



SOCIAL SPENDING, TAXES AND INCOME REDISTRIBUTION IN PARAGUAY

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COMMITMENT TO EQUITY



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ABSTRACT

How much redistribution does Paraguay accomplish through social spending and taxes? How progressive are revenue collection and social spending? Using a standard fiscal incidence analysis, we quantify the reduction in inequality and poverty in Paraguay across income concepts, and contextualize these results by placing Paraguay in comparative perspective with other Latin American countries. Paraguay achieves a relatively small reduction in inequality, even when in-kind education and health benefits are taken into account. Direct taxes are progressive, indirect taxes are regressive, and total taxes are regressive. Social spending is progressive in relative terms, but less so than in any of the other countries analyzed.

Keywords: inequality, poverty, Paraguay, social spending, taxes

JEL Codes: H22, D31, I32, I38

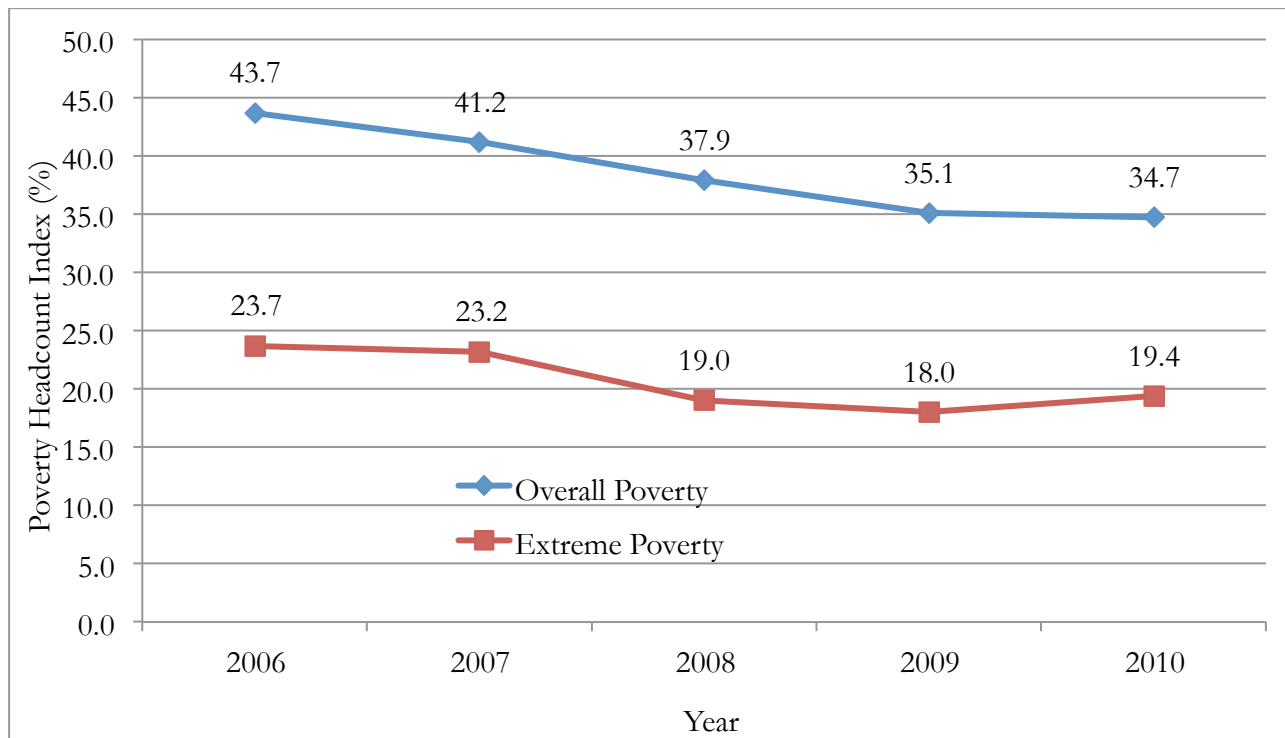
¹ This paper was prepared for the LAC Vicepresidency of the World Bank and is an output of the Commitment to Equity (CEQ) project. Led by Nora Lustig and Peter Hakim the *Commitment to Equity* (CEQ) project is designed progressively to assess the of social spending and taxes, their impact on poverty reduction, and their redistributive effects. It does this through a comprehensive incidence analysis and a diagnostic framework. The incidence analysis addresses the following three questions: How much redistribution and poverty reduction does a country accomplish through social spending and taxes? How progressive are revenue collection and social spending? What could be done to further increase redistribution and improve re-distributional effectiveness? CEQ is the first framework to comprehensively assess the tax and benefits system in developing countries and to make the assessment comparable across countries and over time. Initially, CEQ has focused on Latin America. CEQ/Latin America is a joint project of the Inter-American Dialogue (IAD) and Tulane University's Center for Inter-American Policy and Research (CIPR) and Department of Economics. The project has received financial support from the Canadian International Development Agency, the Norwegian Ministry of Foreign Affairs, the United Nations Development Programme's Regional Bureau for Latin America and the Caribbean, and the General Electric Foundation. <http://www.commitmenttoequity.org/>

