot observe an individual in both states of participation and non-participation. This paper applies a combined matching and difference-in-difference (MDID) approach as outlined in Heckman et al. (1997) to identify the average treatment effect on the treated (ATT). MDID combines the advantages of both matching and difference-in-difference estimation while also relying on the assumptions of the two methods. According to Abadie (2005), such two-step semi-parametric estimation has advantages over a multivariate difference-in-difference estimation when pre-treatment characteristics that may be associated with the dynamics of the outcome variables are unbalanced. Kernel matching, which amounts to a weighting scheme based on the propensity score, imposes on average the same distribution of covariates for treated and control observations. The propensity score is the only function that needs to be estimated in the first step, it models the selection process. The second step estimates the differences in outcomes, where the common trend assumption of the conventional difference-in-difference can then be relaxed to holding conditional on a balanced (weighted) distribution of the specified covariates.

Matching identifies control observations that resemble the treated ones as closely as possible in observable characteristics, it matches "statistical twins". Identification relies on the assumption that selection into treatment is determined by observable characteristics and not confounded by unobservable characteristics that affect outcomes at the same time (conditional independence assumption, CIA). In other words, expected outcomes, given non-participation in treatment T and conditional on observable characteristics X, should be the same for participants and non-participants:

$$E(Y_{0i}|T_i = 1, X_i) = E(Y_{0i}|T_i = 0, X_i) \tag{3.1}$$

This is a strong assumption that may not hold if unobserved factors such as motivation or ability systematically differ by treatment status. The ATT can be estimated under arguably less restrictive assumptions if panel data are available and matching can be combined with difference-in-difference. The latter controls for selection on unobservables, but rests on the assumption that both groups would have experienced the same trends over time in the absence of treatment (common time trend). It measures the treatment effect as the difference in outcomes between treated and non-treated net

of their pre-existing difference before treatment. Combining matching with difference-in-difference allows me to control both for observable and unobservable characteristics that are constant over time.

MDID rests upon two key identifying assumptions. First, conditional on observables X, the evolution of unobservables (captured by the error term u) over time t is independent of treatment status T:

$$E[(u_{1i} - u_{0i})|T_i = 1, X_i] = E[(u_{1i} - u_{0i})|T_i = 0, X_i] \tag{3.2}$$

In other words, identification rests on the assumption that, in the absence of treatment, both groups would have experienced the same time trends. Secondly, there must be common support:

$$0 < Pr(T_i|X_i) < 1 \tag{3.3}$$

This requires that the probability Pr of selection into treatment T cannot be fully explained by observables X; instead, there must be control observations with a probability of treatment in the same range as that of treated observations.

MDID hence estimates the treatment effect as:

$$ATT^{MDID} = \sum_{i=1}\{(y_{1i} - y_{0i}) - \sum_{i \neq j}(y_{1j} - y_{0j})\}w_{ij} \tag{3.4}$$

where y is the outcome of interest, subscripts 0 and 1 indicate the time period before and after treatment respectively, subscripts i and j indicate that the individual belongs to the treatment or control group respectively, and w is a weighting factor. The weight w is defined by the matching method chosen (in the present case a Kernel-based estimator) and represents the weight of the statistical twin j for treated person i.

3.4.1 Targeting and selection into Juntos

Juntos did not include an evaluation design from the start and naturally, programme participation is not assigned randomly. Rather, the targeting process is a three-step procedure: at the first level (geographic targeting), eligible districts are selected according to a composite geographic score that takes into account various poverty measures, child malnutrition levels, the prevalence of unsatisfied basic needs and the extent of

exposure to political violence in the previous decade[10]. Based on this score, which was calculated according to a 2005 census (renewed in 2007), 638 districts were prioritised for roll-out during the first programme years; further districts were included from 2009 onwards. In the second step, the individual targeting, eligible households are selected according to a proxy-means score that takes into account the following criteria: the ratio of illiterate women residing in the household, the ratio of minors that do not attend school, access to industrial sources of fuel for cooking, dwelling characteristics and access to basic services. Most of these targeting indicators are long-term and not easily changeable in response to expectations about the programme's inception (Ashenfelter's dip). Even for those that may easily be adjusted such as school participation, it is unlikely that this would have been the case here because the information was recorded as part of the regular census and detailed criteria on eligibility for benefits were not disclosed beforehand. In a final step (community validation), the list of eligible households is verified by a commission of community members, and local and national representatives of the Juntos administration in order to minimize both inclusion and exclusion errors.

Looking at our sample, Table 3.1 compares families that have never been Juntos beneficiaries in the period under analysis and those that have become Juntos beneficiaries at some point between programme start in 2005 and 2009. It shows that on average, Juntos beneficiary families live in larger households, they are less well off in terms of expenditure (total per capita expenditure lies on average more than 50% below that of non-Juntos families) and in terms of wealth[11]. They are far more likely to live in rural areas where reaching the nearest primary school takes on average 7 more minutes. Perhaps more striking is the fact that the mother in the household has completed on average less than half the years of schooling compared to those in non-Juntos households (less than 4 years as compared to over 8 years). Juntos families tend to live in districts that were ranked in the poorest two quintiles (in terms of poverty incidence) as of 2005 with a prevalence of malnutrition among children aged 6-9 years of a staggering 45% compared to just under 20% in non-Juntos districts in this sample. It is evident that beneficiary households systematically differ from non-beneficiary households. In the first step, I will hence apply matching to find a suitable control group by replicating the programme's targeting criteria as closely as possible with the data.

[10]For further details on the algorithm applied and an extensive discussion of the targeting process, see Escobal and Benites (2012).

[11]The wealth index is a composite score that measures by equal weighting: (i) the housing quality in terms of size and building materials, (ii) possession of consumer durables, (iii) access to services of water, sanitation and electricity.

Table 3.1: Household characteristics in 2006/07 by treatment status

	Non-Juntos HH		**Juntos HH**		**Difference**	
	Mean	N	Mean	N	Points	t-stat
Household size	5.36	2103	6.18	320	-0.83	-6.80
Wealth index	0.53	2103	0.26	320	0.27	21.32
Total expenditure	179.45	2103	83.46	320	96.00	9.60
Ethnic: Mestizo	0.91	2103	0.97	320	-0.07	-4.03
Ethnic: White	0.06	2103	0.02	320	0.04	2.69
Mother's education (years)	8.56	2103	3.54	320	5.02	20.14
Mother's age (years)	33.80	2103	34.23	320	-0.43	-0.84
Rural (=1)	0.19	2103	0.78	320	-0.60	-25.26
District poverty quintile	2.82	2103	1.29	320	1.52	22.60
District child malnutrition	19.64	2103	45.72	320	-26.08	-34.44

Note: Total expenditure refers to biweekly household expenditure in PEN. The district poverty quintile and the district malnutrition rate are drawn from the 2005 census and were used by the Juntos administration in the geographical targeting. The district poverty quintile ranks from 1 (poorest) to 5 (least poor) and draws upon a multidimensional poverty index. The malnutrition rate refers to the age group 6-9 years.

Source: Own calculations from Young Lives Peru Round 2.

Nonetheless, a biased selection may occur if only the best informed or most mobile from the population of eligible households actually participate. The programme design reduces such risk in several ways: Once a district is selected, a survey of each household is conducted in order to determine eligibility. The programme administration then proactively approaches eligible households to explain and offer affiliation with Juntos[12]. Hence, the risk that eligible households are unaware of the programme and thus do not register is low. The sequential regional roll-out may reduce incentives for moving into a (poorer) programme district if a later incorporation of the home district may be expected while moving is costly. Also, a household has to live in the district for at least six months before qualifying for the transfer. Finally, the community validation aims to minimize discretionary powers of local officials or community representatives by ensuring a mixed composition of members. Furthermore, various channels exist for families to complain and demand a re-assessment of eligibility.

Even if we thus believe that the programme rules successfully target the poorest, there may be systematic unobserved differences if for example some parents value education more than others or place more trust in the local health services. Hence, in order to control for any unobserved pre-existing differences between the control and treatment groups, I will apply difference-in-difference estimation on the matched sample. Applied to the present case of Juntos, MDID compares the difference in

[12]This was the case in the first programme years (Escobal and Benites, 2012). Nowadays, households are not necessarily informed individually, but lists of eligible households are posted in the municipality.

outcomes between children of families that are similar in observable characteristics except for the fact that some benefitted from Juntos while others did not, taking into account the differences that existed already before treatment. The core identifying assumptions as outlined above will now be discussed further.

3.4.2 Matching and the common support assumption

As described in Table 3.1, Juntos households differ from non-Juntos households in observable characteristics that may simultaneously affect the outcome variables. Hence, I apply a Kernel-matching estimator by applying an Epanechnikov Kernel with a bandwidth of 0.05[13] (respectively 0.06 and 0.07 for different subsamples, see below) to restrict my control group to those observations that best resemble the former group in terms of observable characteristics. A Kernel estimator has the advantage that it uses weighted averages (depending on the distance of the propensity score) of (nearly) all control observations[14] and thus makes use of more information, thereby reducing the variance. This may be advisable when the number of control observations is large, as in the present case (Caliendo and Kopeinig, 2008). Since the treatment itself can affect matching covariates, matching is best undertaken on the basis of pre-treatment characteristics (Blundell and Dias, 2009). I therefore restrict the treatment group to children whose families joined Juntos at some point between 2007 and 2009 in order to compare outcomes before and after treatment. This way, all children in my sample were non-beneficiaries in the observation year 2006/07, while 16% benefitted from Juntos in the observation year 2009.

My sample includes children of both age cohorts and their siblings if these were at least six years old in 2009 and lived in the household in both survey rounds. In choosing the matching covariates, I try to replicate the actual targeting criteria outlined above as closely as possible. In a first step, I exclude all households from the department of Lima (spanning both the capital and surrounding provinces) since this densely populated area may not serve as a good control group for treated rural districts. Since the range of the geographical score is still fairly large, I include the score itself in the matching

[13]The bandwidth essentially functions as a smoothing parameter of the Kernel density function that has to be chosen carefully to balance between bias and efficiency of the estimator. The bandwidth of 0.05 has been calculated using the following formula: $h = 1.06\frac{A}{n^{1/s}}, A = min(\sqrt{Var(x)}, \frac{IQR(x)}{1.34})$ according to Wilcox (2012) and Silverman (1986), with n referring to the sample size of those observations in the common support, IQR referring to the interquartile range and x referring to the estimated propensity score. Alternative bandwidths of 0.04 and 0.06 have not yielded materially different results.

[14]Depending on whether an Epanechnikov or Gaussian function is applied, the estimation uses all control observations (Gaussian) or just those within a specified calipher of the distance to the treated propensity score. For further details, see Heckman et al. (1997).

Table 3.2: Logit estimation on treatment status

Variable	**Unmatched**			**Matched**		
	Treated	Control	p-value	Treated	Control	p-value
Child's age	8.13	8.14	0.896	8.12	8.23	0.518
Girl (=1)	20.89	13.21	0.991	18.16	16.48	0.477
Indigenous language	1.82	1.22	0.000	1.81	1.81	0.939
Wealth index	0.26	0.50	0.000	0.27	0.28	0.208
Expenditure	78.71	165.54	0.000	79.73	84.61	0.361
Household size	0.09	0.09	0.000	0.08	0.08	0.632
Children aged 6-18	0.07	0.10	0.000	0.07	0.05	0.253
Generations in HH	3.09	8.00	0.448	3.21	3.55	0.858
Out-of-school ratio	1.64	1.18	0.224	1.61	1.62	0.585
Female HH-head	6.83	5.73	0.079	6.76	6.89	0.373
Mother's education	2.24	2.27	0.000	2.21	2.24	0.016
Rural (=1)	8.00	8.05	0.000	7.98	7.95	0.770
Time to school	0.49	0.48	0.000	0.49	0.50	0.581
District index	0.54	0.06	0.000	0.51	0.52	0.986

Note: Expenditure refers to biweekly per capita household expenditure in PEN. Indigenous language is a binary indicator that equals 1 if the child's mother tongue is Aymara or Quechua.

Source: Own calculations from Young Lives Peru Round 2-3.

covariates to ensure balancing between the two groups. As further geographical controls I include the distance to the next primary and secondary schools and whether the child lives in a rural or urban district. Household characteristics include the family's wealth and expenditure situation, the family size and composition, the ratio of minors in the household that do not attend school, as well as the mother's years of schooling. Individual characteristics include age, sex and ethnic background of the child.

Table 3.2 reports the balancing of these covariates before and after matching: it shows that matching achieves a balanced distribution with respect to all but one variable, namely the mother's years of education. In fact, among the treated group, more than 50% of mothers have only two years or less of formal education while in the control group this figure lies at only 14%. This unbalanced distribution is a source of concern since we would expect the educational status of the mother to affect that of her children. Since this relationship is, however, a positive one, it would likely introduce a downward bias in the estimation.

Figure A.3.1 shows the propensity score before and after matching, as well as the region of common support. It confirms that both groups share a rather large area of common support, although 6 out of the 816 children from the treated group have to be dropped because they lie outside of this region. Further, Figure A.3.2 shows that the distribution of key pre-treatment characteristics, which may plausibly be related

to the outcomes measured, can be balanced through the matching specification. The matched sample now includes 6260 observations, of which 1620 belong to the treatment group (2320 respectively 810 children per round). They cover the age range of 6 to 18 years and have a mean age of 10.8 years in the post-treatment round of 2009. The left panel of Figure A.3.3 (Appendix) shows the post-treatment age distribution with two peaks around approximately 8 years (younger cohort) and 14 years (older cohort), and fewer observations (siblings) in between. A large share of the sample is hence still of primary school age (up to grade 6). The right panel of Figure A.3.3 shows the grade distribution by enrolment status: there is a corresponding peak of children, which have finished first grade, while there is no clear peak at later grades. It further shows that the majority of children is registered in school, while the highest risk of dropout seems to be around grade 6.

3.4.3 Common trend assumption

The common trend assumption essentially stipulates that, in the absence of Juntos, the trend in enrolment rates, progression through grades, and in learning outcomes would have developed the same for the treatment and control groups. In other words, the change over time in outcomes observed for the control group represents a good counterfactual of the changes beneficiaries would have experienced had they not benefitted from treatment. Naturally, we cannot test this assumption; nonetheless, trends observed in the period just before Juntos began to operate provide some support for it.

Figure A.3.4 (Appendix) depicts the trends in enrolment and progression through grades from 2002 to 2006/07, the years just before the families in our sample began to benefit from Juntos. The sample used here includes the same children as long as these were between the age of 6 and 18 in 2006/07 (it hence excludes the younger cohort children altogether). The figure shows that, while mean enrolment rates slightly differ between the two groups, the trend over time runs parallel. In a similar way, trends in progression through grades do not differ significantly between the two groups. Table A.3.2 (Appendix) reports the difference-in-difference estimation for the same time period and confirms that trends in outcomes between the two groups do not statistically differ from each other. Unfortunately, the PPVT and math tests were not yet administered in the first Young Lives survey wave of 2002 so that the pre-treatment trend cannot be observed. It seems plausible though to argue that if trends in school participation ran parallel for the two groups, the same holds for learning progress.

3.5 Results

Having balanced the two groups in terms of observable characteristics before treatment, I apply difference-in difference estimation in a second step. The first set of outcomes relates to school participation as measured by enrolment status, years of schooling, transition from primary to secondary school and age-for-grade. Intuitively, the mere compliance with conditionalities should have a positive effect on enrolment, while the effect on years of schooling is ambiguous: it may be positive if beneficiaries are induced to stay in school and advance through grades, while it may be zero (or even negative) if the incentive is only to comply with attendance requirements. The same reasoning applies to the child's grade relative to his or her age, and the transition from primary to secondary school: stringent attendance requirements should lower the risk of drop-out at this transition point. However, it may not if children repeat grades or if opportunity costs of schooling increase exponentially with age and outweigh the financial incentive. Juntos requires a minimum attendance of 85% of schooling hours, on which schools report to the Juntos office every two months. In case of non-compliance with conditionalities, a family will be suspended from the programme temporarily but qualifies again for the payment once conditionalities are fulfilled.

The second set relates to learning outcomes. The anticipated effect is not clear-cut: regular attendance may facilitate better learning outcomes and test scores. However, mere presence in school may not be enough to facilitate an actual transfer of information into enhanced cognitive skills. While the intention of CCTs is to get children into school, prevent early drop out and hence foster learning, these gains may not materialize if schooling quality is low or further support mechanisms for disadvantaged children are not available.

3.5.1 Impacts upon school participation

Table 3.1 reports the results for the first set of outcomes. The parameter of interest is Diff-in-Diff: it captures the change in outcome levels over time between children of beneficiary and non-beneficiary families.[15] The simple differences between the treated group (T) and the control group (C) are reported for the baseline and follow-up period respectively. Standard errors are clustered at the district level.[16]

[15] An additional control related to the interview date are included (but not reported in the table) to control for any variation in time passed between the two survey rounds, since each was carried out over a time span of several months.

[16] The results are robust to clustering standard errors at the household level instead, bootstrapping standard errors or leaving out clusters altogether.

Table 3.1: Juntos impacts upon schooling outcomes (MDID)

Outcomes	Enrolled	Highest grade	Age-for-grade	Complete primary	In secondary
Panel A: Pooled Sample					
Baseline					
Diff (T-C)	-0.013	-0.298	0.181**	-0.030*	-0.028**
	(0.019)	(0.191)	(0.077)	(0.016)	(0.012)
Follow-up					
Diff (T-C)	0.038**	-0.234	0.015	-0.040	-0.011
	(0.018)	(0.232)	(0.097)	(0.030)	(0.034)
Diff-in-Diff	0.051**	0.064	-0.1666***	-0.010	0.017
	(0.020)	(0.068)	(0.054)	(0.023)	(0.029)
Observations	6260	6260	6260	6260	6260
R-squared	0.15	0.14	0.04	0.09	0.07
Panel B: Age group primary school (under 12 years)					
Baseline					
Diff (T-C)	-0.010	0.012	-0.028		
	(0.043)	(0.064)	(0.054)		
Follow-up					
Diff (T-C)	0.012*	-0.022	-0.052		
	(0.007)	(0.134)	(0.086)		
Diff-in-Diff	0.022	-0.010	-0.024		
	(0.041)	(0.094)	(0.069)		
Observations	3346	3346	3346		
R-squared	0.42	0.35	0.21		
Panel C: Age group secondary school (12-18 years)					
Baseline					
Diff (T-C)	-0.006	-0.539**	0.496***	-0.079**	-0.089***
	(0.011)	(0.205)	(0.126)	(0.027)	(0.024)
Follow-up					
Diff (T-C)	0.067**	-0.217	0.107	-0.009	0.004
	(0.032)	(0.227)	(0.151)	(0.047)	(0.068)
Diff-in-Diff	0.073**	0.322***	-0.389***	0.070**	0.093*
	(0.034)	(0.065)	(0.094)	(0.031)	(0.053)
Observations	1956	1956	1956	1956	1956
R-squared	0.04	0.38	0.02	0.34	0.22

Note: Robust standard errors in parentheses; clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1

Kernel bandwidth: 0.05 (Panel A), 0.06 (Panel B), 0.07 (Panel C). Matching covariates include those listed in Table 3.2.

