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Working Paper

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Discussion Paper, No. 2018/7

Provided in Cooperation with:

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Suggested Citation: Gaentzsch, Anja (2018) : The distributional impact of social spending in Peru, Discussion Paper, No. 2018/7, Freie Universität Berlin, School of Business & Economics, Berlin

This Version is available at:

<https://hdl.handle.net/10419/178495>

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The distributional impact of social spending in Peru

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Discussion Paper

Economics

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Abstract

Peru has made great progress in reducing poverty and inequality in the past decade alongside high economic growth. Albeit this progress, the incidence of poverty and inequality remain high. 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 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 I30 H53 I38

Keywords: Income distribution, poverty, social protection, public services, non-cash income, Peru

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

*Acknowledgements: I would like to thank Prof Viktor Steiner, Rolf Aaberge, Francisco Ferreira and Prof Armando Barrientos for their comments and suggestions. I would also like to thank Liz Girón Pena, Dante Betrán, and Woody Wong Espejo for their support in accessing administrative data, and participants of workshops in Italy, Manchester and Berlin for their feedback.

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). Despite its clear links to securing basic living standards, social protection has not played a large role in the development discourse until the late 1990s and has only more recently become recognized as an important instrument to build productive capacities and reduce the high levels of inequality that developing economies often characterize (Devereux, 2001). 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, 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 countries¹ 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 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, 2015a).

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

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

Table 1: Poverty and inequality in Peru since 2004

Year	Population (in mio.)	Poverty incidence			Gini index
		national	urban	rural	
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

Source: SEDLAC (CEDLAS and the World Bank).

of Economic Performance and Social Progress (also referred to as the Stiglitz-Sen-Fitoussi Commission) (Stiglitz et al., 2009) explicitly included among 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 social services including education 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.

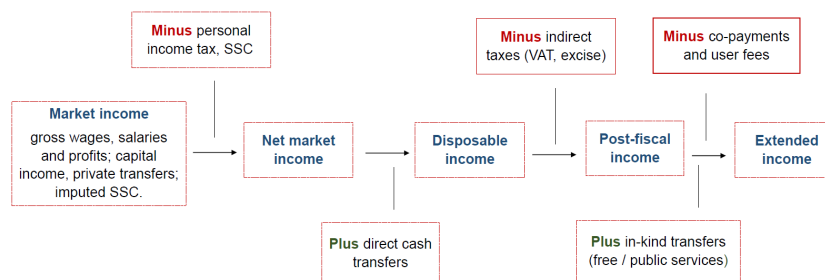
2 Methods and Data

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 poverty 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. Graph 1 illustrates our approach.

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.

Figure 1: Methodology: Constructing extended income



Source: Adapted from Lustig and Higgins (2013)

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 have hardly 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 Constructing income concepts

As figure 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 sensitivity analysis where pensions are treated as market income). 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 taxes² and thus arrive at post-fiscal income. Finally, we add the value of public services that households receive in early 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. Tabel 8 in the appendix 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

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

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 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 forward 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 scale³, 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

2.3 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 6 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

³To 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 in extended income.

⁴Approximately 46% of the population are below the age of 25 while only 6.6% are aged 65 or above (INEI, 2015b).

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? 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 is better off 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 offer voluntary affiliation for non-target populations, but their 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 of the insurance funds to calculate insurance premiums that vary by insurance fund, age, gender and department. Details on the method of calculation are provided in appendix 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.

2.4 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 household 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 Manage-

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

ment 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.

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 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 (3.4% 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 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 public transfers (including income from contributory pensions) does not vary greatly between the bottom four income quintiles, while it is considerably higher 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.

3.1 Revenues: Personal income tax, contributions and VAT

As typical 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 af-

⁶In 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% of GDP and 51% (CEPAL).

⁷The 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: Government finances in 2014

	PEN	US
GDP (Mio.)	574 880	189 710
GDP per capita	18 656	6 157
Population	30.9 Mio	
<i>As % of GDP</i>		
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	
<i>As % of</i>	<i>Pub. Spend.</i>	<i>GDP</i>
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 Statistics Institute (INEI), Ministry of Economy and Finance, National Bank of Peru.

fects social insurance: Peru has contributory health and pension schemes that are mandatory for dependent workers only. The public pension 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 IMF estimates. 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 fall 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

⁸The Tax Code exempts basic food items, children's books and notebooks, public transport (except

Table 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). 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.