² The authors are grateful to Emily Travis for her research assistantship.

1. OVERALL CONTEXT

In 2010, Paraguay's GDP per capita was equal to US\$5,159 in PPP.³ Paraguay's economy has historically reported slow rates of growth; higher commodity prices, however, led to higher growth rates since 2003 (with the exception of 2009, the year of the global financial crisis). As a result, poverty rates declined. According to the Dirección de Estadística, Encuestas y Censos (Office of Statistics, Surveys and the Census), in 2010, the overall incidence of poverty declined to 34.7% of the population (Figure 1).⁴ Extreme poverty, however, has declined more slowly, and in 2010 this indicator registered an upturn to 19.4% of the population.⁵ This situation helped fuel the government's decision to prioritize social policies targeting populations living in extreme poverty, especially in rural areas. In contrast with other Latin American countries, Paraguay's population has retained a significant rural component. In 2010, sixty percent of Paraguay's population was classified as urban and forty percent as rural. It is in the country's rural sector, moreover, where poverty, and especially extreme poverty, has been concentrated. Paraguay features high levels of inequality but similarly to most of the countries in the region, inequality has declined since 2003 (Figure 2).

FIGURE 1. THE EVOLUTION OF OVERALL AND EXTREME POVERTY IN PARAGUAY, 2006 – 2010.



Source: Dirección de Estadística, Encuestas y Censos (Office of Statistics, Surveys and the Census) using the *Encuesta Permanente de Hogares* (Ongoing National Household Survey).

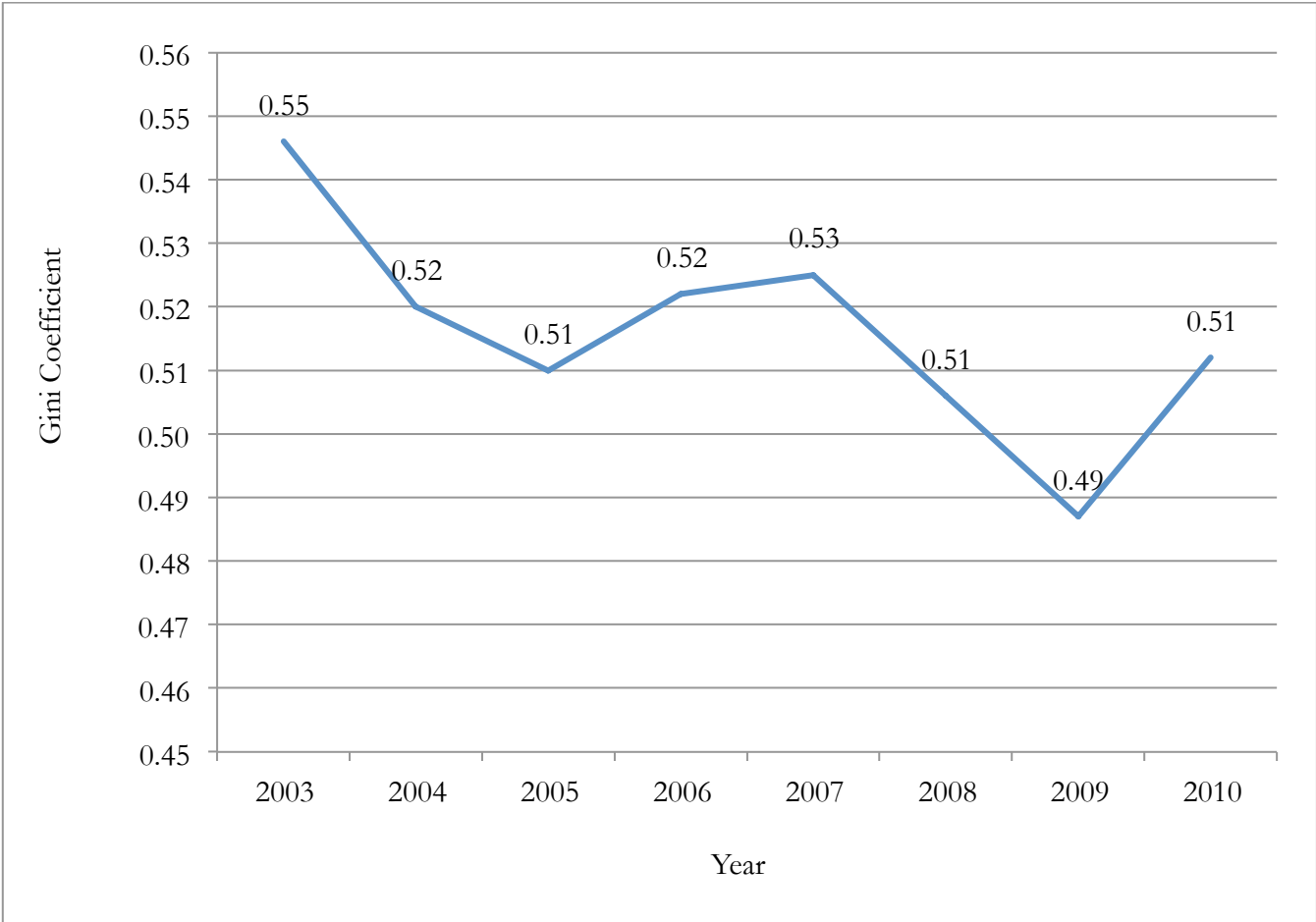
Note: The figures from 2006 through 2008 have been adjusted in accordance with new weighting factors.