Panel A reports the outcomes for the pooled sample. The point estimates suggest that children from Juntos families are about 5 percentage points more likely to be enrolled in school, while the point estimates on years of schooling, albeit positive, are rather imprecisely estimated by the difference-in-difference method and thus statistically not significant. The same holds for the probability of finishing primary school and transiting to secondary school. Highly statistically significant is the difference in age-for-grade, which suggests that Juntos children are catching up with their regular age for grade: while they were are on average older than their peers of the same grade before programme start, this difference fades. While overall these results may be sobering at first sight, descriptive statistics show that school participation and enrolment rates are rather high in primary school from the outset (mean net enrolment rate of 93%). This is different for secondary schooling where mean school participation is significantly lower (83%) and differences run both along a rural-urban divide and between income groups (see Table 3.1). In this sense, the pooled sample may hide heterogeneous effects that differ between age groups.

Hence, we perform a separate analysis for children in the post-treatment age groups of primary (up to grade 6) and secondary (grade 7 to 11) school respectively. Panel B reports the MDID outcomes for the younger group below the age of 12 years. For this group, the outcomes concerning the transition from primary to secondary school are not yet relevant since this transition only happens around the age of 12 years. The results for the relevant outcomes show no significant difference between the groups: while children participating in Juntos have a higher point estimate compared to their non-treated peers in terms of probability of enrolment, the difference is statistically not significant. As argued above, this is not surprising given the generally high participation in primary school. The same holds for trends in years of schooling and conformity with the regular age-for-grade.

The next panel C performs the same analysis for the older age group of 12 years or above. This group contains 1956 observations out of which 646 belong to the treated group. Here, the positive impact upon enrolment rates[17] is significant at the 5% level and suggests a difference of 7.3 percentage points. A significant positive impact appears for years of schooling, which suggests that children from Juntos families accumulate on average just over 4 months more schooling over time than non-treated children. This is consistent with the positive impact upon enrolment that indicates a lower dropout rate among Juntos children. It may further be due to less repetition: column 3 shows

[17]Note that this variable actually refers to being in school or having completed secondary school; as such, the outcome is not coded zero for children that are not enrolled because they completed secondary school (which are only few observations).

that Juntos children progress on average faster through grades. While they are on average almost half a year older than their peers of the same grade before treatment, they close this gap over time and move closer to a regular age for grade. The impact is approximately of the same magnitude as that on years of schooling.

Column 4 tests whether treatment is associated with a higher likelihood of completing primary school. The effect is positive albeit only weakly significant, and driven by a closing of the pre-treatment gap. Similarly for the probability of making the transition from primary to secondary school. The impact of 9 percentage points is weakly significant at the 10% level and larger than that on enrolment. Hence, the impact may be a cumulative effect of less dropout after primary school and faster progression, be that a result of the minimum attendance requirement of 85%, better performance or other driving forces.

In a nutshell, Table 3.1 suggests that, on average Juntos participation has no statistically significant impact upon schooling outcomes of primary school-aged children in terms of their enrolment probability or progress through school grades. We detect a positive impact, however, upon enrolment, years of schooling and the probability of transiting from primary to secondary school among children aged 12 years and above. Descriptive statistics indicate that this age group is at higher risk of school dropout, and that the transition from primary to secondary school is a critical point. If we look at simple differences between the groups in the two time periods, it becomes apparent that positive impacts are often due to beneficiary children catching up with their peers over time. While for most outcomes, beneficiary children started at a lower level (except for enrolment), they catch up by the post-treatment period. This can plausibly be related to programme conditionalities, which not only require enrolment of children aged 6 years and above, but also a minimum and regular attendance requirement of 85%. This observation further supports the MDID strategy since it becomes apparent that even after matching, Juntos children systematically start out with lower outcome levels than their non-treated peers. The difference-in-difference estimation accounts for this pre-treatment difference in outcomes and measures the change experienced over time.

3.5.2 Impacts upon learning outcomes

Table 3.2 looks at learning outcomes as measured by the PPVT and math tests. Scores are standardized by age strata in order to make them comparable over time and age

groups in a linear difference-in-difference model.[18] Since the tests were administered to siblings in the post-treatment round only while the Young Lives cohort children were tested in both rounds, I need to reduce the sample to the cohort children only. An additional control dummy to capture whether a child took the PPVT test in a language other than his or her mother tongue[19] is included.

Column 1 and 2 report the results for the PPVT and math tests of the younger cohort children. In both cases, the coefficients are negative but only in case of the math score is the difference statistically significant. For the older cohort children, aged between 14 and 15 years in the post-treatment round, the coefficients also appear negative but insignificant. The results for the older cohort need to be treated with caution since the number of treated observations only reaches 94, hence the relatively large standard errors. The negative sign of the coefficients seems counter-intuitive at first since there appears no straightforward reason to believe that Juntos participation would have a negative effect on learning outcomes. Figure A.3.5 (Appendix) shows the trend in PPVT and math scores over time: it becomes apparent that both groups have improved their scores over time while beneficiary children have done so by fewer points than their counterparts. In the younger cohort, treated children increased their math test score by on average 1.5 points (approximately 1/2 standard deviation) less than non-treated children did.

A further note of caution applies to the measurement of the younger cohort's math score since the baseline CDA in the pre-treatment round only tests basic numerical concepts and hence may not be a good predictor of later math abilities. If we look at simple differences only, however, it becomes apparent that the negative impact is driven by post-treatment differences: while pre-treatment scores do not statistically differ between the groups, they are significantly lower in the post-treatment round for both tests (younger cohort) respectively PPVT (older cohort). In fact, the negative effect appears even stronger in the first difference estimation: the differences in PPVT and math scores are statistically significant for the younger cohort, while for the older cohort only the difference in PPVT scores is weakly significant.[20] The stronger effect in the first difference estimation is consistent with the fact that Juntos children already had lower mean test scores in the pre-treatment round.

[18] The PPVT test has been standardized using a z-score standardization while for the math tests, a quintile range standardization was applied. The standardization was applied in age strata of 9 months.

[19] Children were free to choose their preferred language and a number of children chose to take the test in their native language Quechua in the pre-treatment round but opted for Spanish in the post-treatment round.

[20] The table reports estimates based on standardized test scores, estimates based on raw scores yielded the same results.

Table 3.2: Juntos impacts upon test scores (MDID)

Outcomes	Younger cohort		Older cohort	
	PPVT	Math	PPVT	Math
Baseline				
Diff (T-C)	0.003	0.256	-0.111	-0.181
	(0.123)	(0.218)	(0.100)	(0.214)
Follow-up				
Diff (T-C)	-0.229*	-0.355***	-0.338**	-0.283
	(0.118)	(0.035)	(0.153)	(0.195)
Diff-in-Diff	-0.232	-0.611**	-0.227	-0.101
	(0.178)	(0.231)	(0.148)	(0.227)
Observations	1491	1571	496	438
R-squared	0.01	0.02	0.06	0.02

Note: Robust standard errors in parentheses; clustered at the district level. Significance level: *** p<0.01, ** p<0.05, * p<0.1
Kernel bandwidth: 0.05 (younger cohort), 0.04 (older cohort). Matching covariates include those listed in Table 3.2 and the child's age in months, siblings rank and whether s/he attended pre-school.

When interpreting these results, one needs to examine carefully what the counterfactual of no treatment may be. Juntos should increase school participation both at the extensive and intensive margin if households comply with conditionalities, and if the incentive provided lowers the opportunity costs of schooling significantly for at least some families[21]. On an individual level, the counterfactual may hence be to attend fewer school hours or to drop out of school altogether. On an aggregate district level, the increased demand for schooling may lead to overcrowding or less stringent criteria for passing school in order to prevent needy children from dropping out and hence losing the transfer. Thus, treatment may have no positive impact on learning outcomes if school quality and infrastructure are not enhanced in parallel, or worse the treatment effect may even be negative if classrooms become overcrowded. Although I do control for regional characteristics related to poverty levels and distance to schools, unfortunately I cannot control for factors related to school infrastructure due to a lack of available data. In this sense, the quality of school infrastructure may be one channel to explain any potential relation between the presence of Juntos and individual learning progress, and is most certainly one that merits further investigation. Finally, I have tested for the length of exposure to treatment. This did not change results significantly nor did it give evidence for positive marginal effects of an extra year of treatment, which may be due to the fact that I cannot yet observe long-term trends.

[21]Recall that previous absence or presence in school is no eligibility criteria, families can claim the benefit regardless of whether their children complied with the conditionalities before programme start already. Hence, if only those families enroll that would comply with conditionalities even in the absence of the transfer, the behavioural change may be zero.

3.6 Conclusion

This paper has evaluated the effects of Juntos participation on educational attainment as measured by school participation and learning outcomes. Juntos constitutes a typical CCT programme that provides incentives to poor families to invest in their children's education by ensuring regular school participation. The paper has adopted a combined matching and difference-in-difference approach to analyze whether Juntos can be associated with higher levels of schooling reached and improved learning outcomes. It has focused on a sample of over 2300 children aged between 6 and 18 years in the period under analysis, which were first surveyed in 2006/07 (pre-treatment) and a second time in 2009 (post-treatment).

The estimated results are mixed: they show no effect on school participation of primary school-aged children, which is not surprising given the high primary school enrolment rates in Peru from the outset. A positive impact is observed for children of secondary school age: treated children have a higher enrolment probability, seem to progress faster through grades and are more likely to finish primary school and enter secondary school holding age constant. This is consistent with evidence from other countries such as Mexico, where CCTs significantly decreased the risk of dropout at the transition from primary to secondary school (Schultz, 2004). It is, however, too early to assess whether any positive effect on years of schooling persists through and up to completion of secondary school, given that Juntos had not been around yet long enough in the post-treatment round of 2009 and given that I do not observe final years of schooling. The findings for learning outcomes are less encouraging: programme participation has no effect on learning outcomes as measured by PPVT and math test scores of the older cohort children, and even a negative effect on math scores of the younger cohort.

The links between Juntos participation and learning outcomes are not clear-cut: the programme may have a positive impact that is transmitted via the attendance requirement and the increased awareness of the value of education that the programme promotes. There are, however, no incentives attached to learning outcomes or performance measures nor have explicit supply side interventions been linked to the programme. A negative relationship as observed for the younger cohort seems worrisome and may point to a potential mismatch between increased demand for schooling services in treatment areas and their supply in terms of quality and infrastructure. CCTs have often been criticized for focusing on the demand side of human capital investment only, neglecting supply factors that may influence schooling decisions and outcomes. While the evidence of this paper is insufficient to draw such conclusion, the link between

CCTs and learning progress as well as the role of school quality and infrastructure certainly merit further analysis.

Equally if not more important are the implications of research on skill formation that points to the important role of early childhood years for cognitive development. It is well known that abilities are not only transmitted from families to children through genes, but that parental investment and the family environment play a huge role. Cunha and Heckman (2007) find that substantial differences in abilities are evident before children start school, and that these differences are related to socioeconomic background. They propose a model in which early childhood investment leads to different returns than late childhood investments, such that no equity-efficiency trade-off exists for the former. In this sense, an intervention such as a CCT may come rather late for the purpose of cognitive skill development if children are already disadvantaged at the time they enter school. By that time, comparatively more investment is needed to close the gap in cognitive skills to their advantaged peers. This is not to suggest that there is no role for CCTs to play or to disregard other objectives they pursue. It may rather point to the argument that early and late interventions are complementarities.

In a similar fashion, this paper has not addressed heterogeneous effects that may differ between different family types, ethnic background or risk groups. As such, larger families may find it more difficult to comply with conditionalities since more children have to fulfil them while the transfer itself stays flat (effectively decreasing in relative importance if younger siblings reach schooling age). Evidence from qualitative interviews[22] furthermore suggests that transaction costs related to the fulfilment of conditionalities (in particular waiting times at health centres) and cash withdrawal may differ substantially between sparsely populated rural areas and more densely populated ones. From a policy perspective, this analysis has also not evaluated the benefits of a conditional versus an unconditional transfer. As such, we cannot determine whether any positive effects observed are primarily due to a shift in the budget constraint (i.e. the transfer) or to a decrease in the opportunity cost of schooling (i.e. the conditionality). While this may not be a relevant question when the main concern is the evaluation of impacts upon human capital formation, it would be a core question when weighing the costs of different programme alternatives against their benefits. In this sense, administrative costs related to the monitoring of compliance with conditionalities would have to be weighed against alternative uses such as increasing the transfer, covering a larger target population, investing in school infrastructure or in fact into

[22]Qualitiative interviews related to programme participation and effects have been conducted with beneficiary families, school directors and local Juntos administrators in 4 districts in 2 departments between December 2015 and January 2016.

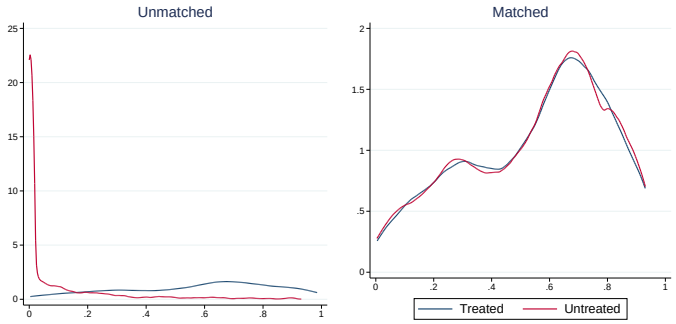
early childhood interventions as proposed by Cunha and Heckman (2007).

In summary, this paper has offered some support to earlier findings from different countries that attest CCTs a positive impact upon school participation of secondary school aged children that may be at risk of school dropout at or after the transition to secondary school. It has not found any evidence for improved learning outcomes that may result from higher school participation, but rather points at further analysis needed to investigate potential links between CCTs and skills formation.

Appendix

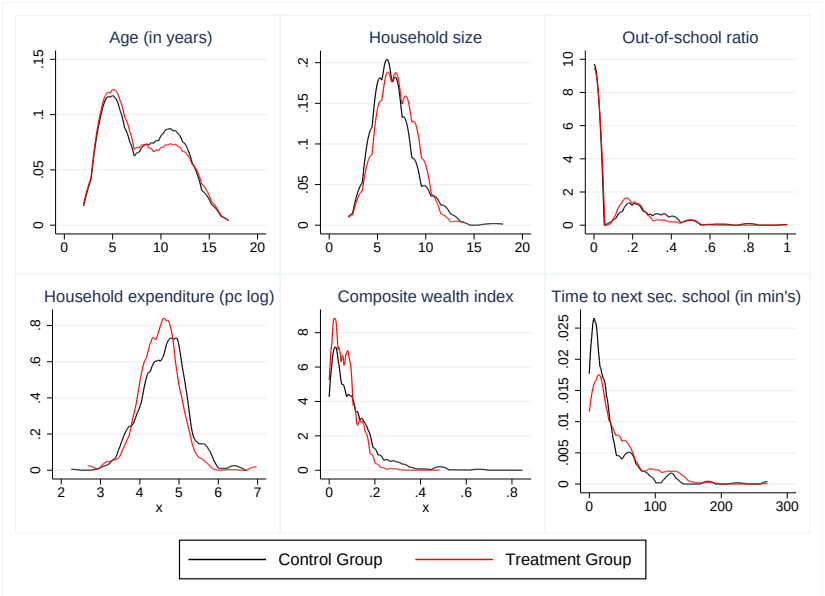
3.A Graphs

Figure A.3.1: Estimated Propensity Score (Kernel)



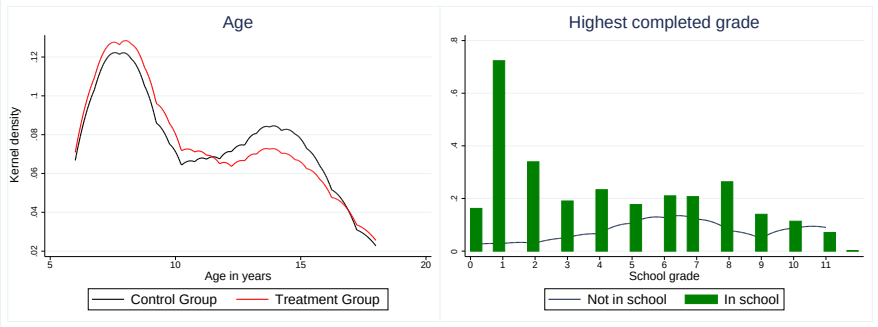
Source: Own estimates based on Young Lives Round 2-3

Figure A.3.2: Distribution of covariates in 2006 by treatment status (matched sample)



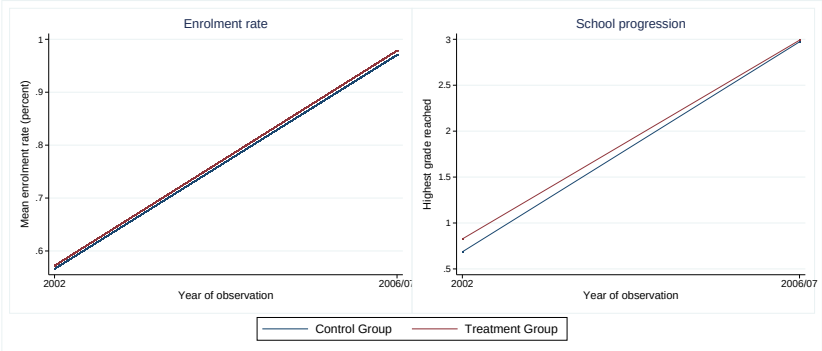
Source: Own estimates based on Young Lives Round 2

Figure A.3.3: Age and educational attainment in 2009 (matched sample)



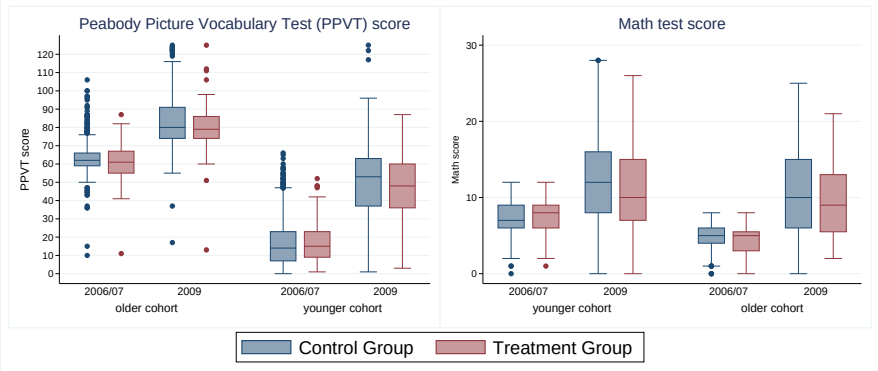
Source: Own estimates based on Young Lives Round 3

Figure A.3.4: Pre-treatment trends from 2002-2006/07 by treatment status



Source: Own estimates based on Young Lives Round 1-2

Figure A.3.5: Test score results by treatment status and cohort



Source: Own estimates based on Young Lives Round 2-3

3.B Tables

Table A.3.1: Definition of outcome variables

Outcome	Variable	Sample
Schooling outcomes		
Enrolled	Child currently attends school (yes/no)	Full sample (Young Lives cohort children and siblings)
Grade	Highest grade completed (in years)	
Age-for-grade	Age deviation from regular age for grade attended (benchmark: 6-7 years in first grade)	
Primary	Child has completed primary school (yes/no)	
In secondary	Child has entered secondary school (yes/no)	
Learning outcomes		
PPVT	Standardized z-score (age-stratified) of the PPVT raw test score	Young Lives cohort children
Math	Standardized quintile range (age-stratified) of the raw CDA (in case of younger cohort 2006/07 round) and math score	

Table A.3.2: Difference-in-difference estimation on pre-treatment trends

	Enrolled	Highest grade
R2*Treated	-0.000148	-0.136
	(0.0385)	(0.118)
Round 2	0.403***	2.152***
	(0.0309)	(0.0910)
Treated	0.00808	0.154
	(0.0368)	(0.0937)
Constant	0.567***	0.821***
	(0.0295)	(0.0702)
Observations	2,952	2,756
R-squared	0.233	0.247

Note: Robust standard errors in parentheses; clustered at the district level.*** p<0.01, ** p<0.05, * p<0.1
R2 equals 1 in Round 2 of the Young Lives survey (2006/07) and 0 in Round 1 (2002). Treated is a binary variable that equals 1 for all observations that received treatment in Round 3 (2009) and 0 otherwise.