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 income equal to that in national accounts.

3.2 Social assistance

Peru's *National Strategy for Development and Social Inclusion: Include to Grow* (MIDIS, 2014) under the Ministry for Social Development 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 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 had 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 In total, spending on social

railway and airway), and cultural events from VAT, and applies higher rates to alcohol and tobacco. We regard mobile vendors (operating by tricycle or van) as informal. Additionally, we regard bakeries and small market stalls operating in the jungle and above 2500 meter altitude as informal since the Tax Code exempts establishments that are located above 2500 meter from paying taxes.

⁹Qali 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

assistance represents 4.5 percent 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 design¹⁰.

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 of these pay a reduced premium (less than 2%) 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 PEAS¹¹. 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.

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 to low coverage in remote rural areas. Pre-school facilities are also insufficient in parts of the country.

(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.

¹⁰These 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).

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

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.

3.5 Other social expenditure

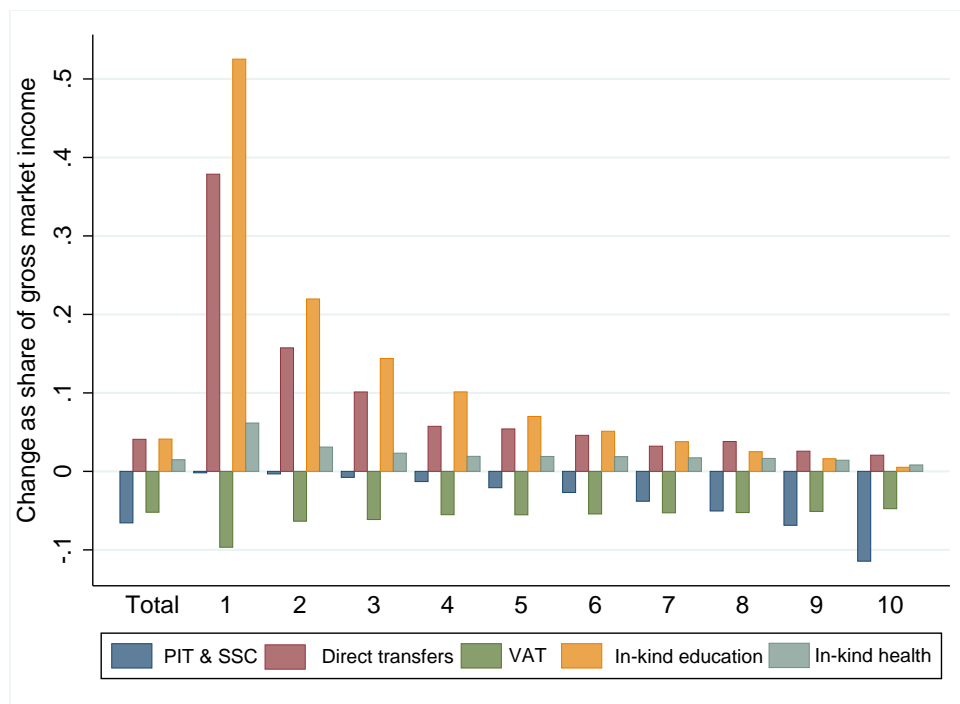
Further social spending categories include housing and sanitation, which together make up less than 1% of GDP. These comprise measures to improve infrastructure in informal settlements and install or upgrade sanitation infrastructure in rural and urban areas. Since we cannot identify whether individual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

4 Results

We start out by examining how fiscal policy affects households along the income distribution. Graph 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 decile, it only taxes away around 11% of gross income. Unsurprisingly, VAT burdens lower income deciles more although they spend a large share of their overall budget on basic food items, which are exempt from VAT.

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. Graph 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 graph further shows that the distance between deciles increases at higher deciles, suggesting that inequality is larger in the upper half of the distribution.