³ PPP means purchasing power parity.

⁴ The overall poverty lines used by the Dirección de Estadística, Encuestas y Censos in their calculations are: 525,960 guaraníes per month in metropolitan areas, 376,753 guaraníes per month in urban areas, and 325,707 guaraníes per month in rural areas. Using the international (moderate) poverty line of US\$ 4 PPP per person per day placed the overall level of poverty at 37.5% of the population in 2005, and at 27.2% for 2010.

⁵ The extreme poverty lines used by the Dirección de Estadística, Encuestas y Censos in their calculations are: 317,510 guaraníes per month in metropolitan areas, 243,662 guaraníes per month in urban areas, and 225,470 guaraníes per month in rural areas.

FIGURE 2. THE EVOLUTION OF INEQUALITY IN PARAGUAY, 2003 – 2010.



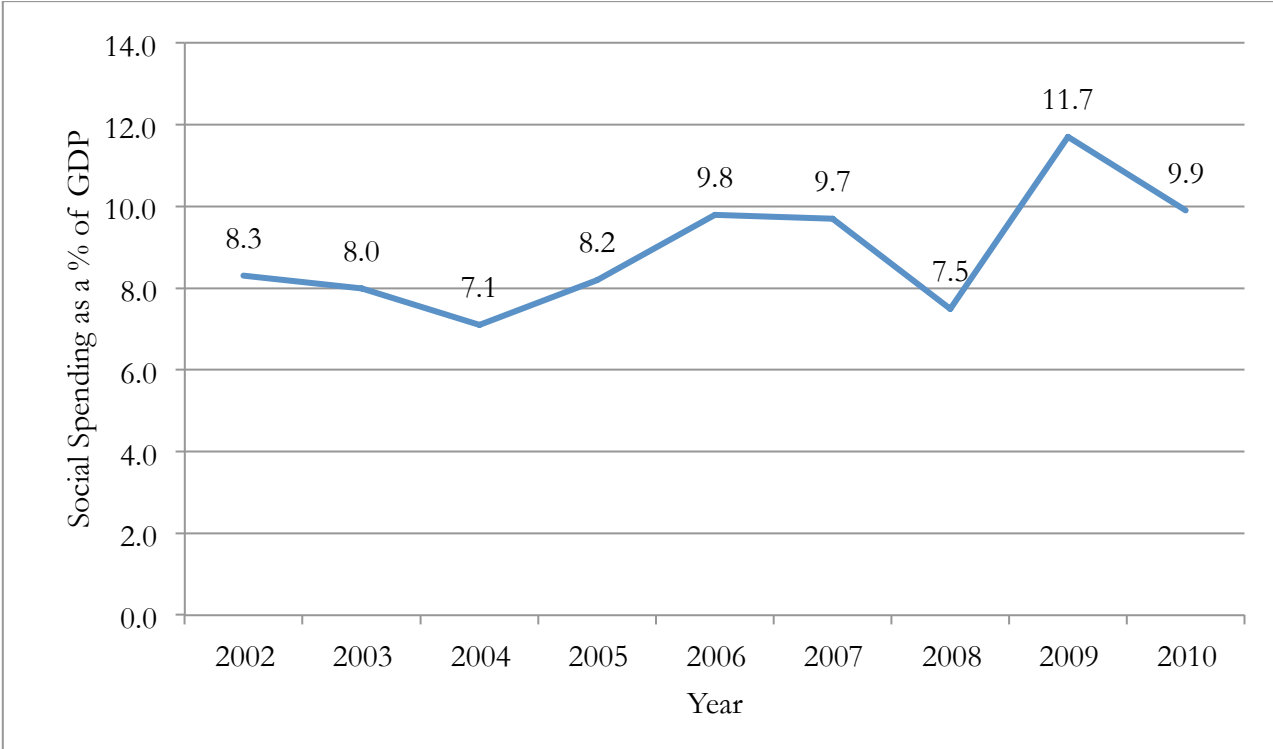
Source: Dirección de Estadística, Encuestas y Censos (Office of Statistics, Surveys and the Census) using the *Encuesta Permanente de Hogares* (Ongoing National Household Survey).

Note: The figures from 2003 through 2008 have been adjusted in accordance with new weighting factors.

Paraguay’s government revenues and spending are around 20% of GDP, a government size similar to Mexico and Peru and about half as large as Argentina’s and Brazil’s. For revenue collection, the government relies heavily on the Value Added Tax. In 2012, a personal income tax was enacted; before there was no direct income tax. According to government data, between 2002 and 2010, social spending grew from **8.2%** to **10.3%** of GDP (Figure 3)⁶.

⁶ This figure includes social spending at the central, departmental, and municipal levels, as well as spending by the National Electricity Administration on the social tariff for electric energy. Source: Ministerio de Hacienda.