Chapter 4

More educated, less mobile? Trends in income and educational mobility in Chile and Peru

4.1 Introduction

Intergenerational mobility measures the degree to which socio-economic outcomes of individuals can be explained by the status of their parents when these individuals were children. A more mobile society is one where an individual's outcomes are less dependent on the socioeconomic status of her parents. Low social mobility is a concern from an equity perspective because it may be indicative of unequal opportunities, as well as from an efficiency perspective if it hampers children from disadvantaged backgrounds in unfolding their full economic potentials in later life. There is, however, no consensus on what level of intergenerational persistence may be considered appropriate, as there will always be some transmission between parents and children due to heritable traits.

Education and income or earnings are the two indicators of welfare that economists and sociologists[1] use most to analyse intergenerational mobility, and in fact, they often use them interchangeably. In the USA, estimates of the intergenerational elasticity (IGE) of earnings have evolved from measures of around 0.2 (Behrman and Taubman, 1985) to 0.4 (Solon, 1992) and more recently 0.45 (Chetty et al., 2014). For Latin America, the few studies that investigate IGE in income or earnings suggest that it is much higher than in the USA. In Brazil, for example, Guimarães Ferreira and Veloso (2006) estimate that persistence in wages of male full-time workers may be as high as

[1]Sociologists additionally look at mobility between occupational groups and social class, which, however, goes beyond the discussion of our paper.

0.67, while Torche (2015b) finds a similar association for men in Mexico but a lower one for women. More evidence exists for educational mobility in Latin America and confirms that social mobility is lower in this region than elsewhere. In a comparison of 42 countries that include seven from the region, Hertz et al. (2007) find Latin America to display the highest intergenerational correlations in educational attainment over a time span of 50 years that lie around 0.6 and thus well above the global level of 0.4. Most studies assume a linear functional form to describe intergenerational mobility.

This paper investigates intergenerational mobility in Chile and Peru and thus compares the relative importance of parental background for own achievements in later life. Latin America is a region that displays very high levels of cross-sectional income inequality. According to Galor and Zeira (1993), high inequality lowers prospects for social mobility and thus inhibits growth because families at the low end of the distribution face constraints to invest in human capital. In a cross-country comparison, Corak (2013) provides descriptive evidence for a positive relationship between current levels of income inequality and the intergenerational elasticity in earnings, an association often described as the Great Gatsby Curve. Contrary to the trends observed in many Western economies, income inequality has fallen in both countries since the turn of the century – by almost 5 Gini points in Chile and 9 in Peru (see Table A.4.1 in Appendix 4.A). This trend was in large part driven by pro-poor growth and decreasing returns to skills (Torche, 2014). At the same time, the education sector has seen a structural expansion over the past decades that caused a rise in average education levels in Chile and Peru.

Although there are comparative cross-country studies on the intergenerational correlation in educational attainment that include Chile and Peru (Hertz et al., 2007; Gasparini et al., 2017), to our knowledge there are only two studies for Chile that analyse IGE of income (Celhay et al., 2010; Nunez and Miranda, 2007), and none for Peru. Celhay et al. (2010) observe individuals when they live with their parents in 1996 and again ten years later, when some of them have become household heads. Based on these pairs, they estimate income elasticities of 0.51 for sons and a lower one for daughters. Nunez and Miranda (2007) use a two-sample approach and estimate income elasticities of 0.57-0.73. The key problem that explains the relative scarcity of empirical studies of earnings or income mobility is the absence of longer-term panel data. To overcome this limitation, we impute parental earnings in a two-stage procedure that allows us to combine information from two different surveys. In the analysis of educational mobility, we go beyond the conventional analysis of linear estimators to look at the strength of persistence at different points of the distribution. As argued by Becker et al. (2015), there are good reasons to believe that the strength of persistence varies

along the income distribution. A less restrictive functional form is particularly acute in the analysis of educational mobility due to the categorical nature of the outcome variable. In other words, the advantage of an extra year of parental education might vary between parents that attained only incomplete primary as opposed to a parent that is otherwise one year short of finishing secondary schooling.

The structure of the paper is as follows. The next section gives a brief overview of socioeconomic developments in the two countries over recent decades that any reader who is familiar with or indifferent about the institutional context can skip. Section 4.2 outlines our research question and discusses the theoretical framework. Section 4.3 introduces the mobility measures that our analysis applies before section 4.4 describes the data and variables of interest. Section 4.5 provides estimates for intergenerational income mobility of the cohorts born between 1977-1990. Section 4.6 then turns to the analysis of educational mobility for the cohorts born between the early 1950s and 1990s, based on retrospective information of parental education from cross-sectional data. The final section discusses the results.

4.1.1 Trends in education and economic policy in Chile and Peru

Latin American countries provide an interesting setting for our study: the region has experienced decreasing returns to skills and educational attainment explains a smaller share of the variation in income than is typically the case in high-income countries. We provide a detailed analysis of mobility patterns in Chile and Peru, a comparison that is insightful because both countries have undertaken similar reforms in education and build on a similar economic growth model. Peru, which has seen a stronger decline in income inequality and higher growth than Chile over the past two decades but remains much poorer overall, has followed Chile's example of opening the education sector to private investment but at a later point in time than its neighbour.

Chile and Peru have followed a similar path of economic development in recent decades. They opened their economies to international trade during the 1980s and 1990s respectively, starting cycles of expansive growth. The 1980s were marked by the debt crisis that affected both countries strongly. Economic policy that followed was characterized by liberalisation and privatization. In Chile, despite recession and high unemployment in the early 1980s, the economy started to recover and saw continuous growth rates that stood in contrast to the rest of the region. Nonetheless, the social consequences of structural adjustment policies were severe: large cuts in public and

social services coincided with rising unemployment and falling wages during the 1980s, while the education sector became more stratified (Ffrench-Davis, 2002). Poverty rates of around 45% (SEDLAC, 2017) in the late 1980s stood in contrast to growth performance. The 1990s saw a slow rise again in social spending, domestic tax revenues and the legitimisation of labour unions (Escobar and LeBert, 2003). Representative household data are only available since the late 1980s but suggest that inequality as measured by the Gini index had remained rather stable at 0.55–0.57 from 1987 until the turn of the century (SEDLAC, 2017).

The education sector was strongly affected by privatisation efforts that began in 1973. By 1981, government support for public schools had been largely cut. School financing operated based on a voucher scheme whereby school fees differed between institutions. This sparked a massive increase of enrolment in private voucher schools and an increase in for-profit educational institutions (McEwan, 2001). The university reform of the 1960s that aimed at establishing autonomy and widening access was halted and higher education became increasingly expensive, which eventually led to a student debt crisis in the 1990s. Compulsory and free education up to secondary level was only established via a constitutional reform in 2003, and education reform remains one of the most fiercely debated issues in contemporary Chilean politics.

Developments in Peru up to the turn of the century were led by a similar spirit yet placed in a different context. Peru's high geographic and ethnic diversity also determines socioeconomic inequalities in many ways. Coastal regions are more densely populated, benefit from access to the sea and more developed infrastructure. The remote mountain and jungle regions have a much higher indigenous population, high levels of informality and subsistence agriculture. Peru was severely affected by the crisis of the early 1980s, which offset a prolonged recession that left the economy in a dismal state by the end of the decade. Despite large increases in foreign direct investment and the country's further integration into the global economy during the 1990s, poverty rates were high and severe malnourishment in rural regions was a consequence not only of terrorist fighting but also of the lacking social progress. Poverty stood at almost 50% (SEDLAC, 2017) in 2000.

Average years of schooling were below four years up to 1970 and characterised by large regional inequalities.[2] Although the 1973 Constitution provided for compulsory education of six years (elementary level) and expanded this to nine years in 1979, schooling rates fell below that in many regions. The 1993 constitutional reform included

[2]Table A.4.1 compares educational achievement between the two countries: mean years of schooling are higher in Chile (11.2 years versus 9.6) while the cleavages between the poorest and richest quintiles are much larger in Peru.

an increase in compulsory schooling up to secondary level (an additional 5 years) and introduced 3 years of pre-school education. The educational infrastructure for this gradually expanded during the 1990s albeit continuous criticism about declining quality in education grew (Balarin, 2008). In 1996, a new education law completely opened the sector to private investment at all levels, dismantled state regulation and granted preferential tax and tariff treatment to private education institutions. The following decade saw a rapid increase in private institutions at all levels from pre-school to university. Between 1998 and 2013, the share of students enrolled in private institutions from pre-school to secondary level more than doubled in urban areas but saw a much smaller increase and overall share in rural areas (Alarcón and Martínez, 2015).

Both economies strongly depend on natural resource exploitation and have seen high growth rates during the times of high commodity prices that coincided with a sharp increase in inequality at the end of the twentieth century (Williamson, 2010). Starting from the early 2000s, the growing public discontent with what was referred to as the *social debt* of the previous decades (Barrientos, 2014) led to a stronger focus on poverty reduction and expanding social protection in both countries. Particularly in Peru, the boom in the commodity sector facilitated pro-poor growth that was driven by an expanding services sector and high consumer spending starting in the early years of this century (World Bank, 2016). Since 2000, expansive cycles have been more stable in Chile, however Peru has shown on average higher growth rates (see Figure A.4.1). The decrease in inequality and poverty since the early 2000s was more pronounced in Peru than in Chile, although Peru remains much poorer overall (see Table A.4.3).

4.2 Mobility of what?

The classic model of intergenerational mobility (Becker and Tomes, 1979, 1986) explain persistence to result from investments that families make into the human capital of their children and from inherited traits. Further, the returns to skills in the labour market may differ between generations. Solon (2004) provides a theoretical framework where increasing labour market inequality has a negative effect on intergenerational elasticities because higher returns raise incentives to invest in human capital formation. Becker et al. (2015) expand this model to explain why societies with higher inequality may display lower mobility, and how changes in the returns to human capital over time affect mobility.

According to Becker et al. (2015), societies where human capital is more unequally distributed feature lower rates of intergenerational mobility. In this model, persistence

of economic status depends on the initial position in the income distribution. The root cause of low rates of social mobility lies in the differential productivity of parental investments. Returns to investment in children increase in parental human capital, since well-educated parents are more likely to raise their children in an environment that acts as complement to their investments. Such complementarities between parental human capital and their investments in children shape a convex human capital production function, which affects intergenerational mobility differently along the income distribution and leads to higher persistence among well-to-do families. At the other end, credit constraints reduce mobility in the lower part of the income distribution. In sum, their model predicts low mobility at both ends of the income distribution, alongside a more mobile middle class.

Studies investigating the nonlinearities in the transmission process described by Becker et al. (2015) are scarce even for countries with rich data availability. Jäntti et al. (2006) study non-linearities in a comparative analysis of 6 countries and find that mobility patterns in the middle of the earnings distribution are similar but mobility at the tails of the distribution is much lower in the USA compared to the UK and Scandinavian countries. Bratsberg et al. (2007) find that IGE in earnings is almost linear in the UK and the USA but has a convex shape in Denmark, Finland and Norway, which they attribute to a strong and equitable public education system in these countries. Correlation in log earnings in the Nordic countries is almost flat in the lower part of the parental earnings distribution and rises in the middle and upper part. For the USA, Chetty et al. (2014) find a linear relationship in percentile ranks with an elasticity parameter of 0.34. Corak and Heisz (1999) find earnings and income elasticities in Canada to be around 0.2 on average, but weaker at the lower end of the distribution than at the top. They describe the pattern of intergenerational mobility to be of an inverted V-shape.

4.2.1 Returns to skills and mobility

Such non-linear relationship between child and parental human capital help to explain why countries with higher inequality – and thus more mass in the tails of the distribution – display lower income mobility. This is not necessarily true for other dimensions of social mobility. According to Becker et al. (2015), changes in inequality that result from changes in returns to human capital across generations have different effects on earnings mobility than on human capital mobility. Increases in returns to skills should have no or relatively small effects on human capital persistence because they leave unaffected the extent to which children benefit from parental education. Persistence

in earnings in contrast depends on returns to skills because of a convex relationship: holding returns fixed in the parental generation while increasing them for the next generation implies an increase in the coefficient of parental earnings. This holds for the short-term (one generation) but looks different in the long-term precisely due to the convexity assumption.

Becker et al. (2015) illustrate their theory with reference to the recent increase in inequality and returns to skills in the USA. As described above, trends in Chile and Peru have been rather different. Both countries experienced a highly volatile economic development in the two decades up to the turn of the century that was accompanied by high levels of inequality, poverty and high returns to skills. The high returns to education that characterised Latin American countries during the 1990s were depleted in Chile and Peru mainly due to increased coverage in secondary and higher education (Torche, 2014) and a growth pattern that relied on commodity exports more than on innovation and productivity gains (which would increase the demand for skilled labour). Although this lowering of the skill premium contributed to declining inequality during the past two decades, the implications for social mobility are ambiguous. The rise in schooling levels should increase educational mobility when comparing how much better or worse educated children are than their parents (in years of schooling). It should not necessarily influence relative mobility that compares how good a predictor parental education is for the child's position in the education distribution of her generation. Declining returns to skills since the early 2000s should leave unaffected the persistence in educational mobility (because returns to parental education stay fixed) but would according to Becker et al. (2015) lead to an increase in income mobility in the short-term that we observe. In both countries, the role of private education has increased and may affect mobility in a way that is partly masked when looking at educational persistence in terms of years of schooling as a rather noisy measure of skills.

In sum and for the sake of simplification, economic theory suggests three dynamics that we aim to test in the following sections:

1. The welfare of current generations is positively associated with the welfare of their parents. This holds for income and education as distinct measures of welfare.

2. The correlation in socioeconomic status declines for younger cohorts due to decreasing income inequality that benefitted particularly the lower deciles where poverty declined significantly.

3. Patterns of persistence are not linear across the distribution but rather more pronounced at the ends.

4.3 Measuring mobility

In a broad sense, mobility refers to changes in status over time. When changes are compared between consecutive dynasties (parents and their children) we refer to intergenerational mobility. These changes can be measured in terms of levels or ranks: Jäntti and Jenkins (2013) distinguish between income changes that alter an individuals' position relative to others in society as opposed to "equiproportionate income growth or equal absolute additions to income for everyone [which] raise incomes but there is immobility in the positional sense."

In this sense, absolute mobility compares levels of earnings or status across generations over time and is informative as people often compare their own living standards with that of their parents (Chetty et al., 2017). Transition matrices for instance show the share of individuals that remain in the same income bracket as their parents compared to those who move upwards or downwards. It thereby captures both structural changes that affect average levels such as economic growth, demographic changes, or immigration, and changes in the individual's relative position in society. Relative mobility shows the level of *social fluidity* or *social openness* as stated by Torche (2015a).[3] It is often measured by odds ratios that compare the odds of two individuals with different origins to reach the same social class or level of outcome. For instance, we can compare the chances that someone from a highly educated family reaches the top of the distribution relative to the chances of someone from a low educated family.

4.3.1 Summary measures of mobility

Conceptual issues aside, a further basic question that economists discuss surprisingly little is the underlying functional form assumption. Sociologists commonly use transition matrices, which compare the odds of mobility across different starting positions. While transition matrices give a comprehensive (descriptive) overview of mobility patterns at different points of the distribution, most economic studies compare more parsimonious measures. The two most common summary measures of intergenerational persistence are the regression and the correlation coefficient (Blanden and Machin, 2013). These are based on a linear regression of the child's outcomes in adulthood on parental outcomes:

$$w_{c,i} = \alpha_1 + \beta_1 w_{p,i} + \beta_2 X_{c,i} + \varepsilon_{1i} \tag{4.1}$$

[3] Jäntti and Jenkins (2013) use the terms exchange mobility for relative mobility and refer to absolute mobility as the cumulative changes arising from structural and relative mobility. For the sake of simplicity, we use only the concepts absolute and relative mobility for the remainder of the section.

Where w represents a socio-economic indicator of welfare, the subscripts c and p indicate the child's and parents' generation respectively, β_1 is the intergenerational regression coefficient and X is a vector of control variables including age and gender. When welfare is measured by income or earnings, these are generally log-transformed due to their right-skewed distributions: here, the intergenerational elasticity β_1 may be interpreted as the percentage change in children's income that is associated with a percentage change in parental income (log-log estimation). Measuring this association as a percentage change captures absolute mobility: A coefficient of 0.5 would tell us that the incomes of children would on average differ by 50% if their parents' incomes differed by 100%. A linear specification of the same formula is often applied in the analysis of educational mobility, although – as we will discuss below – this has drawbacks and alternative specifications may be more suitable for outcomes that are measured as discrete or categorical variables.

While straightforward in its interpretation, the explanatory power of β_1 can be weaker when marginal distributions change between generations. In other words, it needs a relatively stronger coefficient to predict income differences when the spread of the income distribution widens. To net out any differences in the variance of outcomes between periods that may be caused for example by changes in inequality, the correlation coefficient adjusts by the ratio of standard deviations after partialling out the effect of X_{ci} on w_{pi}:[4]

$$\varphi = Corr_{w_{c,i}w_{p,i}} = \hat{\beta}_1 \frac{SD_{w_p}}{SD_{w_c}} \tag{4.2}$$

Where φ can be thought of as a positional persistence measure between generations, and $1 - \varphi$ as a measure of changes in standard deviations of the child's status that are associated with marginal changes in the standard deviation of parental status (Björklund and Jäntti, 2011). We hence interpret φ as a relative measure of mobility.

4.3.2 Measuring education as an ordered response

These summary measures have been criticized on various accounts precisely for their linearity assumption (Torche, 2015a; Durlauf et al., 2017; Bratsberg et al., 2007). To allow for a more flexible functional form in the estimation of educational persistence, we apply an ordered probit model. An ordered probit can be applied when the response variable has a natural ordering but the values are not an accurate measure of spacing

[4] Given that we are only interested to estimate β_1 but assume that $X_{c,i}$ is correlated with $w_{p,i}$ and $w_{c,i}$, we want to clear β_1 from any variation that may arise from not holding $X_{c,i}$ constant. We hence partial out the effects of $X_{c,i}$ by first estimating the residuals from regressing $w_{p,i}$ respectively $w_{c,i}$ on $X_{c,i}$ (and a constant). We then regress the residual of $w_{c,i}$ on the residual of $w_{p,i}$ to estimate $\hat{\beta}_1$.

between them. This model can be derived from a latent variable specification, where we treat skills as a latent variable s^* that is determined by $s^* = \beta x + \varepsilon$ and where we assume the error ε (conditional on x) to be i.i.d. with a standard normal distribution (Wooldridge, 2002). We only observe s_i, which takes on the value k {0, 1, 2, 3} of one of four ordered completed schooling levels (none, primary, secondary, and higher). We model three unknown cut-offs C that are defined as: $C_1 < C_2 < C_3$ and determine $s_i = k$ such that:

$$\begin{aligned} s_i &= 0 \quad \text{if} \quad s_i^* \leq C_1 \\ s_i &= 1 \quad \text{if} \quad C_1 < s_i^* \leq C_2 \\ s_i &= 2 \quad \text{if} \quad C_2 < s_i^* \leq C_3 \\ s_i &= 3 \quad \text{if} \quad s_i^* > C_3 \end{aligned} \tag{4.3}$$

In our case, we want to measure the probability of child c reaching any of the four schooling levels s conditional on parental schooling s_p, age and gender:

$$s_{c,i}^* = \delta s_{p,i} + \vartheta X_{c,i}' + \varepsilon_{c,i} \tag{4.4}$$

We specify parental education as binary variables for three completed education levels (primary, secondary, higher) and treat these as exogenous. We leave out the binary indicator for no formal schooling as a baseline category. This allows us to estimate the conditional probability of educational achievement along different levels of parental education.