Figure 2: Redistributive impact by decile



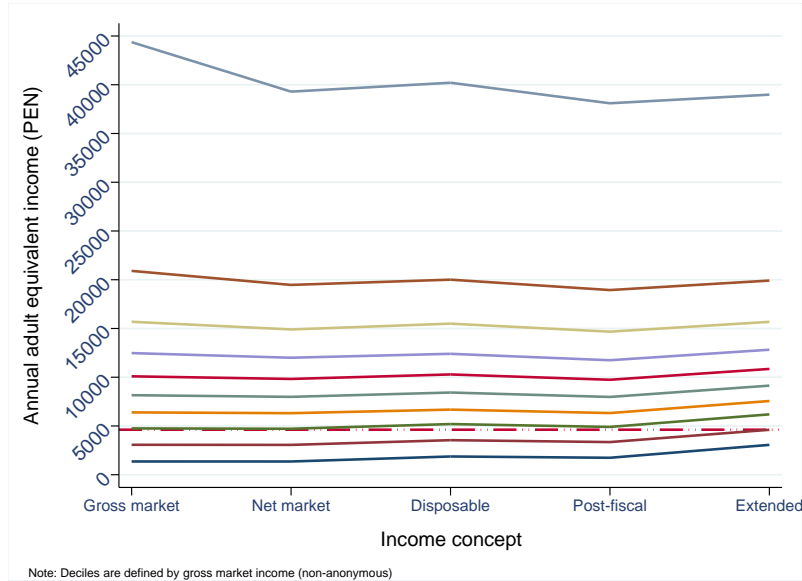
The dotted red line represents the relative poverty threshold measured as 50% of median disposable income. It follows the third decile closely and only falls slightly below it in disposable income. This illustrates that the incidence of relative poverty remains largely unaffected by redistribution through direct taxation and transfers, but falls when we look at an extended income concept.

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 interpretation¹², 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 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 measure, the decrease in inequality observed here is substantive. However, when we look at the contribution of the different fiscal measures, 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 two. This is indicative not only of the small transfer amounts that social assistance programmes pay, but also of the relatively high value of

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

Figure 3: Mean Income by decile



public education and health when compared to the incomes of the poor. While this underlines again how important it is to include services in the analysis, it also raises questions on the role of service quality, 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 11 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 4 measures average changes at the national level. As illustrated above, large inequalities persist between urban and rural areas in Peru ¹³. Looking at these areas separately shows that overall inequality is much higher in rural areas than in urban areas. At the same time, the reduction in inequality achieved is also higher in rural areas: here, the Gini index sees a decrease of more than 10 percentage points. In contrast,

¹³The classification of urban and rural adopted here is according to ENAHO: an area with more than 2000 inhabitants counts as urban.

Table 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%
<i>Urban only (N: 77 819)</i>					
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%
<i>Rural only (N: 38 256)</i>					
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).

the reduction experienced in urban areas figures at only 5.5 percentage points. Again, the largest share can be attributed to in-kind benefits: in rural areas, they account for 8 and in urban areas for 3 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 in rural areas and even in urban areas, they contribute only 2 points and are statistically not significant. In urban areas, only the reduction through in-kind services is statistically significant, in rural areas the reduction through cash transfers is also significant (see Table 11).

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 9 and 10 in the appendix 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 9), 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 10). 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 on 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 11).

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 impact of public services. This suggests that differences between regions must be significant. A main advantage of the Gini index is its ease of interpretation. However, it cannot easily be decomposed. The Theil index, which belongs to the family of general entropy measures, can in turn be decomposed into changes between and within groups. While we only distinguished between urban and rural areas above, 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 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 regions 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 metropolitan region of 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 regions. The lower panel of table 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. We compute the ratio of within to between group inequality: it 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 inequality between the regions contributes less than 20%. Graph 7 (appendix) plots the densities of log incomes by regions 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 regions. The next section turns the focus on the bottom of the distribution to examine whether the welfare state reduces poverty effectively.

4.3 Poverty

Povrty 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

Table 5: Inequality of gross and extended income within regions

Region	Income share	Population share	Mean income	Group Theil	
<i>Gross market income</i>					
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	
<i>Extended income</i>					
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.

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). Summing these two components gives the moderate poverty line.¹⁴ Assessing our income concepts against these poverty lines 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 income¹⁵. The second

¹⁴Peru 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 methodology was revised, 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 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 (2015a).