FIGURE 3: PARAGUAY: SOCIAL SPENDING AS A % OF GDP, 2002 - 2010



Source: Ministerio de Hacienda (Ministry of Finance) and the Central Bank of Paraguay.

How much redistribution does Paraguay accomplish through social spending and taxes? How progressive are revenue collection and social spending? What could be done to further increase redistribution and improve re-distributional effectiveness? Using the *Encuesta Permanente de Hogares* (EPH) 2010, we apply standard incidence analysis to estimate the impact on inequality and poverty of direct taxes, indirect taxes, and social spending, here defined to include cash and food transfers and in-kind transfers in education and health in our benchmark scenario (and contributory pensions in the sensitivity analysis). Some caveats are in order. This exercise does not incorporate behavioral, life-cycle or general equilibrium effects. The analysis also does not look into the macroeconomic sustainability of taxation and social spending patterns. Nonetheless, this study is one of the most detailed incidence analyses for Paraguay to date.

The paper is organized as follows. Section 2 presents a summary of Paraguay’s social spending and taxes. Section 3 describes the data and methodology used in the incidence analysis.⁷ Section 4 presents the main results. Section 5 concludes.

2. PARAGUAY’S TAX AND GOVERNMENT BENEFITS SYSTEM

i Central government revenues

The Paraguayan Central Government is responsible for collecting government revenues, which are comprised of tax and non-tax revenues. Table 1 shows the relative size of each component of government revenues.

⁷ A more detailed description of certain aspects of the methodology is included in an Appendix.

TABLE 1. CENTRAL GOVERNMENT REVENUES IN PARAGUAY, 2010.