4.4 Data

The study will draw upon the household surveys CASEN (*Caracterización Socioeconómica Nacional*) from Chile and ENAHO (*Encuesta Nacional de Hogares*) from Peru. We use the waves of 2015 and 1997 from ENAHO and 2013 and 1996 from CASEN)[5]. Both are cross-sectional household surveys that contain longitudinal subsamples only in the form of semi-rotating three to five-year panels. It is hence not possible to link parents and children over a longer time period. Both use a multistage stratified sampling design, whereby ENAHO is representative at the province level and CASEN at the municipal *comuna level*. The surveys hold a rich set of information

[5]2013 is the latest wave of CASEN where income can be compared with previous years. In earlier waves incomes were corrected to match the national accounts. The latest wave from 2015 has departed from this practice.

on demographics, income sources of all household members aged 14 and above, consumption and expenditure as well as receipt of government transfers. They also collect retrospective information on the highest level and years of education reached by both parents of the household head (CASEN since 2006 and ENAHO since 2001), as well as the region of birth. CASEN additionally holds information on whether the child lived with both parents up to age 15, while both surveys lack information about parental occupation or income. CASEN has been conducted every three years since 1985, and every two years since 2009. ENAHO has been surveyed yearly since 1996.

While the analysis of educational mobility looks at household heads in the age range of 25 to 60 years, for the analysis of income persistence we restrict our sample of adult children observed in 2013 and 2015 to household heads aged 25 to 36 years for two reasons. First, at this age individuals should have completed education and entered the labour market.[6] Second, we want to observe their parental generation at a time when these children were of schooling age (defined here as the regular schooling age of 6-18 years) and have to rely on survey waves of 1996 and 1997. While there is a large literature that examines at what age investment into children reaps the largest returns (Cunha and Heckman, 2007), we choose this age range since parental income is one of the main determining factors for school enrolment in the presence of credit constraints. The restriction to household heads is mandated by data constraints: retrospective parental information is only recorded for heads of the household in Peru.

We measure two types of income concepts: individual net market income and adult equivalent disposable household income. Our definition of net market income includes labour income from dependent and independent work (cash and in-kind) net of direct taxes and social security contributions, income from self-production, private pensions, and capital income (land or property rent, interest, dividends). Disposable income additionally includes public and private cash transfers, and imputed rents of owner-occupied housing. Income is adjusted to real prices of 2013 and expressed in terms of purchasing power parity to allow cross-country comparison. We use the equivalence scale applied by the National Statistics Office Chile.[7]

We measure education in years as deviation from the mean by cohort and gender[8], and in four levels (no formal education, completed primary, completed secondary,

[6]Secondary school ends after 11 years of total schooling in Peru and 12 years in Chile, while a typical post-graduate degree takes 4-6 years depending on the career chosen. There is no mandatory military service in either country.

[7]The equivalence scale used by the National Statistics Office Chile is $N^{0.7}$, with N referring to the number of household members.

[8]Parental education is measured in years as deviation of the mean by cohort of the child, since age of the parents is not available in the child survey.

completed tertiary). Tertiary education includes university education and technical or vocational training. We truncate years of education at 18 years for those with completed university. Parents' educational achievement comes from retrospective information provided by household heads. Since the Peruvian survey only reports 9 levels of education, we need to transform these into years. We do so by assigning regular years of schooling to completed levels and testing two different approaches for incomplete levels: (i) assigning the median value between the reported levels, and (ii) assigning random values. Results are not sensitive to the specification used. We count the parent with the highest education among the two. Approximately 23% of the sample in Chile and 12% in Peru miss information on parental education. To test whether dropping these observations introduces a selection bias, we compare the restricted sample that has information on parental education against the missing sample. In a regression of education on a dummy that indicates whether an observation has information on parental education or not, age, gender and birth region, the dummy is not significant at conventional levels in Peru although there is a slight downward bias in Chile. Regressing income on the same variables shows that the dummy is not significant at the 95% level in both countries (see Table A.4.2 in Appendix 4.B).

4.5 Mobility in income

Recalling equation 4.1, we now want to measure economic advantage in terms of income:

$$y_{c,i} = \alpha_2 + \gamma y_{p,i} + \theta X'_{c,i} + \varepsilon_{2i} \tag{4.5}$$

Where y is log income of the adult child and parent respectively, X is a vector of controls including age and gender, α_2 is a constant that captures average income in the children's generation, and ε_2 is a i.i.d error. We interpret the parameter γ as the elasticity of child's income with respect to parental income: a coefficient of 0 would indicate that parental income does not constitute an unequal starting position, while $\gamma = 1$ would represent a completely immobile society where relative income shares of parents are reproduced in their offspring's generation.

We can measure γ consistently if we observe y_p and y_c without error in a random sample of parent-child pairs, where $E(\varepsilon_2|y_p, X'_c) = 0$. Even in a setting with rich panel data where parents and their adult children are observed jointly, this bears challenges. The two most obvious ones are measurement error and omitted variable bias. Measurement error arises when we observe current income rather than permanent

or long-term income (Blanden and Machin, 2013). In the presence of life-cycle bias in income, this measurement error varies along the distribution. The resulting bias will depend upon the age at which both parents and adult children are observed: if we observe young children and old parents, the downward bias will likely be stronger[9]. Haider and Solon (2006) show for the USA that income should be observed between the ages of approximately the early 30s to mid-40s to obtain measures that are relatively closer to permanent incomes. Jäntti and Jenkins (2013) propose the age range of 30-40 years. Omitted variable bias is an obvious concern if we believe that the child's income in adult life is determined by other factors that are correlated with parental income – such as parental education or networks – that are not controlled for in equation 4.5.

Previous studies have addressed these sources of endogeneity and the lack of panel data through the two-sample instrumental variable (TSIV) estimator. This estimator uses an instrument for parental earnings and combines information from two surveys – the main one containing information on the child's income and a supplemental one that holds data on the parental generation. It was formally developed by Angrist and Krueger (1992) and more recently extended by Inoue and Solon (2010) and Pacini and Windmeijer (2016) to account for differences in the distributions of the instruments that may arise from heterogeneous samples, referred to as Two-Samples-Two-Stages Least Squares (TS2SLS). Only few studies applying this methodology can identify actual parents in the supplemental dataset[10], while the majority predicts some average value of 'synthetic fathers' in an older survey of working men of the parental generation. The approach has been used to estimate earnings elasticities between fathers and sons *inter alia* by Björklund and Jäntti (1997) for Sweden and the USA, Nicoletti and Ermisch (2008) for the UK, and Dunn (2007) for Brazil. These studies adopt a similar strategy in their choice of instruments: they predict father's earnings from father's education (Dunn, 2007) in combination with information on father's occupation (Björklund and Jäntti, 1997) and age (Nicoletti and Ermisch, 2008). Since there are compelling reasons to question the exogeneity of father's education in the structural equation, such estimator is biased and inconsistent. Nicoletti and Ermisch (2008) show that under the plausible assumption of a positive correlation between parental education and the error term, the estimator will be biased upwards to the degree that parental education influences children's earnings independently.

Given that retrospective data on parental characteristics is even sparser in our

[9]This holds if we assume that individuals with high permanent incomes start with a low income that rises steeply in comparison to individuals with low permanent incomes. In this case, we would underestimate income elasticities among higher earning individuals.

[10]To our knowledge, Björklund and Jäntti (1997) is the only study that estimates IGE in income using a TSIV method based on actual father-son pairs.

surveys, TS2SLS is not a valid approach in our setting[11]. Instead, our strategy is to impute unobserved parental income as a function of educational attainment and regional characteristics. We draw upon previous survey waves of CASEN and ENAHO to observe earnings in the parental generation, an approach also known as cold-deck imputation. We thus provide estimates of the strength of intergenerational correlation in income between successive generations of children born between 1977-1990 and parents. Even though we cannot claim causal inference, comparing the strength of correlation in education and income across two countries will give insights as to where barriers to mobility are higher, or if the two dimensions are indeed close substitutes. If for example the correlation across generations is significantly stronger in income than in educational attainment, this may point towards labour markets where returns to factors associated with parental income[12] are relatively stronger than returns to years of education. Conversely, if there is a strong association in educational attainment but higher mobility in income, a more rigorous analysis of growth patterns and structural economic changes may provide explanations. Comparing these dynamics across two neighbouring countries can shed additional light on mobility dynamics.

4.5.1 Predicting parental income

As proposed by Haider and Solon (2006), we limit the age range within the sample of adult children. We choose a minimum age of 25 because by this age, individuals should have completed education and entered the labour market. The maximum age of 36 years is due to the availability of parental cross-sections. Although this age range is younger than proposed by Haider and Solon (2006), it is in line with the range chosen in other studies[13]. Our offspring sample thus contains household heads of the birth cohorts 1977-1990 observed in 2013 (CASEN) respectively 2015 (ENAHO). At the time we observe the parental generation in 1996 (CASEN) and 1997 (ENAHO), these individuals were aged between 7 and 18 years. We restrict our sample of the parental generation to household heads aged 25-45 years that report having children born between 1977 and 1990. Unfortunately, CASEN and ENAHO do not report retrospective information on parental age or occupation. Confining the parental sample

[11]The choice of potential instruments is limited to parental education and regional characteristics. Place of residence during childhood fails the exclusion restriction since there is large heterogeneity in both countries in regional educational infrastructure, which would in turn affect the dependent variable independently through its effect on child's educational attainment.

[12]Such factors may be manifold and include parental networks, segregated educational systems where costly private education reaps higher returns than public education, or even nepotism.

[13]Compare in particular 3 studies for the USA: Solon (1992), Zimmerman (1992), Mazumder (2005), Corak and Heisz (1999); and Dunn (2007) for Brazil.

to this age group allows us, however, to minimize life-cycle bias as described above[14].

We predict parental income by an OLS log earnings equation in the first step:

$$y_p = \alpha_3 + \sum_{i=1}^{k} p_j \beta_j + \varepsilon_3 \tag{4.6}$$

where y_p is log income observed in the supplementary dataset, the constant α_3 represents average income in the parental generation, p stands for the group of predictors that are specified as binary variables for each of the four completed education levels and the 15 respectively 8 regions in Chile and Peru, and β_j is the slope coefficient for each of the k predictors. We define as base categories no formal education ($p_{none}^{educ} = 1$ if an individual has not completed any formal level of education and 0 otherwise) and the capital regions ($p_{capital}^{region} = 1$ if an individual comes from Santiago de Chile respectively Lima and 0 otherwise). Thus, we obtain expected income $\hat{y}_p = p\hat{\beta}_x$, where $\hat{\beta}_x$ is the estimated coefficient vector. Our measure of parental income is hence an average of current income over cells defined by education and region. This is analogue to the use of cohort values described by Deaton (1985) to avoid errors-in-variables bias in repeated cross-sections and thus helps us to address measurement error in the explanatory variable. It relies on the assumption that transitory fluctuations are random.

In the next step, we carry these predictions over to our main equation and regress the log of child income on $\hat{y}_p$ and a vector X of observable characteristics that include age and gender:

$$y_{c,i} = \alpha + \gamma \hat{y}_{p,i} + \theta_2 X'_{c,i} + \varepsilon_{2i} \tag{4.7}$$

To account for the uncertainty that arises from generating the regressor $\hat{y}_p$, we derive robust standard errors as a function of the variances and covariances of the estimators in equation 4.6 and their linear projection in our main dataset (Pacini and Windmeijer, 2016).

4.5.2 Intergenerational income mobility

As described above, we analyse income as our variable of interest contrary to many other studies that look at earnings. In the two countries of analysis, a considerable share of the population makes a living from self-employment, in the informal sector

[14]The parental age range 25-45 years in 1996 (Chile) and 1997 (Peru) is based on a plausible reproductive age. While we thus exclude very young and very old parents, which may cause a bias if parental age is correlated with children's circumstances, we argue that this age range allows us to better control for lifecycle effects on earnings, which are plausibly larger.

or through subsistence activities, which we include in our income concept, but which would not be fully reflected in an earnings concept. Our analysis compares net market income of the parent and child with an alternative specification using adult equivalent disposable income. Persistence in disposable income is naturally subject to different dynamics: it includes redistribution through the tax and transfer system and a needs-based adjustment for household composition. Elasticities of disposable income hence are not indicative of opportunities, but they can give an indication of the correlation in living standards across generations.[15]

The results from the first stage prediction of parental income are reported in Table A.4.6. Table 4.1 presents the results from the estimation of intergenerational elasticities that we obtain from regressing the child's observed income on imputed parental income. In both countries, the correlation coefficient γ is higher for disposable than for market income, but only in Chile is the difference between the two statistically significant. Simple statistical tests suggest that this is due to family size and patterns of assortative mating[16]. In Chile, we estimate a γ coefficient for market income of 0.66 and of 0.76 for disposable income. Confidence intervals range from 0.61 to 0.70 for persistence in market income and 0.72 to 0.81 in disposable income. These figures are in line with previous estimates for Chile of between 0.57 and 0.73 derived from TSIV estimation (Nunez and Miranda, 2007)[17]. Female-headed households have significantly lower incomes in both countries but controlling for the sex of the household head does not affect the elasticity parameter. In Peru, we estimate an elasticity of 0.63 for market income that is slightly higher at 0.67 for disposable income (confidence intervals range from 0.56 to 0.71 for the former and 0.61 to 0.73 for the latter estimate). The difference is statistically not significant, the same applies to the change associated with controlling for the gender of the household head. In quantitative terms, this would mean that same-aged children of parents whose income differed by 10% earn incomes in adult life that differ by 6.6% on average in Chile and 6.3% in Peru. These measures are by themselves not indicative of unequal opportunities since persistence may be driven by differential efforts or preferences that persist over generations.

Persistence is slightly lower in Peru where inequality declined more, and recent growth patterns increased demand for low-skilled workers. Since the earliest household data on income for the parental generation are of the 1990s, we cannot test whether

[15] In this sense, such a measure may for example show weaker persistence if there has been an expansion of the welfare state that redistributes towards the lower end of the distribution.

[16] The analysis is based on adult equivalent disposable income. Family size decreases with income, and educational attainment among spouses is highly correlated.

[17] Nunez and Miranda (2007) use TSIV estimation in a descriptive analysis of income elasticities, where they predict father's earnings using years of schooling and potential experience (defined as the difference between age and years of schooling minus 6) in an older survey of the parental generation.

Table 4.1: Two-stage estimates of Intergenerational Income Elasticities for cohorts born between 1977-1990

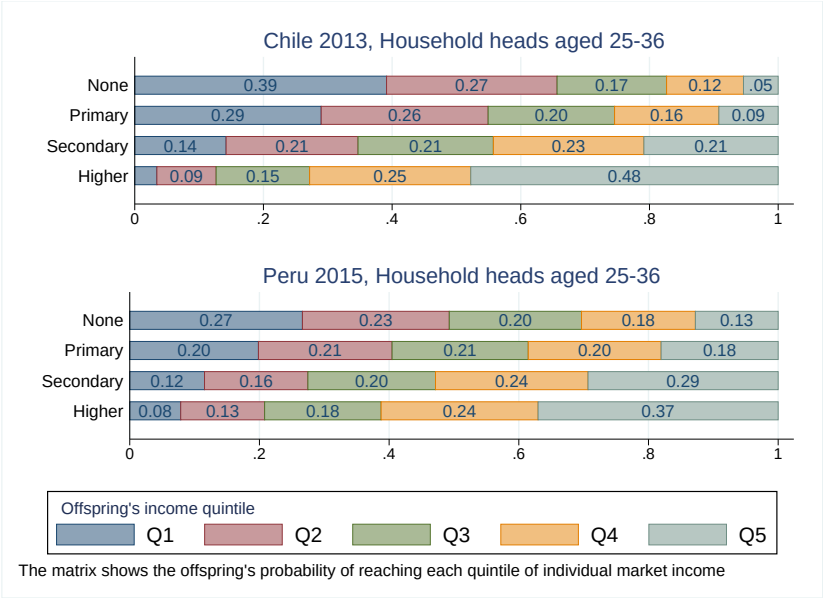
	CHILE				**PERU**			
	γ *(log mkt inc)*		γ *(log disp. inc)*		γ *(log mkt inc)*		γ *(log disp.inc)*	
Log Y_p	0.656***	0.656***	0.761***	0.761***	0.630***	0.668***	0.671***	0.660***
	(0.0246)	(0.0238)	(0.0231)	(0.0232)	(0.0384)	(0.0392)	(0.0298)	(0.0298)
Female		-0.232***		-0.230***		-0.266***		-0.0858***
		(0.0226)		(0.0211)		(0.0342)		(0.0312)
Const.	2.769***	2.926***	2.238***	2.336***	2.917***	2.717***	2.685***	2.767***
	(0.137)	(0.132)	(0.117)	(0.116)	(0.185)	(0.188)	(0.127)	(0.125)
N	6,691	6,691	6,905	6,905	4,369	4,369	4,623	4,623
R-squ	0.131	0.203	0.178	0.200	0.106	0.136	0.174	0.174

Robust standard errors in parentheses; the robust variance estimator for β_{ts} is obtained by incorporating robust variance estimators for estimated βyp from the first stage and for the vector of its linear projections in our main dataset.
*** p<0.01, ** p<0.05, * p<0.1.

income mobility has changed over time and whether Peru started off at a similar level of mobility as Chile in previous generations. Testing for differential coefficients along the distribution of offspring income is also complicated by our reliance on imputed average income values for parents. We hence resort to comparing offspring's relative income position across parental education levels.

Figure 4.1 plots the probability of being in one of five income quintiles conditional on parental education. For Chile, being born to parents without any formal education raises the probability of belonging to the bottom quintile to almost twice the average, while the probability of being in the top quintile is only a quarter the average. Persistence at the top is even stronger: having highly educated parents raises the chances of being in the top to 2.4 times the average but lowers chances of landing in the lowest quintile to around 15% the average. The association is weakest for children of parents with secondary education. In Peru, the association between income and parental education is lower than in Chile. At the bottom, the probability of being in the lowest quintile is about 35% higher than the average for children of parents without formal education while their probability of being in the top is still 65% the average. For those with highly educated parents, the chances of being in the bottom quintile are 40% the average and of being in the top quintile almost twice the average. In both countries, there is hardly any association with income at the median parental education level, which is primary in Peru and secondary in Chile. The association between parental education and adult equivalent disposable income (see Figure A.4.2) is more pronounced than with individual market income.