¹⁵We have alternatively scaled absolute poverty lines up by the mean ratio of per capita weight and equivalence weight in the same reference population as used for the calculation of poverty lines. Results do not differ from the more pragmatic approach of using per capita income.

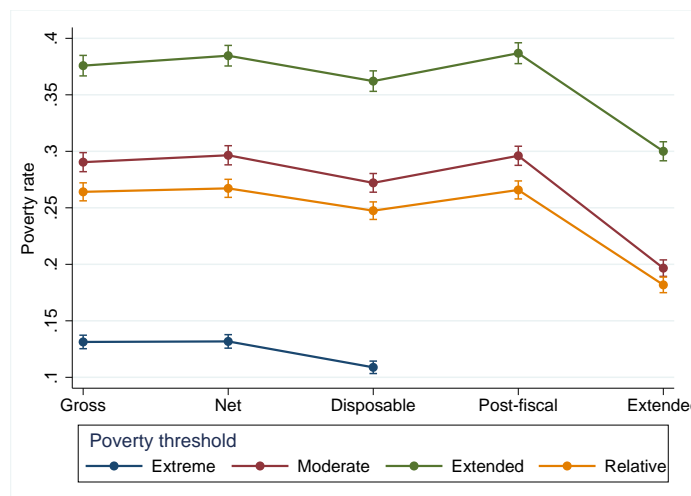
one is more demanding: we calculate an extended poverty line that is consistent with the approach Peru uses for calculating its monetary poverty lines.¹⁶ That is, we observe consumption of the reference population that includes the costs for public services in health and education. We define the needs 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 poverty line. 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, counts the fraction of the population below the poverty threshold while the poverty gap, or FGT1, indicates the depth of poverty (Foster et al., 1984). 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. Graph 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 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 measures 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 or 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. Graph 8 (appendix) 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 the metropolitan region of Lima as the richest region of the country. Extreme poverty experiences the strongest decline in the highlands where it is also highest to begin with.

¹⁶I would like to thank Francisco Ferreira from the World Bank Research Department for his recommendation to use this approach.

¹⁷There are very few households that report zero income in gross and disposable aggregates. We drop these from the analysis.

Figure 4: Poverty headcount ratio along income concepts



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. Table 6 reports the poverty gap index 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 arrive at the mean per poor transfer needed, we simply divide the former by the headcount ratio.

A gap of 3.8% on a monthly threshold of extreme poverty of PEN 161 (approximately 3.5 USPP per day and thus higher than the World Bank absolute poverty line for upper middle income countries) means an average lumpsum payment of PEN 6.1 per person per month to pay for closing the gap - each poor individual would need to receive on average PEN 56.2 per month. The aggregate shortfall is less than 0.1% of GDP and hence much less than Peru spends on social assistance. This obviously assumes perfect targeting, disregards transaction costs and inequality among the poor. It is hence is 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 PEN114, and slightly higher at PEN119 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). Although

on aggregate the costs sum to less than 0.2% of GDP, the per poor transfer is actually higher than what targeted assistance pays to the poor: the CCT Juntos pays on average PEN100 per month family regardless of family size and is hence not primarily designed as an income transfer to combat poverty. Pensión 65 pays a monthly PEN125 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.

Table 6: The poverty gap index 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	0.033%
Moderate	10.22%	0.0020	303	31.0	113.9	0.169%
Extended	9.60%	0.0018	370	35.6	118.5	0.193%
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. The per poor transfer is calculated by multiplying the per person transfer with the poverty headcount ratio.