	% of total	% of GDP
Current revenues	98.6	18.9
Tax Revenues	70.8	13.6
Income Taxes	11.4	2.2
Excise Tax (ISC) -- Fuel	5.9	1.1
Value Added Tax (IVA)	33.8	6.5
Custom Duties	8.5	1.6
Non-tax Revenues	23.4	4.5
Retirement Fund Contributions (*)	7.1	1.4
Royalties and Compensation	12.5	2.4
Non-tax Donations	0.1	0.0
Non-tax Transfers	4.2	0.8
Other Non-Tax Revenues	3.8	0.7
Capital revenues	1.4	0.3
Total	100.0	19.2

Source: Ministerio de Hacienda (Ministry of Finance).

Note: (*) Contributions made by private sector employers and employees to Paraguay's Social Security Institute (Instituto de Previsión Social), a decentralized governmental entity, were not included in these calculations.

Tax revenues are derived predominantly from four main taxes: the value added tax (Impuesto al Valor Agregado, or IVA), the tax on the income of commercial, industrial and service activities (essentially the corporate income tax, Impuesto a la Renta Actividades Comerciales, Industriales y de Servicios, or IRACIS), the selective consumption tax (an excise tax, Impuesto Selectivo a Consumo, or ISC), and custom duties (foreign trade tax). There are other taxes, such as the small business tax (Impuesto a la Renta del Pequeño Contribuyente, or IRPC), the farming income tax (Impuesto a la Renta de Actividades Agropecuarias, or IMAGRO), and other less significant taxes such as the single tax (el tributo único), the single tax on *maquilas*, registration and stamp duties (el impuesto a los actos y documentos), a vehicle tax (el patente fiscal), and others. A personal income tax (Impuesto a la Renta Personal, or IRP) was included in the country's 2004 fiscal reform, but its implementation has been postponed several times, up until its enactment in August of 2012.

On the other hand, the government's non-tax revenues are comprised mainly of contributions to the Retirement Fund, royalties and compensatory payments. The contributions to the Retirement Fund are deducted directly from the salaries of public sector officials and employees. The royalties and compensatory payments refer to revenues received by Paraguay from the operation of the binational hydroelectric plants at Itaipú and Yaciretá, the transfer of electric power to Brazil, and for inundated land (Argentina).

The government's revenues from taxes account for 70.8% of total government revenue, and are equivalent to 13.4% of GDP, indicating a low fiscal burden. One peculiar aspect of Paraguay's tax structure is its heavy reliance on revenues from indirect taxes, which include the IVA and the ISC, as well as custom duties. The IVA is the most important source of revenues, accounting, in 2010, for 33.8% of total government

revenues, and 6.4% of GDP. The most important direct tax is the corporate income tax (IRACIS, which represents 11.4% of the government's total revenues and 2.2% of GDP). The farming income tax (IMAGRO) represents barely 0.3% of the government's tax revenues.⁸ This points out a lack of coherence in the country's fiscal policy, given the fact that agriculture and livestock is the country's most important productive sector, contributing 18.3% of total GDP, far ahead of the industrial sector (10.7%), trade (15.7%), and other sectors.

ii Government spending

Paraguay has a limited tradition of delivering social services and benefits. Recently, in 2003, the need for such programs became a topic of public debate, which was met with a favorable response in terms of the approval of an increase in the budget for social spending. Starting in 2003, a series of non-contributory (welfare) programs were implemented. This trend gained further momentum in 2005, and accelerated again significantly between 2008 and 2010. Table 2 shows the components of social spending, and their relative sizes as a percentage of GDP in 2005, 2008 and 2010.

TABLE 2. SOCIAL SPENDING AS A PERCENTAGE OF GDP IN PARAGUAY, 2005, 2008, AND 2010.

	2005	2008	2010
Education (*)	3.95	3.47	4.44
Health	1.45	1.26	2.30
Social Security	2.46	1.67	1.90
Social Assistance	2.76	2.76	3.58
Social promotion and action (**)	0.14	0.74	1.41
Social Tariff for Electric Energy	0.00	0.00	0.05
Labor relations	0.01	0.01	0.01
Housing and urban development	0.00	0.21	0.18
Other services (***)	0.16	0.13	0.04
Total Social Spending	8.16	7.49	10.32

Source: Author's own calculations, based on Finance Ministry data.

Notes: (*) Includes assistance to people with special needs, social action services, social services from state governments, and promotion, assistance, and social action against discrimination. (**) Includes social services for agrarian reform, high school and university education, culture, sports, and recreation, and non-discriminatory education, recreation, and culture, science and technology, and other social services.