Figure 4.1: Offspring's income quintile conditional on parental education



Source: Own estimates based on CASEN 2013 and ENAHO 2015

Overall, we find evidence for a stronger association between parental education and adult child income for children of parents with very high or very low education. Nonetheless, this correlation appears less strong than we might have expected from our analysis of income persistence. This is not surprising since we assume that parental education primarily impacts upon offspring's educational attainment. Further, we ignore income variation within education levels, which may also be correlated across generations. To analyse non-linear patterns in more detail, the next section will examine patterns of mobility and persistence in educational achievement across generations.

4.6 Mobility in education

Although we assume that a linear specification is biased due to functional form misspecification, we report results for the two summary measures introduced above in order to compare our estimates with those of previous studies. In this sense, the summary measures serve to illustrate trends in mobility over time and across countries rather than as an interpretation of the strength of the coefficient itself. We estimate measures of β_1 in a linear OLS regression as specified in equation 4.1 and scale for changes in the marginal distributions over time to estimate φ from equation 4.2. Both are measures of persistence: a higher measure implies a stronger association between the outcomes of successive generations.

Table 4.1: Summary measures of intergenerational persistence in years of education

	Chile			**Peru**		
	β_1	β_1	φ	β_1	β_1	φ
Parental education	0.454***	0.431***	0.542***	0.516***	0.492***	0.459***
	(0.00674)	(0.00696)	(0.00696)	(0.00858)	(0.00876)	(0.00876)
Controls: age, gender	No	Yes	Yes	No	Yes	Yes
Constant	8.023***	-0.000849		6.645***	0.456***	
	(0.0686)	(0.0308)		(0.0642)	(0.0408)	
Observations	29,618	29,618	29,618	19,022	19,022	19,022
R-squared	0.325	0.293		0.228	0.210	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4.1 reports the estimates of educational mobility for household heads of the birth cohorts 1953-1990 in both countries, where attainment is measured in years of education. We estimate a β_1 of 0.43 in Chile and 0.49 in Peru, and a φ of 0.54 in Chile and 0.45 in Peru. On average, absolute mobility as measured by β_1 is hence higher in Chile, while relative mobility appears higher in Peru. Marginal changes in the distribution play a role in both countries but affect our measures differently. In Peru, the fact that φ is lower than β_1 indicates that the dispersion in education has increased in the children's generation relative to that of their parents. It thus needs a larger β_1 – larger absolute differences – to explain the same level of correlation. In Chile on the other hand, β_1 is smaller than φ and indicates the opposite: the dispersion of educational attainment has decreased in the children's generation compared to that of their parents. Levels centre closer around the mean. A marginal change in parental education may hence explain less variation in children's education when measured in levels as compared to standard deviations. Adjusting for marginal changes in the distribution hence leads to higher measures of persistence in Chile and lower ones in Peru.

Compared to Hertz et al. (2007), our measures of persistence are lower than those found for Peru and Chile, but still much higher than the levels in other regions. The authors estimate a regression coefficient of 0.64 for Chile and 0.88 for Peru, and a correlation coefficient of 0.60 for Chile and 0.66 for Peru. Their estimates for other world regions are significantly smaller (correlation coefficients of around 0.4). We explain this difference by the fact that their study is based on older cohorts and smaller sample sizes.[18] As we will see below, our estimates suggest trends of increasing mobility

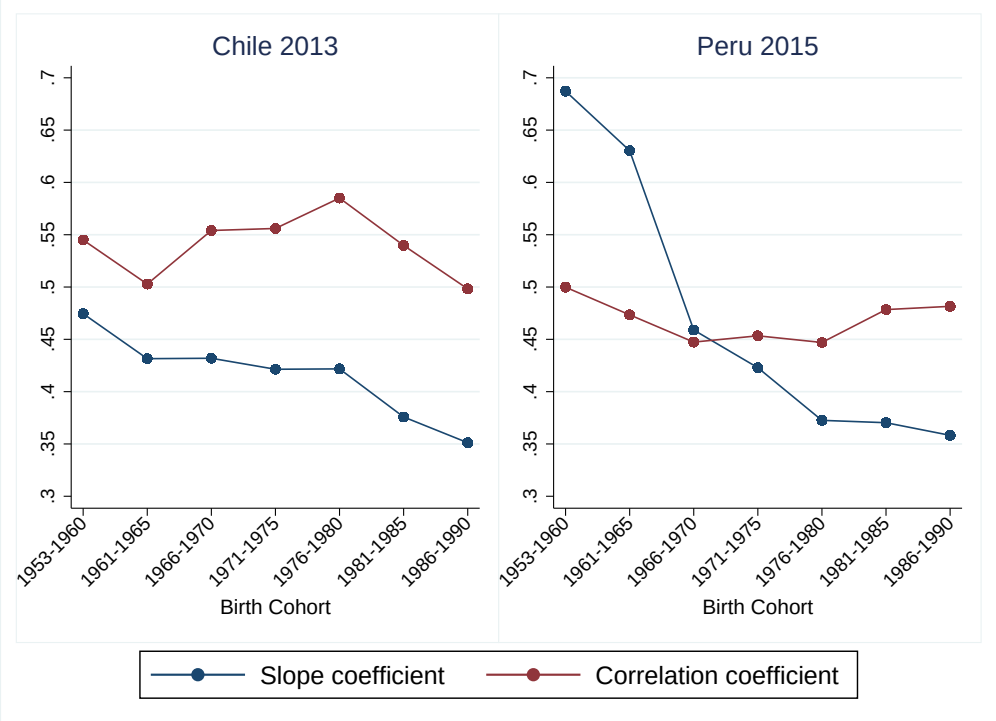
[18]Hertz et al. (2007) base their analysis for Chile on individuals born between 1930-1979 and observed in 1998-99, respectively for Peru on individuals born between 1916-65 and observed in 1985.

that would explain why our younger sample experiences higher mobility.

Figure 4.1 disaggregates these summary measures by birth cohorts in order to examine the trend over time. The first thing that becomes apparent is that trends over time differ between the two countries. In Chile, the regression coefficient suggests higher mobility than the correlation coefficient and a continuous decrease in persistence across cohorts. The correlation coefficient is larger throughout and shows a decrease in mobility for the cohorts born between 1966 until 1980, after which it starts increasing again. The distance between the two widens due to this increase. Given that the correlation coefficient adjusts for changes in the margins of the distribution, such pattern shows that the variability of years of education is smaller for children relative to that of their parents. This can be explained by the rise in years of education over time that had a large effect at the bottom of the distribution: the share of people with no formal education has decreased considerably over time, reducing mass in the bottom tail of the distribution. Nonetheless, these absolute changes do not translate into positional changes. There is a diverging trend for the birth cohorts 1961-1980 that were of schooling age between the early 1970s and early 1990s: the regression coefficient moves very little while the correlation coefficient increases. This suggests that the spread in the distribution of these cohorts' years of schooling decreased relative to that of their parents, while the average association between their years remained rather constant. This may be related to trends in the early 1960s and until the military coup of 1973, when wider access to higher education was promoted in Chile and led to a spread in parental years of education. Albeit the children of these parents benefitted from increased schooling infrastructure, the privatization of education starting in the mid-1970s meant that higher levels became more difficult to reach for successive generations of students. Positional mobility increases again for the birth cohorts 1981 onwards, which were in secondary school from the mid-1990s onwards. In this period, public education expenditure slowly started to rise again and may have had some positive effects on access to schooling for households in lower deciles. We will investigate mobility patterns at the tails of the distribution further below to see whether the structural education expansion has altered children's chances of upward mobility conditional on parental education.

Peru in turn has seen a large increase in absolute mobility over time that is not reflected in relative mobility. The regression coefficient stands at almost 0.7 for the older cohorts and falls to 0.36 for the youngest cohorts in our sample. It thus reaches the same average mobility levels as Chile in absolute terms. Peru had very low schooling levels until the 1970s so that the expansion of educational infrastructure even at the primary level had a strong impact upon rising absolute mobility: whereas low average

Figure 4.1: Educational persistence by birth cohorts



Source: Own estimates based on CASEN 2013 and ENAHO 2015

education allowed for little absolute mobility in older cohorts, the expansion of schooling infrastructure beyond urbanized regions in the 1970s soon induced high increases in mobility. As Table A.4.4 shows, more than 55% of parents[19] in our sample had no formal schooling, this share decreased to less than 13% in the offspring generation. Scaling for these large changes in the marginal distribution suggests a far less dynamic scenario. The correlation coefficient decreases by around 5 percentage points from an initial 0.5 for the first cohorts in our sample, but then stays flat and sees a moderate increase again for the youngest cohorts, which were of schooling age during the 1980s. This time in Peru was marked by political terrorism that affected the poorest regions in the highlands the strongest. At the same time, the economy declined and public services were virtually non-existent in remote rural regions. The regression coefficient is higher than the correlation coefficient up until the cohorts of 1966-1970 and then falls below it. Hence, at this point the spread in the marginal education distribution of children starts to surpass that of parents. This is likely a result of the initial increase in education from very low average levels among the oldest cohorts. The next generations then see a decreasing dispersion around a higher mean than that of their parents. There is still room for absolute mobility since even the cohorts of the 1970s and 1980s

[19]This coarseness of the education variable is in fact another reason why we introduce non-linear estimation below.

only saw a gradual enforcement of compliance with compulsory primary education.

In summary, we can conclude from Figure 4.1 that relative and absolute measures can paint quite a different picture, a distinction that merits particular attention in countries that have seen significant changes in mean education levels. There has been a large increase in absolute mobility that was particularly strong in Peru. This is consistent with the average rise in years of education in both countries that resulted from a structural expansion that created much room at the top. The changes over age cohorts in relative persistence are more modest, indicating that distributional patterns have shown a considerable degree of stability. The educational achievement of parents thus continues to be a fairly strong predictor of the child's position in the education distribution of their generation. Relative mobility has seen an increase in Chile for younger cohorts that goes parallel to increasing absolute mobility, which may be indicative of education levels rising equitably across the distribution. We do not see this trend in Peru. We know that Peru has implemented similar reforms as Chile in the past decades but with a time lag. From these average measures it is, however, difficult to speculate whether we see different windows of the same larger trend in both countries or whether the two countries follow different trends altogether.

4.6.1 Non-linearities in the mobility process

Summary measures can give a description of average degrees of correlation across the whole population but it seems implausible that the strength of such correlation would be the same for all educational backgrounds. To give a more detailed picture of mobility processes across different levels of parental education, we report the results from an ordered probit estimation. This answers the question of how likely it is for children to move across the education distribution holding parental education fixed. It is thus not affected by the large changes in the margins that occurred between the two generations. We specify education as a categorical variable with four possible outcomes and regress these on binary variables for the same educational outcomes in the parental generation, controlling for age and gender.

Table A.4.5 (Appendix 4.B) reports the estimation results of the ordered probit model: as expected the coefficients are significant and the threshold estimators statistically differ from each other. Table 4.2 reports the marginal effects of parental education on the child's educational attainment. In both countries, the probability of reaching primary or less decreases steadily at all levels of parental education compared to the baseline of no formal education. The effect is stronger in Chile, where the con-

Table 4.2: Marginal effects of parental education on child's educational attainment (Results from an ordered probit estimation, evaluated at sample means)

	Chile				**Peru**			
	None	Primary	Sec'dary	Higher	None	Primary	Sec'dary	Higher
Base level	25.2%	37.8%	31.6%	5.6%	19.3%	34.6%	36.6%	9.5%
Marginal effects of parental education								
Primary	-0.145	-0.094	0.128	0.111	-0.126	-0.114	0.089	0.151
	(0.0046)	(0.0027)	(0.0042)	(0.0030)	(0.0037)	(0.0042)	(0.0028)	(0.0054)
Sec'dary	-0.215	-0.238	0.125	0.328	-0.163	-0.192	0.074	0.281
	(0.00456)	(0.0040)	(0.0044)	(0.0051)	(0.0035)	(0.0052)	(0.0036)	(0.0082)
Higher	-0.237	-0.353	-0.100	0.691	-0.188	-0.288	-0.051	0.527
	(0.0047)	(0.0039)	(0.0069)	(0.0074)	(0.0035)	(0.0052)	(0.0089)	(0.0129)
Evaluated at means								
at	$s_{p,i}$ = none		0.207 (mean)				0.555 (mean)	
	$s_{p,i}$ = primary		0.408 (mean)				0.233 (mean)	
	$s_{p,i}$ = secondary		0.264 (mean)				0.144 (mean)	
	$s_{p,i}$ = higher		0.122 (mean)				0.067 (mean)	
	cohort		3.322 (mean)				3.465 (mean)	
	female		0.338 (mean)				0.263 (mean)	

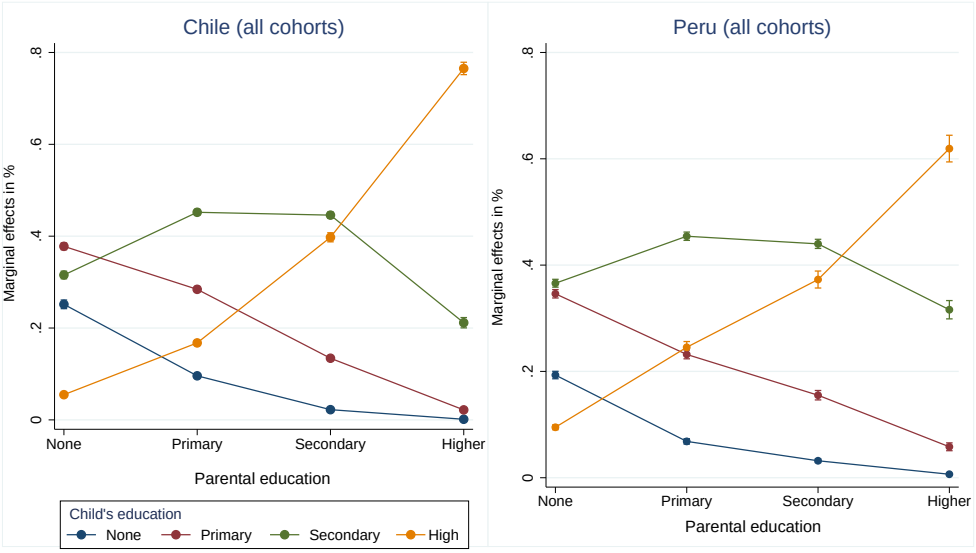
Robust standard errors in parentheses. For ease of notation, we do not report significance levels since reported marginal effects are all significant at the 5% level.

Source: Own estimations based on CASEN 2013 and ENAHO 2015.

ditional probability of having no education decreases by 14.5 percentage points when parental education increases from none to primary, and by 23.7 percentage points when it increases to higher education. At the primary level, the likelihood decreases by 9.4 percentage points when parental education increases to primary and by 35.3 percentage points when it increases to higher. In Peru, the effects are somewhat smaller but follow the same trends. These trends reverse for individuals who completed secondary or higher education. The chances of finishing secondary increase with parental education up to secondary in both countries but falls again with higher education. Only the chances of reaching higher education increase at all levels of parental education, and this increase is particularly strong at the top: having highly educated parents increases them by 69.1 percentage points in Chile and 52.7 percentage points in Peru against the baseline. This is consistent with the small changes in φ that we observed in the previous section.

These numbers suggest that persistence is strong at the bottom and the top. Figure 4.2 gives a graphical representation of Table 4.2 and shows that the conditional probability of having no formal education decreases from around 22% in Chile and 20% in Peru to zero when we move from having parents with no educational degree to

Figure 4.2: Marginal effects of parental education on child's education, with 95% CIs

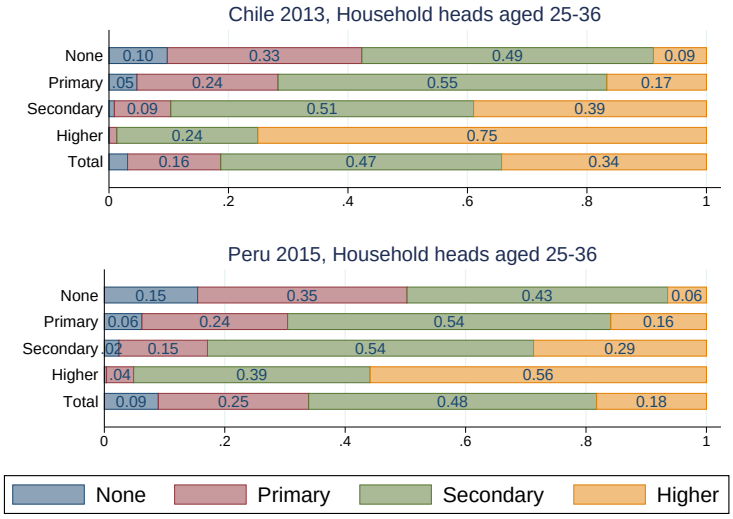


Source: Own estimates based on CASEN 2013 and ENAHO 2015

a post-secondary one. In Chile, the conditional probability of achieving only primary also decreases to almost zero when parents have higher education, in Peru it is below 10%. Conversely, Figure 4.2 also shows that there is upward mobility: the chances of reaching higher education for those whose parents had only primary or below lies between 5 and 18% in Chile and between 10 and 22% in Peru. In Peru, the parental background is not a very strong predictor for individuals that completed secondary (mandatory secondary schooling was introduced in 1993 in Peru although compliance is not enforced). Figures A.4.3 and A.4.4 depict how these marginal effects of parental education differ by birth cohorts. Whereas the differences are small and not always significant in Peru, persistence at the bottom seems to have decreased for younger cohorts in Chile and increased at the top.

The transition matrix in Figure 4.3 depicts how conditional probabilities vary across parental background for household heads aged 25-36 years, the same group for which we analyse income mobility further above. The last bar of each figure describes the marginal probability – or overall shares – of each level in the respective country and year of observation. In the case of zero transmission of educational advantage from parent to child, we would expect the chances of reaching post-secondary training to be the same for someone with parents of no education as for his peer whose parents hold a university degree. In the other extreme case of perfect transmission, we would expect children to remain in exactly the same rank in the education distribution as their parents, which in absolute terms may translate to a higher level due to the rise in

Figure 4.3: Offspring education conditional on parental education



Source: Own estimates based on CASEN 2013 and ENAHO 2015

average years of education. Table A.4.4 reports the empirical distribution of education in both generations observed in our sample. It shows the rise in average education levels between the two generations: while almost half of the parents of our sample in Peru had no formal education, the average adult child observed in 2015 reached secondary education. In Chile, the average level of education is primary among parents and secondary among the children's generation.