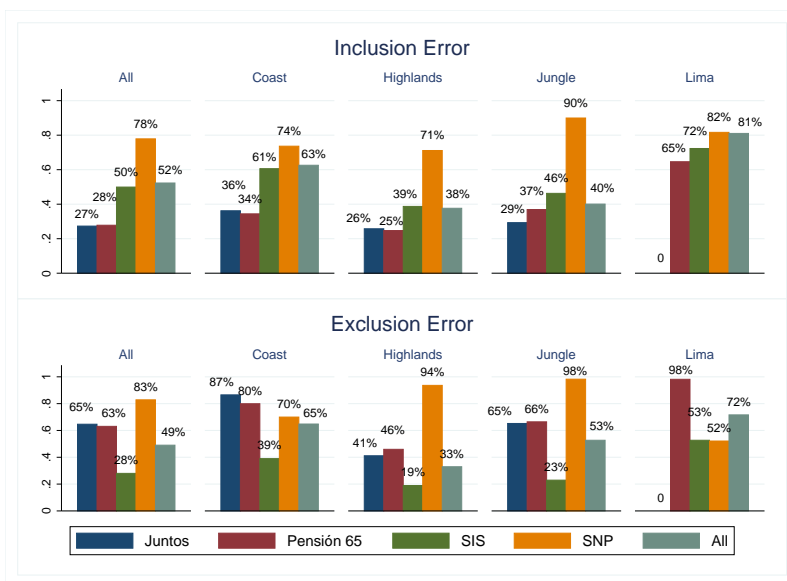
4.4 Targeting of transfers

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 Graph 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 benefit¹⁸. 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. Given 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 multi-dimensional and incorporate income and consumption levels but also housing conditions, assets and the number of illiterate household members among others. Such multidimensional proxy-means test is more likely to identify vulnerability to chronic poverty than a

¹⁸These are: having children below the age of 14 for Juntos, being aged 65 or above and not receiving a contributory pension in the case of Pensión 65, and not being enrolled in EsSalud in the case of SIS.

Figure 5: Targeting error by region



one-time income measure that we use. 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 benefits¹⁹, 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 prioritized for early stages of rollout when Juntos and Pensión 65 were introduced 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 in the highlands and the jungle. 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.

¹⁹In the case of Juntos, transaction costs are related to meeting conditionalities, but also 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.

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 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 criteria (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 7: Raising social protection spending

	GDP share	Point reduction			Post-transfer incidence		
		Ex. Pov.	Mod. Pov.	Gini	Ex. 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: Ex. Pov. refers to the headcount ratio of extreme poverty and Mod. Pov. refers to the headcount ratio of moderate poverty.

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 tax and direct transfer system is largely neutral in distributional terms. 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 political 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 begun 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 is a primary concern of the population and associated with high levels of inequality, may strengthen preferences for more redistribution in the future (Herrera, 2017).

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 by 16 to 20 Gini points (OECD, 2017b). Building up a stronger system of social protection that shields people from risk and vulnerability is a goal that the Peruvian government has adopted in the recent decade as evidenced by the creation of the MIDIS. 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 small: 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. While 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 and their implications for valuating public services 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 directly attributed 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.

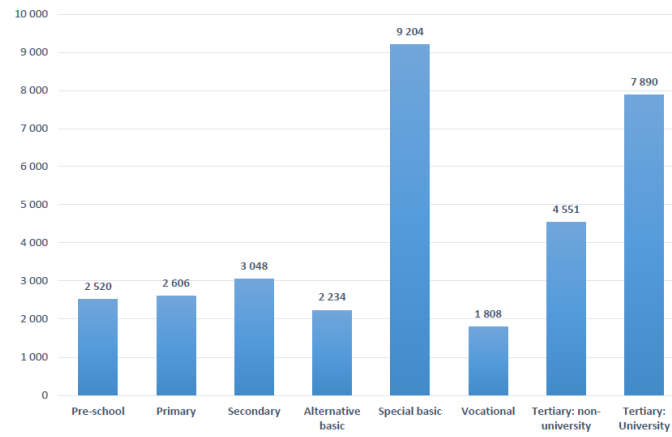
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Appendix A Graphs

Figure 6: Annual education spending per student by level



Note: Spending refers to mean annual spending per student per level in PEN, 2014. Source: Ministry of Education.