The social protection system

Paraguay's social security system is based on the distribution of a defined set of benefits. In Paraguay there are two separate government-controlled social security agencies: one for public sector employees and one for private sector workers (the Social Security Institute [Instituto de Previsión Social, IPS]). In addition, there are private retirement and pension funds which are not regulated by any government institution. Social security programs account for 1.9% of GDP. This table does not include retirement payments disbursed by the IPS, which is the largest social security system for salaried private sector workers. In 2010, the Caja

⁸ Another direct tax is the property tax, which is administered by municipal governments.

Fiscal, reserved for public sector workers, had 33,369 retirees receiving contributory pensions.

There are also many beneficiaries of non-contributory pensions: in 2012, there were 60,559 beneficiaries. The non-contributory pension programs and their benefits are described below.

Adultos Mayores en situación de pobreza con Pensión Alimentaria (Pension for Senior Citizens Living in Poverty)

To access this benefit, an individual must meet the requirements of Law 3728, which are essentially to be living in poverty and be older than 65. In addition, potential beneficiaries must not have debts to the state, and their national identification card must not be expired. The Ministerio de Hacienda (Ministry of Finance) uses data from the Dirección General de Estadísticas, Encuestas y Censos (Office of Statistics, Surveys and the Census) to maintain a list of eligible individuals and select beneficiaries. In 2010 there were just 7,000 beneficiaries; in 2011 the number of beneficiaries increased to 25,000, and today there are 45,831 beneficiaries. The minimum size of the transfer is 25% of the legal monthly minimum wage; thus the minimum transfer equaled 376,871 guaraníes per month (\$4.63 PPP per day) in 2010.

Survivorship pensions

The survivors of deceased pensioners and of people in an activity with the right to retirement are eligible to receive survivorship pensions. Survivors with the right to this pension are the spouse, children, and parents, provided that they lived at the expense of the deceased person, and there are no other beneficiaries. For the children of the deceased person to receive a survivorship pension, they must be single minors (unless they are disabled). The amount received by each beneficiary corresponds to a percentage of the original pension.

Disability pensions

Individuals with a disability (whether natural or due to an accident) who are younger than 62 years old and worked for a minimum of ten years can receive a disability pension. Currently, there are just 473 disability pension beneficiaries.

Veterans of the Chaco War

There are currently 1,240 veterans of the Chaco War who receive pensions and subsidies. These ex-soldiers receive benefits equal to 3,440,000 per month (\$42.35 PPP per day), in accordance with the Pensions Law. Their heirs (widows, minor children, or disabled children) have the right to receive up to 75% of the pension received by the veteran, which does not include the subsidy. Currently, there are 11,956 heirs of veterans receiving 1,290,000 guaraníes per month (\$15.88 PPP per day).

Heirs of Police and Military Killed in Action

The widows, children, and parents of police officers and military personnel killed in action can receive a pension from the state, as long as they demonstrate dependence on the deceased person, in accordance with Law 3217/07. They receive a percentage of the salary or pension that would have corresponded to the deceased person. The percentages are 65% for widows and 25% for parents of the deceased person; if there are children, 45% goes to the widow and 20% is distributed between the children.

Social promotion and action programs

Social promotion programs in Paraguay currently include the so-called direct cash transfer programs, which are:

Tekoporã

This is a conditional cash transfer program (CCT) for families living in extreme poverty. The program started in 2005 and includes beneficiaries in both rural and urban areas. It is the largest and the most widely known social program. Through Tekoporã close to 83,500 families living in extreme poverty receive monthly cash transfers of between 180,000 and 300,000 guaraníes (\$2.22 to \$3.69 PPP per day). In 2010, this program's budget totaled US\$ 71.2 million, equivalent to 0.39% of GDP. To be eligible for this program a family must live in conditions of extreme poverty. Families receiving this benefit are made up of pregnant women, dependent elderly family members over 65 years of age, or children under the age of 18. Indicators of extreme poverty include precarious living conditions, such as homes with dirt floors, mud walls, thatched roofs, and lacking electricity or access to clean drinking water and sanitation.