As the above analysis suggests, the conditional distributions are very different from the marginal distributions in both countries. To compare the degree of persistence across educational categories, we calculate persistence factors defined as the ratio between the conditional distribution in each cell and its marginal distribution in the child's generation: $P(edu_c|edu_p)/P(edu_c)$, where P stands for the probability of educational attainment edu of child c and parent p. The closer to one the persistence factor, the less persistence we observe. Table 4.3 reports the results. In Peru, the probability of having no formal education given that one's parents also had none is two thirds higher for the younger sample aged 25-36 than the average, while the chances of reaching post-secondary education are half the average. Persistence at the upper end is even three times the average. The picture is equally pronounced in Chile: persistence at the low end of educational achievement is more than three times the average, and more than double at the upper end of the matrix. Hence, in both countries, persistence is highest at the lower and upper end while we observe more mobility in the middle. The fact that these factors have changed at both ends across cohorts suggests that stronger persistence at the top and bottom is not only a result of ceiling and floor effects (see

Table 4.3: Persistence factor in education by country and age groups

		Chile				Peru			
		None	Prim	Sec	High	None	Prim	Sec	High
		Age group 25-60							
Parental education	None	**2.58**	1.63	0.80	**0.20**	**1.49**	1.29	0.92	**0.46**
	Prim	0.99	**1.22**	1.15	0.60	0.53	**0.86**	1.15	1.20
	Sec	0.23	0.58	**1.14**	1.43	0.25	0.58	**1.11**	1.80
	High	0.01	0.09	0.54	**2.76**	0.05	0.22	0.80	**3.00**
		Age group 25-36							
	None	**3.14**	2.09	1.04	**0.26**	**1.70**	1.41	0.90	**0.35**
	Prim	1.51	**1.51**	1.17	0.49	0.68	**0.98**	1.12	0.87
	Sec	0.29	0.61	**1.08**	1.14	0.27	0.60	**1.13**	1.58
	High	0.01	0.08	0.50	**2.19**	0.04	0.18	0.82	**3.07**

Note: Persistence factors are calculated as the ratio between the child's conditional expectation of educational attainment and its marginal expectation.
Educational attainment is specified as the highest levels achieved out of 4 levels: none, primary (prim), secondary (sec), higher (high).
Source: Own estimations based on CASEN 2013 and ENAHO 2015.

Torche (2015a). In Chile persistence at the bottom has increased from 2.58 to 3.14 for the younger group compared to the full sample, in Peru this increase was from a factor of 1.49 to 1.7. At the top, persistence has stayed roughly the same in Peru but decreased from 2.76 to 2.19 in Chile. The chances for upward mobility from the lowest educational class to the highest – a measure of directional mobility that Corak (2017) calls *Rags to Riches* – are larger in Peru than in Chile. In the pooled sample, the chances in Peru are around 46% the average while they are only 20% in Chile (top right corner in each table). For the younger age groups, the difference between countries is smaller.

In both countries, persistence at the lower end has decreased for younger cohorts (slightly in Peru and markedly in Chile), and increased at the upper end (markedly in Peru and slightly in Chile). Figure A.4.5 compares diagonal persistence factors for the oldest two and youngest two cohorts in our sample (figures for other cohorts available upon request) and visualizes the strength of top persistence compared to the weak persistence in the middle. Obviously, whether perfect mobility is an appropriate benchmark remains a much-debated issue, since transmission from parents to children may happen due to various reasons. Nonetheless, given that the simple correlation between parental and offspring education is so strong underlines the importance that opportunities might play.

Table 4.4: Joint probabilities of educational achievement between parents and children, household heads aged 25-60.

			Children			
		None	Primary	Secondary	Higher	Total
Parents: Chile	None	**5.2**	8.0	6.2	**1.3**	20.7
	Primary	3.8	11.9	18.3	6.8	40.7
	Secondary	0.7	3.0	12.4	10.2	26.4
	Higher	0.1	0.3	2.4	**9.4**	12.2
	Total	9.7	23.2	39.3	27.8	100.0
	N			29 630		
Parents: Peru	None	**11.4**	19.1	18.6	**6.4**	55.5
	Primary	1.2	5.8	10.9	5.4	23.3
	Secondary	0.3	1.6	7.8	4.7	14.4
	Higher	0.0	0.3	2.3	**4.1**	6.7
	Total	12.9	26.9	39.6	20.6	100.0
	N			19 023		

Source: Own estimations based on CASEN 2013 and ENAHO 2015.

4.6.2 Absolute versus relative mobility

Scholars and policy-makers remain divided as to whether more importance should be attached to relative or absolute mobility (Jäntti and Jenkins, 2013). Those that focus on absolute mobility emphasize that increasing the pie means everyone will have a larger share than previously. Others argue that maintaining distributional patterns across generations is evidence of unequal opportunities and inequality traps (see Bourguignon et al. (2007), Durlauf et al. (2017)). The above analysis of conditional expectations focuses on relative mobility and neglects the decreasing share of low-educated people in both countries. In other words, although bottom persistence has increased in both countries, there are much fewer persons with low education now than there were in previous generations. Similarly, while top privilege remains very strong, more people overall reach higher education and contribute to upward mobility at other points of the distribution. The sharply falling β_1 measure in Figure 4.1 vividly illustrates this point.

To put the different dimensions of mobility into perspective, Table 4.4 reports the joint probabilities of the possible $edu_p * edu_c$ combinations. It shows that the underlying education distributions in both countries are quite different. Bottom persistence seems to be a lesser concern in terms of scale than upper class persistence in Chile: the probabilities of both parent and child having no formal education is 5.2% as opposed to 9.4% of both having higher education. Upward mobility in turn is very small. The

odds of having higher education and parents without any formal education is only 1.3 (compared to 6.4 in Peru). The increase in education levels has been much smaller in Chile than in Peru. Peru has almost caught up with Chile in terms of average education levels in recent decades. The very large share of parents with no formal education in Peru clearly drives the comparably high probability of bottom persistence there. Almost the entire share of individuals from the children's generation that have no formal education equally had parents without education. Upper persistence seems less a phenomenon than upward mobility, but this is likely driven by a tripling of the population share that achieves higher education from one generation to the next. Moving down the education ladder is a rare phenomenon in both countries: having parents with higher education while reaching only primary or less virtually does not happen (despite more than a quarter of the children's generation reaching only primary or less). Surely, downward mobility is no desirable trend or sign of widening opportunities, but rather serves to underline the differences in odds.

4.6.3 Comparing mobility in income and education

Comparing these patterns of persistence in education with those of income is inherently difficult for various reasons, chiefly because we cannot observe income mobility over a span of generations long enough to detect trends. Due to the same data limitations, we cannot depart from a linear analysis of income mobility and compare patterns across the distribution. Nonetheless, several observations can be made. Firstly, educational persistence has decreased substantially in absolute terms but only moderately in relative terms. Summary measures of the correlation in educational attainment of around 0.5 for the younger cohorts in both countries are still higher than those estimated in high income countries such as the UK and USA (correlations in the range of 0.35 and 0.46 respectively according to Blanden and Machin (2013)), or Italy (0.47 according to Checchi and García-Peñalosa (2009)). Nonetheless, this difference seems to be less strong than the comparative analysis for older cohorts by Hertz et al. (2007) suggested.

Albeit our estimates of income persistence do not allow to compare younger with older cohorts, they suggest that correlation in income is at least on a similar scale as education. Even for young cohorts that experienced educational expansion and economic growth that benefitted the lower deciles, income elasticities are still high at around 0.66 in market income. These correlations may be biased upwards due to the imputation of parental income that relies on parental education. Blanden and Machin (2013) suggest scaling down estimates that are derived from two-sample estimation approaches by a factor of 0.75 to make them comparable to OLS estimates that do not

rely on instrumental variable or imputation techniques. While such scaling factor may seem somewhat arbitrary, even allowing for it leads to significantly higher persistence measures in Peru and Chile than those other studies found for high income countries in the range of 0.24 for Canada, Sweden and Germany to around 0.37 in the UK (scaled) (for a comparative review of these studies, see Blanden and Machin (2013)). The association between the child's income quintile conditional upon parental education suggests that a non-linear pattern may also be present in income mobility in Chile and Peru (to the degree that parental education determines parental income).

4.7 Discussion

This paper has analysed two dimensions of intergenerational mobility, namely education and income, in Chile and Peru using measures that capture both relative and absolute mobility. Whereas absolute mobility serves to compare living standards between generations, relative mobility is often associated with equality of opportunity. Previous studies have argued that educational mobility is a good proxy for income mobility since education constitutes a main determinant of income (Blanden and Machin, 2013). The circumstance that the distribution of educational achievement experienced rather different trends than the distribution of incomes over the past two decades in both countries calls into question whether this is a valid assumption for Chile and Peru. Comparing these two countries is insightful because they have experienced similar education policy reforms and relied on a growth strategy in the past decades that in combination with educational expansion favoured a decrease in the skills premium. Peru has experienced stronger growth and higher reductions in inequality in the past decades than Chile but is still poorer and has lower schooling levels, leaving more scope for upward mobility in times of growth.

We tested three hypothesis that we derived from economic theory. We found support for the first one that parental welfare is strongly associated with that of their children as adults. Given the challenges in data availability inherent to measuring persistence in an intergenerational framework, we adopted a combination of strategies. We analysed intergenerational income elasticities in a first step. Due to the absence of long-term panel data, we do not observe actual parent-child pairs and instead adopt a two-sample imputation strategy that combines information from repeated cross-sections. We limit the analysis to household heads aged 25-36 observed in 2013 (Chile) and 2015 (Peru) and link these to older cross-sections of the late 1990s that represent the parental generation. Our results suggest that income mobility is low

when compared to countries in other regions (for an overview of IGE estimates for different countries see Blanden and Machin (2013)). We estimate income elasticity coefficients of between 0.63 – 0.67 in Peru and 0.66 – 0.76 in Chile. These estimates are consistent with previous studies for the region. Slightly higher mobility in Peru than in Chile is consistent with trends of decreasing inequality since the early 2000s and economic growth that has benefitted the lower deciles disproportionately. These trends were stronger in Peru than in Chile. Due to data limitations, we cannot test for a convex relationship in income mobility but instead assume a relationship that is linear in logs.

The plausible assumption that educational achievement stays constant in adulthood allows for a more detailed analysis of educational mobility. Our analysis of educational mobility covers household heads aged between 25 and 60 years, which correspond to the birth cohorts 1953-90. Such analysis is possible with cross-sectional data since household surveys contain retrospective information on parental education. We find that absolute mobility has increased strongly over time in both countries, but much more so in Peru. Peru had very low average schooling levels during the 1970s and 1980s, leaving much room at the top. This is one reason for why upward mobility – the probability of children from low-educated families to reach higher education levels than their parents – is stronger in Peru than in Chile. Chile also experienced a structural education expansion but started at higher average years of schooling than Peru. Nonetheless, parental background remains a strong predictor of relative educational achievement in both countries: scaling mobility measures for changes in the marginal distribution shows that there is less dynamism across cohorts than absolute mobility signals. The fact that persistence at the tails of the education distribution is much stronger than in the middle is indicative of this finding. In both countries, self-reproducing educational elites seem to exist alongside persisting low achievement across generations, which may be indicative of a poverty trap. Individuals with parents of average education in turn experience relatively high mobility in both countries.

Hence, our findings offer support for the third hypothesis that persistence is non-linear across the distribution, and some (albeit ambiguous) support for the second hypothesis that welfare persistence should decrease for younger cohorts. The ambiguity arises from the diverging trends in absolute and relative mobility: our analysis has shown that it is important to distinguish between the two concepts, even more so in countries that experienced a structural expansion of education or large changes in inequality over time. Looking only at measures of absolute mobility gives a much more optimistic outlook on trends in both countries. It is equally important to look beyond summary measures and examine whether the strength of persistence differs along the

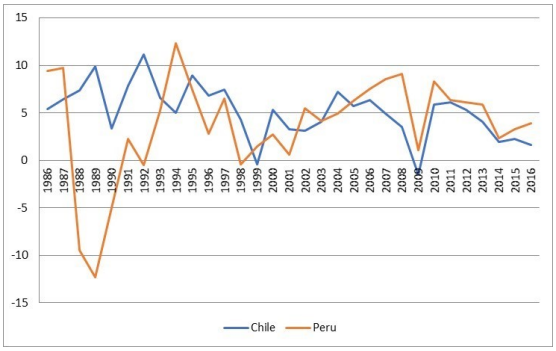
distribution. While summary indicators are a convenient way of comparing measures between countries or over time, they hide important dimensions of heterogeneity that result from non-linearities in the transmission process. Although intuitively compelling, non-linear approaches still see much less application in the literature than linear models.

The limitations of our analysis point to scope for further research. In particular, the links between intergenerational mobility in income and education merit a deeper analysis. The intuitive hypothesis that both experience the same trend does not follow from theory. As Becker et al. (2015) outline, a crucial factor in the equation are changes in returns to human capital that can affect income persistence while holding skills persistence constant. Our discussion of institutional reforms in Chile and Peru further suggests that educational achievement is only a noisy measure of human capital that disregards for example changes in quality and the degree of segmentation spurred by the privatisation of education. Such analysis of the interdependencies between education and income necessitates a modelling of underlying causal mechanisms that drive persistence. Since the different dimensions of advantage likely influence mobility simultaneously, analysing a single outcome dimension inherently fails to address endogeneity. In this sense, our analysis does not aim to identify the underlying structural factors of mobility and persistence but rather provides a detailed analyses of intergenerational correlation patterns that causal analysis can build upon.

Appendix

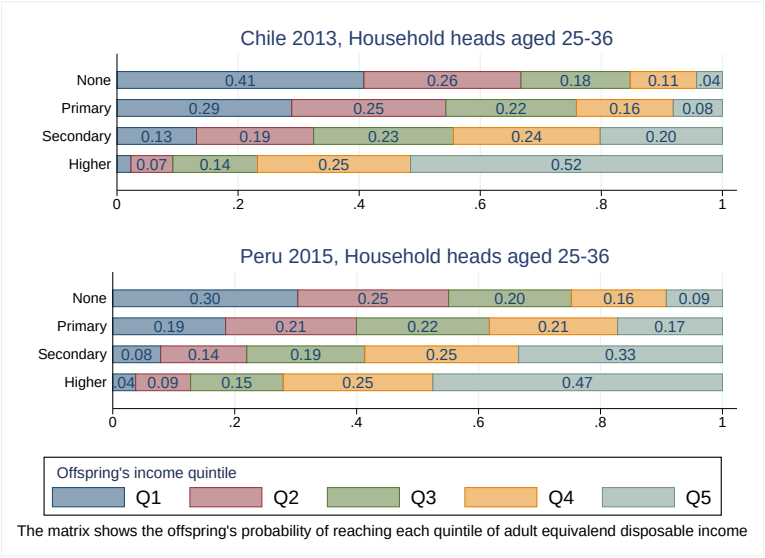
4.A Graphs

Figure A.4.1: Annual GDP growth



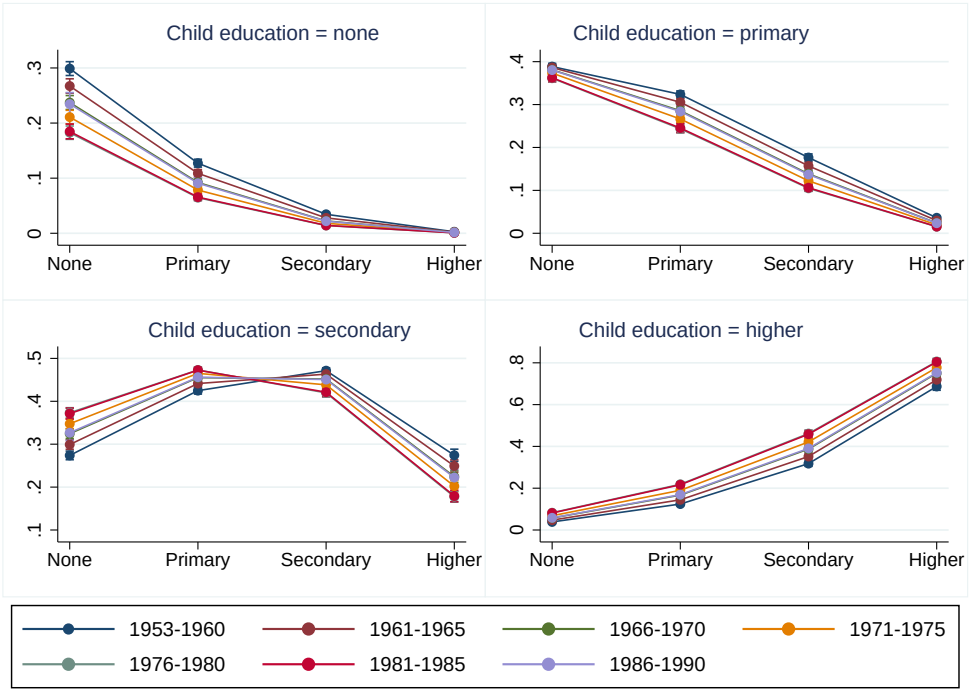
Source: World Bank

Figure A.4.2: Offspring's income quintile (disposable) conditional on parental education



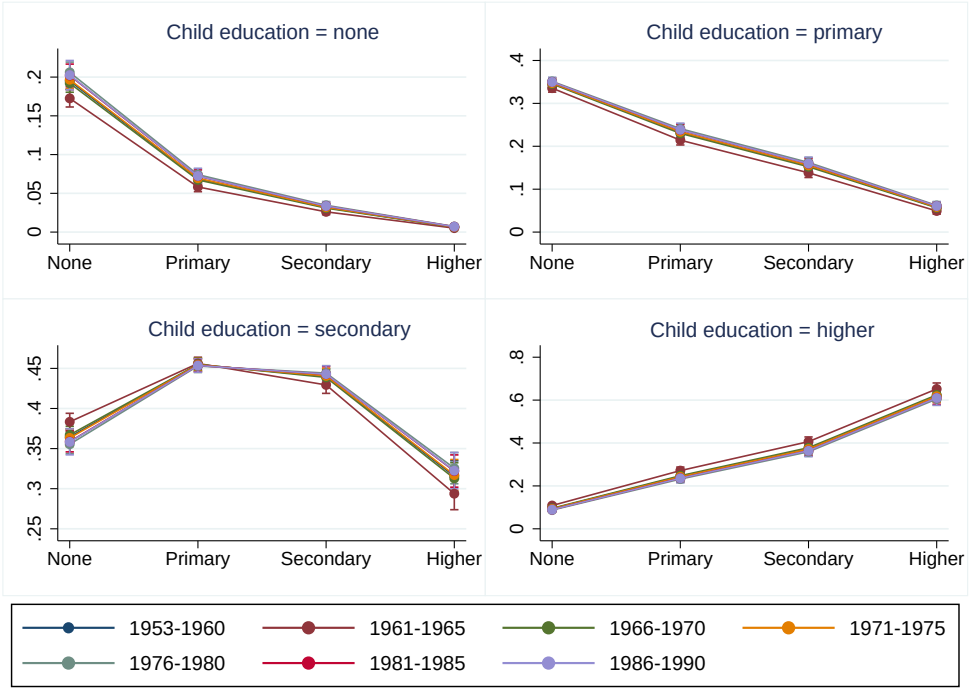
Source: Own estimates based on CASEN 2013 and ENAHO 2015

Figure A.4.3: Marginal effects of parental education by cohort in Chile, with 95% CI



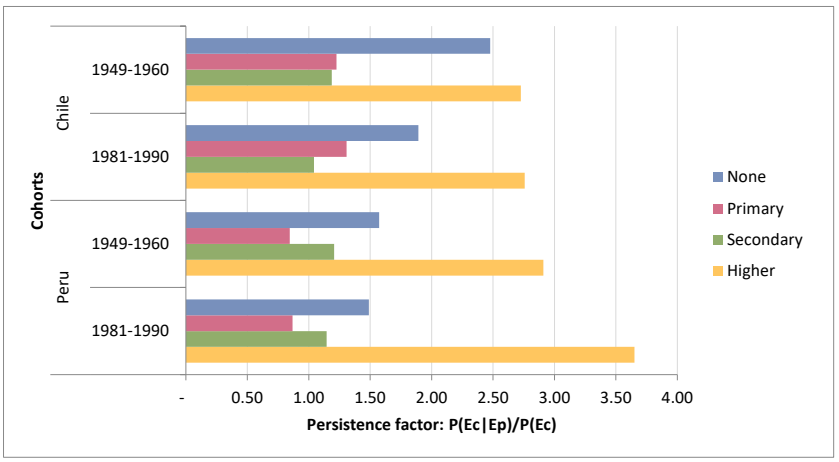
Source: Own estimates based on CASEN 2013

Figure A.4.4: Marginal effects of parental education by cohort in Peru, with 95% CI



Source: Own estimates based on ENAHO 2015

Figure A.4.5: Persistence factors for youngest and oldest cohorts in Peru and Chile



Source: Own estimates based on CASEN 2013 and ENAHO 2015

4.B Tables

Table A.4.1: Average years of education by equivalized income quintiles, adults aged 25-65

Chile				Peru			
Year	Quint 1	Mean	Quint 5	Year	Quint 1	Mean	Quint 5
1996	6.9	9.5	12.7	1997	3.2	7.3	10.7
2006	8.2	10.4	13.3	2005	4.5	8.7	12.2
2013	9.1	11.2	14	2014	5.6	9.6	12.7

Source: SEDLAC (CEDLAS and the World Bank)

Table A.4.2: Testing for selection bias in the restricted sample

	Chile		Peru	
	Education	Log mkt inc	Education	Log mkt inc
Restricted	-0.32***	-0.03	0.02	0.10*
R. St. Errors	-0.03	-0.02	-0.02	-0.04
Observations	34309	7612	21765	5188
R-squared	0.113	0.36	0.085	0.271

Standard errors in parentheses. * p<0.05, ** p<0.01, *** p<0.001.
Restricted refers to a binary variable that equals 1 if an observation has missing information on parental education, and 0 otherwise.
Source: Own estimations based on CASEN 2013 and ENAHO 2015.