Figure 7: Densities of log income by regions

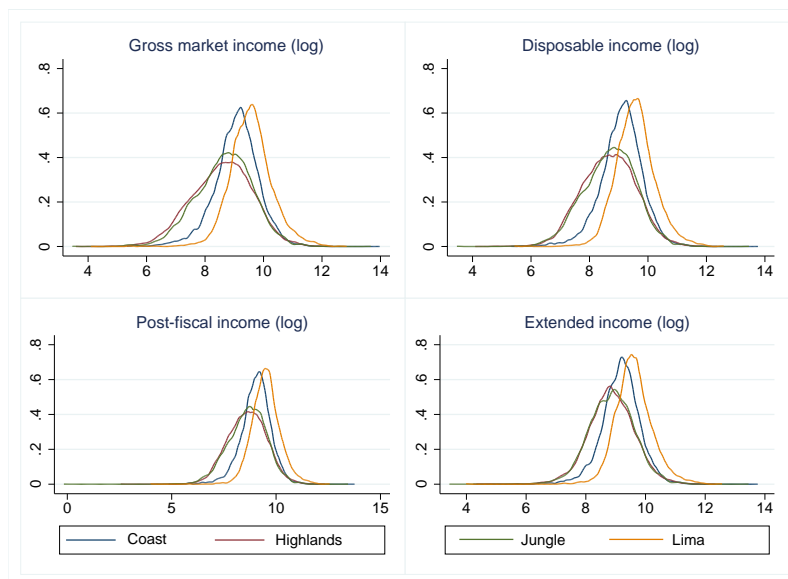
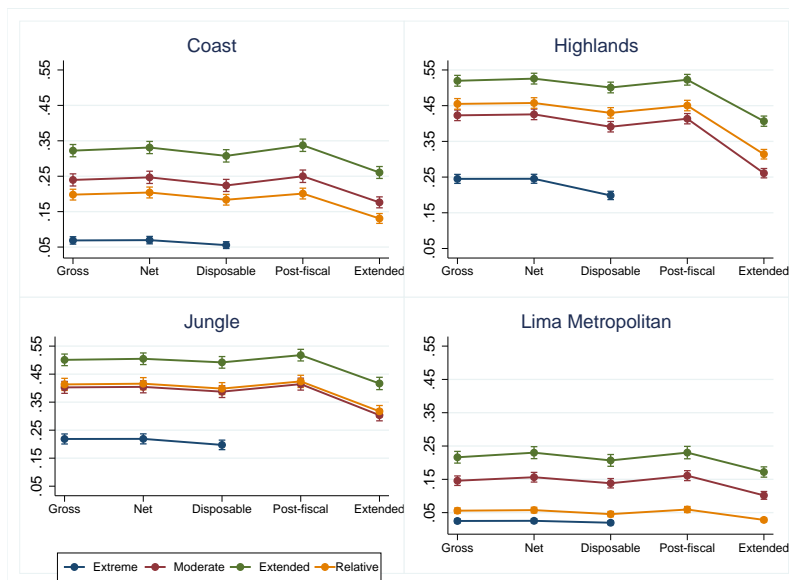


Figure 8: Poverty headcount ratio by regions



Appendix B Tables

Table 8: Tax and benefit receipts in ENAHO and administrative accounts

<i>Social assistance</i>				
	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%
<i>Revenues</i>				
	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 3.1).

Table 9: 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%
<i>Urban only (N: 77 819)</i>					
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%
<i>Rural only (N: 38 256)</i>					
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.

Table 10: Sensitivity of changes in inequality along income concepts

Indicator	Gross	Net	Disposable	Post-fiscal	Extended
<i>V2: Public pensions treated as deferred income</i>					
Gini	0.472	0.454	0.446	0.447	0.406
P90/10	11.55	10.67	9.39	9.46	6.67
<i>V3: EsSalud contributions borne fully by employer</i>					
Gini	0.469	0.454	0.446	0.447	0.406
P90/10	11.07	10.54	9.39	9.46	6.67
<i>V4: Health in-kind benefits valued by actual-use approach</i>					
Gini	0.473	0.454	0.446	0.447	0.400
P90/10	11.39	10.54	9.39	9.46	6.29
<i>V5: Public pensions as income, EsSalud borne by employer, health as actual use</i>					
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.

Table 11: Confidence intervals of estimated Gini coefficients from table 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
<i>Urban areas</i>					
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
<i>Rural areas</i>					
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).

Appendix 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.

We first 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 service by subgroup with average costs per service. 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 an average cost profile by age and gender. This covers medical costs of the insurance but not administrative or other non-service costs. We calculate risk factors as the ratio of subgroup cost profile and average service cost per affiliate. We apply this risk factor to the average total cost per affiliate to arrive at the insurance value. In short, the insurance value is defined as:

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

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 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 legislative 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.

Diskussionsbeiträge - Fachbereich Wirtschaftswissenschaft - Freie Universität Berlin
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