Table A.4.3: Descriptive indicators for Chile and Peru 1995-2015

	Chile			Peru		
	1996	2006	2013	1997	2005	2015
Mean income (pc, 2010 US$)	8 534	11 313	14 547	3 140	3 831	5 935
Mean income (pc, 2010 $PPP)	12 203	16 783	20 946	6,099	7,440	11,527
Gini coefficient	0.553	0.522	0.509	0.532	0.489	0.439
Poverty rate	23.2%	13.7%	11.7%	47.5%	48.7%	22.7%
Population (in 1000)	14 596	16 332	17 819	24 039	27 610	31 377

Source: OECD, CEPAL, SEDLAC, National Institute for Statistics & Informatics Peru.

Table A.4.4: The distribution of educational attainment across generations in %

	Highest completed education level							
	None	Primary	Secondary	Higher	None	Primary	Secondary	Higher
	Chile				**Peru**			
	Whole sample (N:29630)				Whole sample (N: 19023)			
Children	9.74	23.22	39.28	27.76	9.13	24.6	48.09	18.18
Parents	20.72	40.75	26.37	12.17	55.5	23.3	14.4	6.7
	Age group 25-36 (N: 7288)				Age group 25-36 (N: 4630)			
Children	3.11	15.6	47.03	34.26	12.9	26.9	39.6	20.6
Parents	11.72	34.96	34.9	18.41	44.24	24.76	21.65	9.35

Note: Children refers to the educational level of household heads aged 25-60 years, while parents refers to the educational level of parents that these same household heads report retrospectively.

Source: Own estimations based on CASEN 2013 and ENAHO 2015.

Table A.4.5: Ordered probit estimation of adult child's education level

	Chile	**Peru**
Parental education		
Primary	0.614***	0.626***
	(0.0171)	(0.0195)
Secondary	1.287***	0.997***
	(0.0197)	(0.0242)
Higher	2.254***	1.624***
	(0.0277)	(0.0359)
Cohort	0.0672***	-0.0123***
	(0.00364)	(0.00431)
Female (=1)	0.0286**	-0.0772***
	(0.0136)	(0.0179)
Constant cut1	-0.483***	-0.927***
	(0.0184)	(0.0198)
Constant cut2	0.532***	0.0377**
	(0.0185)	(0.0191)
Constant cut3	1.807***	1.252***
	(0.0202)	(0.0204)
Observations	29,630	19,023

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

Source: Own estimations based on CASEN 2013 and ENAHO 2015.

Table A.4.6: First stage predictions of parental income, CASEN (1996) and ENAHO (1997)

	Chile			**Peru**	
	Market	Disposable		Market	Disposable
Primary	0.268***	0.234***	Primary	0.435***	0.385***
	(0.0327)	(0.0322)		(0.0864)	(0.0578)
Secondary	0.681***	0.637***	Secondary	0.891***	0.873***
	(0.0366)	(0.0355)		(0.100)	(0.0625)
Higher	1.574***	1.597***	Higher	1.385***	1.528***
	(0.0570)	(0.0501)		(0.111)	(0.0713)
Regional dummies					
Tarapacá	-0.0468	-0.102	North. Coast	-0.254***	-0.450***
	(0.0937)	(0.102)		(0.0948)	(0.0786)
Antofagasta	0.192**	0.0273	Central Coast	-0.180*	-0.250***
	(0.0761)	(0.0738)		(0.105)	(0.0735)
Atacama	0.0786	-0.132	South. Coast	-0.138	-0.266***
	(0.0939)	(0.0862)		(0.0975)	(0.0968)
Coquimbo	-0.288***	-0.339***	North. Sierra	-0.766***	-0.978***
	(0.0497)	(0.0483)		(0.122)	(0.0909)
Valparaíso	-0.223***	-0.246***	Central Sierra	-0.601***	-0.813***
	(0.0427)	(0.0413)		(0.0966)	(0.0710)
Libertador	-0.282***	-0.295***	South. Sierra	-0.349***	-0.600***
	(0.0479)	(0.0410)		(0.0891)	(0.0692)
Maule	-0.401***	-0.420***	Jungle	-0.295***	-0.563***
	(0.0416)	(0.0391)		(0.0868)	(0.0685)
Bío Bío	-0.362***	-0.431***			
	(0.0457)	(0.0429)			
La Araucanía	-0.437***	-0.419***			
	(0.0492)	(0.0469)			
Los Lagos	-0.373***	-0.323***			
	(0.0643)	(0.0565)			
Aysen G.C.I.d.C.	-0.0943	-0.0462			
	(0.0723)	(0.0585)			
Magallanes y Ant.	0.0762	0.157			
	(0.118)	(0.102)			
Los Ríos	-0.428***	-0.541***			
	(0.0623)	(0.0621)			
Arica y Parinacota	-0.412***	-0.400***			
	(0.117)	(0.0923)			
Constant	6.339***	5.695***		6.616***	6.090***
	(0.0354)	(0.0339)		(0.131)	(0.0740)
Observations	8,802	9,010		2,199	2,290
R-squared	0.340	0.370		0.289	0.415

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The variables Primary, Secondary and Higher are specified as binary variables for completed education levels. The regional dummies exclude the metropolitan regions of Santiago and Lima as base categories. Sierra refers to the highlands.

Source: Own estimations based on CASEN 1996 and ENAHO 1997.

Chapter 5

Conclusion

This dissertation has investigated the links between the welfare state, inequality and poverty in Peru and Chile. The main questions the thesis has addressed focused on (i) the current capacity of the Peruvian tax and transfer system to redistribute resources among households with the objective of reducing income inequality and poverty; (ii) the impacts of Peru's CCT Juntos, which aims to reduce the intergenerational transmission of poverty, on educational outcomes of beneficiary children; and (iii) quantifying the degree of persistence in income and educational attainment across generations in Peru and Chile. Its main findings can be summarized as follows:

(1) The design of social protection in Peru has undergone major changes in the past two decades, and contributes to reducing poverty and inequality, an area where impressive progress has been made since the turn of the century. Nonetheless, the current welfare system contributes only little to vertical redistribution across households. A combination of low tax progressivity, low social transfer amounts that fail to reach significant shares of the current income-poor, and persistently high regional differences in living standards contribute to the relatively small redistributive impact of the tax and transfer system. In-kind public services in health and education have a larger redistributive impact than direct transfers: their value is high in comparison to the incomes of the lowest deciles, and their use is concentrated among the poor. This is especially true for education. The analysis suggests that in-kind services contribute about 4 Gini points to the overall inequality reduction of 7 Gini points achieved through the tax and transfer system. This compares to a 1-point reduction attributed to cash transfers, and just under 2 points to personal income taxes and social security contributions. The redistributive impact is larger in rural areas, where inequality and poverty are also higher to begin with. The impact on poverty is equally modest: significant reductions in the headcount ratio are only made in extreme (subsistence)

poverty but not in the incidence of moderate (monetary) poverty. Expanding social protection under the current rules of targeting and coverage would not suffice to close the poverty gap even with substantial expenditure increases. Closing the gap would necessitate a broader targeting and substantially higher transfers.

(2) The CCT Juntos as the largest targeted social assistance intervention in Peru pays an income transfer to eligible families, conditional upon children of these families making use of primary health care services and attending school regularly. These conditionalities aim to increase the demand for primary health care and basic education, thereby fostering investment into the human capital stock of disadvantaged children and reducing the intergenerational transmission of poverty. The impact evaluation of Juntos presented in Chapter 3 finds that the programme is effective in raising educational enrolment and attainment. No positive impact is, however, detected upon performance in standardized receptive vocabulary and mathematics tests. This may be indicative of a neglect of supply factors such as schooling infrastructure and resources, as criticism of low schooling quality in Peru abounds (Morón et al., 2009; OECD, 2016; Baca Campodónico et al., 2014). Further, Juntos children may be disadvantaged in other dimensions than the household's credit constraints.

(3) Cross-country studies suggest that intergenerational educational mobility is much lower in Latin America than in other regions of the world (Hertz et al., 2007). Chile, Peru's neighbour and the country with the highest GDP per capita in the region, has been a forerunner for many educational and economic policies that Peru adopted later on. Peru equally relies on a primary export-driven growth strategy as Chile (Herrera, 2017). It has made more progress in reducing inequality since the early 2000s than its regional neighbour albeit it still has a considerably higher incidence of absolute poverty. When looking at absolute measures, intergenerational mobility has increased notably in both countries from the cohorts born in the early 1950s to those born in the late 1980s. This trend was stronger in Peru but only so for levels to catch up with Chile that displayed higher mobility already among older cohorts. This gain in mobility is mainly explained by rising average levels of schooling. Looking at the probability of educational attainment conditional upon parental education reveals that there continues to be strong persistence: the probability to attain post-secondary training is about three times larger for someone with highly educated parents than for the average cohort representative. Contrary, the chances of upward mobility (defined here as completing post-secondary training conditional upon parents having no formal education) is less than half the average chance in the population of reaching higher education in Peru and only one fifth in Chile. This likely helps to explain the high persistence across generations that we also observe in income: we estimate correlations

between parental income and child income in adulthood in the range of 0.64–0.67 in Peru and 0.66–0.76 in Chile. This is consistent with findings from other economies in the region, in particular Brazil (Guimarães Ferreira and Veloso, 2006), Chile (Nunez and Miranda, 2007), and Mexico (Torche, 2015b).

Overall, the findings suggest that the welfare state of Peru needs to increase levels of expenditure (and consequently revenue generation), its capacity to reach the poorest and deliver high quality public services if it wants to sustain poverty reduction and redistribution in less favourable external conditions and stagnating growth in the future. These directions can help to consolidate an emerging middle class rather than creating a new vulnerable class that risks falling back into poverty during the next recession. Government statistics suggest that the incidence of extreme poverty already stopped falling since 2013 in some regions of the country (INEI, 2015).

Two issues that this thesis has not investigated but certainly merit close attention are the (lack of) integration of 'new' social assistance policies with the old insurance schemes, and revenue generation. Participation in social insurance is contingent upon formal sector employment, and while benefit levels generally exceed those of non-contributory schemes, this is precisely because beneficiaries pay contributions. Given the large scale of the informal sector in Peru (estimated at 70% by the ILO (2014)), this risks making employment in the formal economy less attractive at the margin than in the informal economy for a worker of a given productivity (Ferreira and Robalino, 2011). This thesis has only investigated the redistributive impact of the welfare state in a static model, but certainly there are behavioural and other dynamic effects. The focus here was laid on equity objectives of social protection without analysing potential efficiency trade-offs. Related to the issue of informality is the current structure of revenue generation in which personal income taxation (PIT) only plays a minor role given the low rates and a narrow tax base. Raising PIT revenues and increasing their progressivity arguably necessitates strong administrative and enforcement capacities. The alternative route that many low and middle-income countries choose instead is to increase consumption taxes. This can have adverse, welfare-reducing impacts on poor households even if the tax and transfer system is progressive overall (Higgins and Lustig, 2016).

The analysis of Peru is relevant beyond its mere country or even regional context. It illustrates a situation that development economists refer to as a middle-income trap. Countries that fail to promote economic diversification, skills upgrading and investment into productivity gains after having advanced to a middle-income status risk falling into such trap. Further, economic theory and empirical evidence suggest that high

inequality (beyond some threshold) is associated with lower growth (Galor and Zeira, 1993; Ghatak and Nien-Huei Jiang, 2002; Cingano, 2014). Peru has seen very positive trends in both human and economic development since the early 2000s. It has more than halved poverty in only a decade, brought levels of income inequality down and achieved among the highest growth rates in the region. This stands in stark contrast to the shattered state of its economy and the political violence of the early 1990s. Not least due to these achievements, the World Bank cites Peru in its flagship report on inequality as a good practice example for achieving inclusive growth (World Bank, 2016).

Notwithstanding these positive developments, the analysis of the previous chapters points to a note of caution. The social protection architecture, including public services in education and health, are an important pillar of development. The thesis identifies several factors that may contribute to avoiding the risk of being trapped in a middle-income status. These are no 'new' factors but rather appeal to standard economic theory. Nonetheless, framing them in the context of recent socioeconomic trends in the region is important to understanding the role of the welfare state in low and middle-income countries. They include the overall size of the welfare state, its capacity to reach the vulnerable and raise prospects for social mobility, including through the provision of high quality public services in education and other fields. A well-functioning welfare state can enhance economic development. But possibly more important and beyond economic efficiency, these issues are all equally appealing for reasons of distributive justice.

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English Summary (Abstracts)

Chapter 2: The distributional impact of social spending in Peru

This paper examines the distributional and poverty impact of the public tax and transfer system in Peru. It applies an extended income approach that accounts for the value of publicly-provided health, education and childcare services. Accounting for public services is important since they provide welfare, and unequal access to basic services is a main development challenge for low and middle income countries. We find that public social spending reduces overall inequality by almost 7 Gini points. This reduction is mainly driven by in-kind benefits while the impact of taxation and direct cash transfers is small. Income differentials within regions explain approximately four fifths of overall inequality compared to differences between regions, which explain about one fifth. This ratio remains largely unaffected by public redistribution. Mean levels of welfare vary widely across regions. This is also because social spending achieves little poverty reduction. It decreases absolute poverty by 2-3 percentage points in terms of monetary income and up to 9 percentage points or 25% when accounting for public service use. The largest share of the poor, over 50%, are not reached by social assistance. To tackle poverty more effectively, transfer levels and coverage need to be increased. Current policies seem insufficient to achieve a more equitable income distribution.

JEL: D31, H53, I30, I38
Keywords: Income distribution, poverty, social protection, public services, non-cash income, Peru

Chapter 3: Do Conditional Cash Transfers (CCTs) raise educational attainment? A case study of Juntos in Peru

This paper empirically investigates the impacts of Peru's Conditional Cash Transfer (CCT) programme Juntos upon educational outcomes of beneficiary children. The findings associate Juntos participation with higher overall enrolment rates and grades

of schooling for children aged 12 to 18 years. This effect translates into a higher probability of finishing primary school and entering secondary school for the same age group. Evidence suggests that this is linked to a faster progression through grades rather than final years of schooling. We find no impact on enrolment or school progression for younger children aged 6 to 11 years. Further, Juntos participation does not have a positive impact upon scores of receptive vocabulary and mathematics tests. Rather, children aged 7-9 years seem to make less progress over time compared to children from non-beneficiary families, while there is no impact upon older children. Evidence on the underlying reasons for this is inconclusive and merits further analysis.

JEL: H53, I24, I38, J24
Keywords: Conditional cash transfer, educational attainment, intergenerational persistence, matching and difference-in-difference, Peru

Chapter 4: More educated, less mobile? Trends in income and educational mobility in Chile and Peru

We analyze intergenerational persistence in income and education in Chile and Peru for birth cohorts of the early 1950s to 1990. Both countries have seen a structural expansion of education over this period and decreasing income inequality in more recent decades. We impute non-observed parental income from repeated cross-sections and estimate persistence in the range of 0.63-0.67 in Peru and 0.66-0.76 in Chile for household heads of the birth cohorts 1977-1990. The analysis of educational mobility covers household heads of birth cohorts from 1953-1990 and relies on retrospective information. We observe an increase in absolute mobility for younger generations which we relate mainly to the structural expansion of education that created room at the top. In relative terms, mobility patterns remain more stable – parental education is still a strong predictor for own educational achievement. The relationship is non-linear in both countries: persistence among very low and highly educated groups is strong while individuals with parents of average education levels are more mobile. Upward mobility is stronger in Peru than in Chile: the chances to move from no formal education to higher education across one generation are 46% the average chances of higher education in Peru compared to only 20% in Chile. The chances of persisting in the top across generations are also slightly higher in Peru with a factor of 3 times the average chances of high education compared to a factor of 2.76 in Chile.

JEL: I24, I26, J62, O15
Keywords: Intergenerational mobility, inequality of opportunity, income persistence, education, transition probabilities, Chile, Peru

German Summary

Die vorliegende Dissertation befasst sich mit den Verteilungs- und Armutswirkungen des Wohlfahrtsstaats in Lateinamerika, insbesondere in Peru. Die Arbeit analysiert den Beitrag, den das soziale Sicherungssystem sowie öffentliche Dienstleistungen zur Umverteilung von Einkommen und zur Minderung des Armutsrisikos leisten, und wie stark die Chancen für soziale Mobilität durch das Elternhaus geprägt werden. Lateinamerika hat – im Gegensatz zu den Entwicklungen in vielen europäischen und angelsächsischen Ländern – seit Anfang der 2000'er Jahre eine rückläufige Einkommensungleichheit sowie eine beeindruckende Armutsreduzierung erlebt. Parallel dazu – und in Teilen ursächlich hierfür – hat ein Wandel der Sozialsysteme stattgefunden, der im Wesentlichen durch einen Ausbau von bedarfsgeprüfter Sozialhilfe sowie durch Einführung und Ausweitung sozialer Kranken- und Altersversicherungen gekennzeichnet war. Bis Ende der 1990'er Jahre waren Systeme der sozialen Sicherung in der Region vorrangig auf beitragsfinanzierte Kranken- und Rentenversicherungen beschränkt, die abhängig Beschäftigte im Staatsdienst und in der formalen Wirtschaft absicherten, nicht jedoch die Vielzahl von informell Beschäftigten und Bauern im ländlichen Raum. Steuerfinanzierte Maßnahmen zur Armutsbekämpfung waren bis auf wenige fragmentierte Interventionen hingegen kaum präsent.

5.1 Forschungsmotivation und Relevanz

Soziale Sicherung kann einen wesentlichen Beitrag zur sozioökonomischen Entwicklung von Volkswirtschaften leisten. Über normative Ziele der Verteilungsgerechtigkeit hinaus kann Sozialpolitik (abhängig von ihrer Ausgestaltung) die Effizienz von Wirtschaftssystemen steigern und Wachstum befördern. Die entwicklungsökonomische Theorie nennt hierfür drei zentrale Ansatzpunkte. Sozialtransfers können Kreditbeschränkungen lockern, aufgrund derer arme Bevölkerungsgruppen sinnvolle Investitionen – wie etwa in Bildung oder Unternehmertum – unterlassen. Zweitens können sie Absicherung gegen Risiken wie zum Beispiel Krankheit, Arbeitslosigkeit oder Naturkatastrophen

gewähren, die aufgrund von Marktversagen ohne staatliche Intervention häufig nicht versicherbar sind. In Entwicklungsländern führen solche Risiken nicht selten dazu, dass Familien ihr ohnehin niedriges Vermögen abbauen, Kinder aus der Schule nehmen oder unternehmerische Risiken von vornherein nicht eingehen. Drittens können Eltern Armut an ihre Kinder 'vererben', wenn – wie im theoretischen Modell der Armutsfalle – die untersten Einkommensgruppen langfristig zu einem anderen (niedrigeren) Gleichgewicht konvergieren als höhere Einkommensgruppen. Wenn auch die empirische Evidenz für solche Armutsfallen umstritten ist, so herrscht doch weitgehend Konsens darüber, dass der Einfluss der elterlichen Bildung und des Vermögens bedeutend für den späteren Erfolg des Kindes sind. Der Sozialstaat kann hier zur Verbesserung der Chancengleichheit beitragen.

Diese Aspekte wurden in den Entwicklungsstrategien vieler Länder des globalen Südens lange Zeit vernachlässigt. Der Ausbau des – vergleichsweise immer noch begrenzten – Wohlfahrtsstaat in Lateinamerika hat nicht zuletzt aufgrund der sozioökonomischen Entwicklungen der vorangegangenen Jahrzehnte stattgefunden. Die 1980'er Jahre standen in Lateinamerika im Schatten der Schuldenkrise: Hohe Arbeitslosigkeit und Inflation gingen einher mit Kürzungen in Gesundheits- und Bildungsetats, was das ohnehin große Gefälle im Lebensstandard zwischen Reich und Arm bei einer überdies kleinen Mittelschicht weiter verstärkte. Trotz des ab den 1990'er Jahren in vielen Ländern wiedereinsetzenden Wirtschaftswachstums stiegen Armut und Ungleichheit weiter an. Noch zu Beginn der 2000'er Jahre verzeichnete nahezu jedes Land der Region einen Gini Koeffizienten von über 0.5, und die Armutsraten lagen in Ländern wie etwa Ecuador, Bolivien und Kolumbien bei über 60%. Eine neue Sozialpolitik sollte dazu beitragen, die *deuda social* - die 'sozialen Schulden', die nicht zuletzt den Ausgabenkürzungen und der hohen Arbeitslosigkeit infolge der finanziellen Schuldenkrise angelastet wurden – abzubauen.

Peru spiegelt diesen regionalen Trend in vielerlei Hinsicht wider. Die Schuldenkrise traf das Land Anfang der 1980er Jahre besonders hart und stürzte es neben der wirtschaftlichen auch in eine politische Krise. Insbesondere die ländlichen Regionen, in denen der Staat oft nur ansatzweise präsent war, waren von hoher Armut geprägt. Noch vor 20 Jahren lag die Einkommensungleichheit gemessen am Gini Koeffizienten bei etwa 0.51; über 55% der Bevölkerung galt als arm, darunter 24% als extrem arm und damit vom Hunger bedroht. Seit Anfang der 2000'er Jahre und bis etwa 2014 jedoch verzeichnete Peru auch im regionalen Vergleich hohe Wachstumsraten und erreichte beeindruckende Erfolge in der Armutsreduzierung. Laut amtlichen Statistiken fallen derzeit etwa 21% Prozent der Bevölkerung unter die moderate und 4% unter die extreme Armutsschwelle. Der Gini Index für Einkommensungleichheit liegt derzeit bei

etwa 0.44 (gemessen an verfügbaren Haushaltseinkommen).

5.2 Fragestellung und Ergebnisse

Inwiefern dies auch auf die wachsende Rolle der Sozialpolitik in Peru zurückzuführen ist, soll Thema dieser Dissertation sein. Sie besteht aus drei empirischen Forschungsbeiträgen zu den Verteilungswirkungen von Sozialpolitik und sozialer Mobilität in Peru und Chile. Diese stellen in sich abgeschlossene Studien dar, die inhaltlich aber eng miteinander verknüpft sind.

Der erste Beitrag analysiert die Verteilungswirkungen des peruanischen Steuer- und Transfersystems unter Einbeziehung von staatlichen Bildungs- und Gesundheitsleistungen in einer Querschnittsanalyse für das Jahr 2014. Armut und Ungleichheit werden in der Regel an verfügbaren Haushaltseinkommen bemessen – also nach Abzug direkter Steuern und Abgaben sowie unter Hinzurechnung von monetären Transfers. Nicht berücksichtigt werden in der Regel staatliche Dienstleistungen, die den Bürgern unentgeltlich oder teilsubventioniert bereitgestellt werden. Solche Dienstleistungen können jedoch erheblich zur Umverteilung beitragen und die Einkommenssituation von Haushalten beeinflussen. So kann sich ein Haushalt einen besseren Lebensstil leisten, wenn er Zugang zu einem öffentlich finanzierten Bildungs- und Gesundheitswesen hat, als wenn er entsprechende Dienstleistungen aus seinem verfügbaren Einkommen bezahlen muss. Ebenso können Ungleichheiten weiter verstärkt werden, wenn Haushalte am unteren und oberen Ende der Einkommensverteilung sich gegen Entgelt jeweils gemäß ihrer Kaufkraft in segmentierten Bildungs- und Gesundheitssystemen bewegen.

Peru wendet etwa 10% seines Bruttoinlandsprodukts für Sozialausgaben (einschließlich Bildung) auf, dies entspricht 45% der öffentlichen Ausgaben. Seit 2002 gibt es neben der beitragsfinanzierten auch eine soziale Krankenversicherung, die mittlerweile fast 50% der Bevölkerung abdeckt. Auch eine Sozialhilfe für bedürftige Familien und eine steuerfinanzierte Rentenversicherung wurden im letzten Jahrzehnt eingeführt. Die Studie untersucht, wie sich die Einkommenssituation von Haushalten unter Einbeziehung direkter und indirekter Steuern und Transfers verändert und welche Auswirkungen dies auf die Gesamtverteilung hat. Um staatlich subventionierte Dienstleistungen einbeziehen zu können, werden diese zunächst in Geldwerten bemessen. Für öffentliche Kinderbetreuung und Bildung werden hierbei die Ausgaben, die der Staat für die Bereitstellung der Leistungen aufwendet, als Maßstab herbeigezogen (Produktionskostenansatz), während bei der öffentlichen Gesundheitsversorgung der

Versicherungsansatz angewandt wird. Dieser stützt sich auf detaillierte Statistiken der beiden Versicherungsfonds über Kosten und Inanspruchnahme von Leistungen, die nach Alter, Geschlecht und Region aufgeschlüsselt sind und auf deren Grundlage sich eine differenzierte Versicherungsprämie errechnen lässt. Nach Einbeziehung dieser in Geldwerten bezifferten Bildungs- und Gesundheitsleistungen sprechen wir von einem erweiterten Einkommenskonzept.

Gesamt betrachtet reduziert das Steuer- und Transfersystem die Ungleichheit in den erweiterten Haushaltseinkommen gemessen am Gini Koeffizienten um etwa 15% gegenüber den Markteinkommen vor staatlicher Intervention. Dies entspricht einer Minderung des Gini Koeffizienten um 7 Prozentpunkte von 0.47 im Markteinkommen auf 0.4 im erweiterten Einkommen. Im ländlichen Raum wird dabei deutlich stärker umverteilt als im urbanen. Dennoch reduziert staatliche Umverteilung die starken regionalen Ungleichheiten kaum: Etwa 20% der Ungleichheit im Land ist auf das Gefälle zwischen den Regionen (Küste, Hochland und Regenwald) zurückzuführen, dieser Anteil bleibt auch nach staatlicher Intervention konstant. Während aggregiert betrachtet 7 Prozentpunkte beträchtlich erscheinen mögen, fällt bei einer genaueren Betrachtung ins Auge, dass diese größtenteils durch staatliche Dienstleistungen, insbesondere Bildung, erzielt wird. Der monetäre Wert dieser Leistungen ist gemessen an den Einkommen der unteren 20% der Bevölkerung sehr hoch, darüber hinaus werden öffentliche Leistungen überproportional von ärmeren Bevölkerungsgruppen genutzt, während mittlere und obere Einkommensgruppen stärker auf private Angebote zurückgreifen. So erzielen öffentliche Bildung und Gesundheit eine Minderung des Gini Koeffizienten um vier Prozentpunkte, während Sozialtransfers nur etwa einen Punkt, Einkommenssteuern und Sozialabgaben trotz ihrer progressiven Ausgestaltung nur zwei Punkte beitragen. Regressive Konsumsteuern schlagen in der aggregierten Betrachtung hingegen kaum zu Buche. Die geringe Wirkung von Einkommens- und Konsumsteuern ist unter anderem auch auf die hohe Informalität der peruanischen Wirtschaft zurückzuführen.

Obwohl öffentlich finanzierte Bildungs- und Gesundheitsleistungen gerade für die unteren Einkommensdezile von hohem Wert sind, können sie Einkommensarmut nicht (ausreichend) bekämpfen. Der Beitrag des Wohlfahrtsstaats zur Armutsreduzierung ist dementsprechend gering: er reduziert extreme Armut um etwa 21% oder 3 Prozentpunkte, moderate Armut jedoch kaum. Auch nach staatlicher Intervention fallen – gemessen am monetären Einkommen – noch etwa 10% der Bevölkerung unter die absolute und 27% unter die moderate Armutsschwelle.[1] Dies ist sowohl auf das relativ

[1]Gemessen am Konsum fallen die extreme Armut mit 4% und die moderate Armut mit 23% geringer aus, da Haushalte am unteren Ende der Einkommensverteilung einen beträchtlichen Teil

niedrige Finanzvolumen von Sozialtransfers wie auch auf die geringe Abdeckung der armen Bevölkerung zurückzuführen. Mehr als 50% der aufgrund ihrer Markteinkommen als arm einzustufenden Haushalte beziehen keine staatlichen Geldleistungen.

Im zweiten Beitrag werden die Wirkungen des Sozialtransferprogramms Juntos evaluiert. Juntos ist gemessen am Finanzvolumen und Anzahl der Begünstigten das größte Transferprogramm Perus und fällt in die Kategorie der sogenannten *Conditional Cash Transfers* (CCTs, bedingte Sozialleistung). CCTs wurden in Lateinamerika seit Ende der 1990'er Jahre in nahezu jedem Land vor dem Hintergrund der niedrigen Bildungs- und Gesundheitsversorgung und hohen Kinderarbeitsquote der ärmeren Bevölkerungsschichten eingeführt. Sie knüpfen die Zahlung einer Sozialhilfe an die Bedingung, dass Kinder primäre Gesundheitsdienstleistungen in Anspruch nehmen und regelmäßig die Schule besuchen. Ein ausdrückliches Ziel ist es, Chancengleichheit zu erhöhen und das Armutsrisiko benachteiligter Kinder durch Investitionen in ihr Humankapital langfristig zu mindern. Die Analyse evaluiert anhand eines quasiexperimentellen Ansatzes die Wirkungen des Programms auf Bildungserfolge von Kindern. Hierfür werden Kinder aus Juntos-Familien in Gemeinden, die von Beginn an zu Zielregionen des Programms gehörten, verglichen mit Kindern aus Gemeinden, die erst zu einem späteren Zeitpunkt in das Programm integriert wurden. Mithilfe eines statistischen *Matching*-Verfahrens wird für beobachtbare Unterschiede wie etwa die Einkommens- oder Bildungssituation der Eltern und regionale Faktoren kontrolliert, während mögliche unbeobachtbare Einflüsse wie etwa der Wert, den Eltern Bildung beimessen, durch einen *difference-in-difference* Ansatz herausgerechnet werden.

Die Evaluation kommt zu dem Ergebnis, dass Juntos einen signifikant positiven Effekt auf das Bildungsniveau von Kindern hat: die Teilnahme am Programm erhöht die Wahrscheinlichkeit, dass Kinder die Schule besuchen und den in ländlichen Regionen oft kritischen Übergang von der Grund- in die Sekundarschule schaffen, um 5-9 Prozentpunkte. Diese Effekte sind ausschließlich in den älteren Altersgruppen zu beobachten, während im Grundschulalter kaum Unterschiede hinsichtlich des Schulbesuchs bestehen. Da besonders in den hier betrachteten frühen Jahren des Programms keine systematische Überprüfung der Erfüllung von gestellten Bedingungen stattgefunden hat, ist dies kein rein mechanischer Effekt. Keine positiven Effekte und sogar eine leicht negative Tendenz werden hingegen bei Ergebnissen in standardisierten Sprach- und Mathematiktests beobachtet. Während Kinder aus Juntos-Familien hier schon vor Programmteilnahme schlechter als andere abschnitten, vergrößert sich dieser Abstand mit der Zeit weiter. Wenn auch statistisch nicht signifikant, so könnte diese

ihres Konsums durch private Zuwendungen bestreiten. Die offiziellen Statistiken Perus messen Armut auf Grundlage des Konsums.

negative Tendenz jedoch darauf hinweisen, dass Juntos kein geeignetes Instrument für den Aufbau von Humankapital im Sinne von kognitiven Fähigkeiten darstellt. Diese Diskussion schließt an die Kritik an, dass CCTs aufgrund ihrer Nachfrageorientierung das Erfordernis eines verbesserten Angebots in der Bildungsinfrastruktur und -qualität teils außer Acht lassen.

Der dritte und letzte Beitrag schließlich widmet sich am Beispiel von Peru und Chile der Fragestellung, wie entscheidend das Elternhaus für die eigene Wohlfahrt im späteren Leben ist. Während sich die Forschung zu intergenerativer sozialer Mobilität einig darin ist, dass es ein gewisses Maß an Beständigkeit zwischen der sozialen Stellung von Eltern und der ihrer erwachsenen Kindern wohl immer geben wird, herrscht kein Konsens darüber, wann solche Zusammenhänge als Chancenungleichheit gewertet werden können. Empirische Studien beziffern die Korrelation zwischen elterlichem Arbeitseinkommen und das ihrer erwachsenen Kinder auf etwa 45% in den USA und deutlich niedriger etwa in Großbritannien. Für Lateinamerika gibt es bisher nur wenige empirische Studien, insbesondere aufgrund der mangelnden Datenlage. Diese schätzen die soziale Mobilität in Bezug auf Einkommen und Bildung jedoch deutlich geringer als in den USA oder Großbritannien ein.

In Peru und Chile hat in den letzten Jahrzehnten eine starke Bildungsexpansion stattgefunden, die das allgemeine Bildungsniveau gehoben hat. Das Kapitel betrachtet die Geburtsjahrgänge 1953-1990 und kommt zu dem Ergebnis, dass absolut betrachtet die Mobilität in beiden Ländern gestiegen ist: auch Kinder aus bildungsfernen Elternhäusern erreichen höhere Schulabschlüsse und der Anteil derjenigen mit Aus- oder Hochschulbildung in der Bevölkerung ist gestiegen. Relativ zur eigenen Altersgruppe betrachtet ist der Bildungserfolg der Eltern für die jüngeren Kohorten jedoch noch fast so entscheidend für die Position in der Bildungsverteilung wie er es für die älteren Kohorten war. Dies wird anhand von Übergangsmatrizen deutlich, die darstellen, wie sich die Wahrscheinlichkeit, einen bestimmten Bildungsgrad zu erreichen, mit der elterlichen Bildung verändert. So gelingt es in Chile immerhin 9% und in Peru 6% derjenigen, deren Eltern keinen formalen Schulabschluss haben, eine Hochschul- oder Berufsausbildung zu absolvieren. Dies steht aber im Gegensatz zu einer Wahrscheinlichkeit von 75% in Chile und 56% in Peru für Kinder von Eltern, die ebenfalls über einen höheren Bildungsabschluss verfügten. In den Geburtsjahrgängen 1977-1990 erreichen in Chile noch immer 16% nur einen Grundschulabschluss und in Peru 9% gar keinen Abschluss. Die Wahrscheinlichkeit hierfür tendiert bei Kindern aus gut gebildeten Familien in beiden Ländern jedoch gegen null, während sie am unteren Ende der Bildungsskala deutlich über dem Durchschnitt liegt.

Dieser starke Zusammenhang spiegelt sich auch in der Einkommensmobilität wider: Aufgrund der Datenlage beschränkt sich die Analyse auf die Geburtsjahrgänge 1977-1990. Zudem muss das elterliche Einkommen mithilfe von Querschnittsdaten der Elterngeneration imputiert werden, da keine Langzeitstudien vorliegen. Laut dieser Schätzung ergeben sich Einkommenselastizitäten zwischen Eltern und Kindern von etwa 63-76%. Diese rein statistische Korrelation liefert zwar noch keinen Aufschluss über die Ursachen des Phänomens. Dennoch zeigt der Vergleich mit anderen Ländern, dass Peru und Chile eine besonders hohe Beständigkeit von Einkommen und Bildung zwischen den Generationen aufweisen. Dies legt die Vermutung nahe, dass ungleiche Startpositionen eine Rolle für den eigenen Bildungs- und Einkommenserfolg im späteren Leben spielen und auch das weiterhin hohe Niveau an Ungleichheit in den Gesellschaften mitprägen.

5.3 Fazit

Die Dissertation kommt zu dem Schluss, dass der Wohlfahrtsstaat in Peru zwar über die letzten beiden Jahrzehnte einen Um- und Ausbau erlebt hat, der für Umverteilungsziele wichtig ist. Das soziale Sicherungssystem erstreckt sich nicht mehr nur primär auf eine beitragszahlende Minderheit, sondern bietet einem Großteil der Bevölkerung Absicherung gegen verschiedene Armutsrisiken. Jedoch sind die Sozialausgaben gemessen an ihrem Anteil am Bruttoinlandsprodukt weiterhin – auch im regionalen Vergleich – gering, zudem wird ein beträchtlicher Anteil der armen Bevölkerung – mehr als 50% – von Maßnahmen der sozialen Sicherung nicht erreicht. Dies trägt dazu bei, dass der Wohlfahrtsstaat in seiner derzeitigen Ausgestaltung einen relativ geringen Beitrag zur Minderung der Ungleichheit leistet. Das Niveau an Armut und Ungleichheit liegt weiterhin hoch, während die Chancen für sozialen Aufstieg stark durch das Elternhaus geprägt werden. Die vergangenen 15 Jahre waren durch hohes Wirtschaftswachstum gekennzeichnet, was zudem insbesondere den unteren Einkommensgruppen zugute kam. In Zeiten weniger ausgeprägten Wachstums besteht jedoch das Risiko, dass sich die zuletzt positiven Trends der Armutsreduzierung umkehren. Der Wohlfahrtsstaat kann einen wichtigen Beitrag leisten, um dies zu verhindern und die sozioökonomische Entwicklung des Landes zu fördern. Peru ist als Beispiel über die Landesgrenzen hinaus eine relevante Fallstudie, da viele Länder der Region vor sehr ähnlichen Herausforderungen beim Ausbau ihres Wohlfahrtsstaats stehen.