Families are selected for the program based on criteria of unmet basic needs (UBN), which are determined by region, based on the 2002 Population and Housing Census. In regions found to be of high priority, two instruments are employed: the "Ficha Hogar" is applied in order to determine families' demographic and socio-economic conditions, and the Quality of Life Index (QLI) is used to measure and classify six dimensions: health, formal education, income, housing, public services and social well-being assets. Families with the lowest QLI indicators are selected to participate in the program.

Beneficiaries are required to comply with a set of conditions, including a health and education plan, which can be met by accessing local public services. Participating families commit themselves to: seek prenatal medical attention, participate in nutritional surveillance, growth, and weight control programs, ensure that children are vaccinated and attend school, and participate in nutritional programs. Adults in the family must also participate in literacy programs, toddlers in early childhood education programs, and school-age children must attend school.

A study of Tekoporã (Galeano, 2008) found that beneficiaries' incomes increased by 17% and extreme poverty was reduced from 51% to 45% among the beneficiary population. Moreover, approximately 13% of participants reported achieving greater access to credit, and among those living in extreme poverty, overall indebtedness fell by 45% (Imas, 2011).

Pro-País II

This is the second most important program in terms of budget. In 2010 this program served 14,839 beneficiary families and had a budget of US\$ 8.3 million. This program is often classified as a sub-program of Tekoporã. Like Tekoporã, Pro-País is a conditional cash transfer program, and employs a similar system for locating and selecting beneficiaries. The main difference between these programs is that Pro-País is located in the urban areas making up the Greater Asunción metropolitan area,⁹ and the program also finances community-based and productive projects costing up to US\$ 60,000.

Abrazo

In 2010 this direct transfer program served 1,708 beneficiary families and had a budget of US\$ 2.2 million. The mission and target population of the Abrazo program are significantly different from those of

⁹ Asunción and the cities located within its zone of influence.

Tekoporã and Pro-País II. Abrazo serves street children, who are selected to participate in the program by “promoters” employed by the National Secretariat of Children and Youth. The objectives of this program are: i) to reduce poverty, ii) guarantee the rights of the child, and iii) provide integrated health, education and protection services to boys and girls who work in public spaces within the city (Imas, 2011). Social workers provide the families of participating children with psycho-social support, and if needed, families also receive basic food rations or “bonos solidarios” (vouchers). The conditions that beneficiaries must fulfill include ensuring that the child continues to live at home, attends school, and is provided with necessary care.

Health and Education

In 2010 spending on health and education in Paraguay was equivalent to 6.7% of GDP, totaling US\$ 1.2 billion. Spending on education is divided among three levels: elementary education, which serves children from preschool through eighth grade; secondary and technical school, which serves students from ninth through twelfth grades; and higher education, which serves students at the university and doctoral levels. In 2010, the financing of these programs represented 42%, 19%, and 32%, respectively, of total spending on education. The remaining 7% was spent on cultural education and community enrichment. Part of the expenditure on educational programs covers the cost of nutritional programs (more widely known as the school lunch program), and programs that provide school supplies for elementary schools located in the poorest regions.

In regard to health services, according to data provided by the World Health Program, in 2008, an estimated 7% of the population of Paraguay had access to private medical care, 20% was served by the Social Security Institute (IPS), and the remainder relied on the public health care system. The public health care system is comprised predominantly of the Ministry of Public Health and Welfare, and by the military and police medical services. Our analysis includes benefits received both through the public contributory health system (via IPS) and through the free public health care system.

In 2009, spending on health care services rose dramatically by 63% -- an additional amount of US\$ 133.5 million. The rise was due to the expansion of free universal health care including vaccinations, primary care, and hospitals. That year (2009), health care expenditures represented 10.6% of the Central Government’s total spending. In 2010, health care expenditures rose in relative terms, accounting for 11.6% of the Central Government’s total expenditures.

This sustained expansion of health care spending, which increased nearly fourfold between 2005 and 2010, was directly associated with the implementation of free health care services, which include immunization, primary care, and direct access to hospitalization.

Housing and Urban Development

Expenditures on housing and urban development have virtually no effect on social spending. These expenditures consist of subsidies to low-income and middle-class families for buying or building a home, and loans at preferential rates for middle class families. The Ministry of Housing and Habitat (Secretaria Nacional de la Vivienda y el Habitat, or SENAVITAT) is responsible for these programs, which starting in 2010, have also provided subsidies to indigenous groups. Note that spending on housing and urban development is not included in our analysis due to the difficulty in identifying beneficiaries in the survey

data.

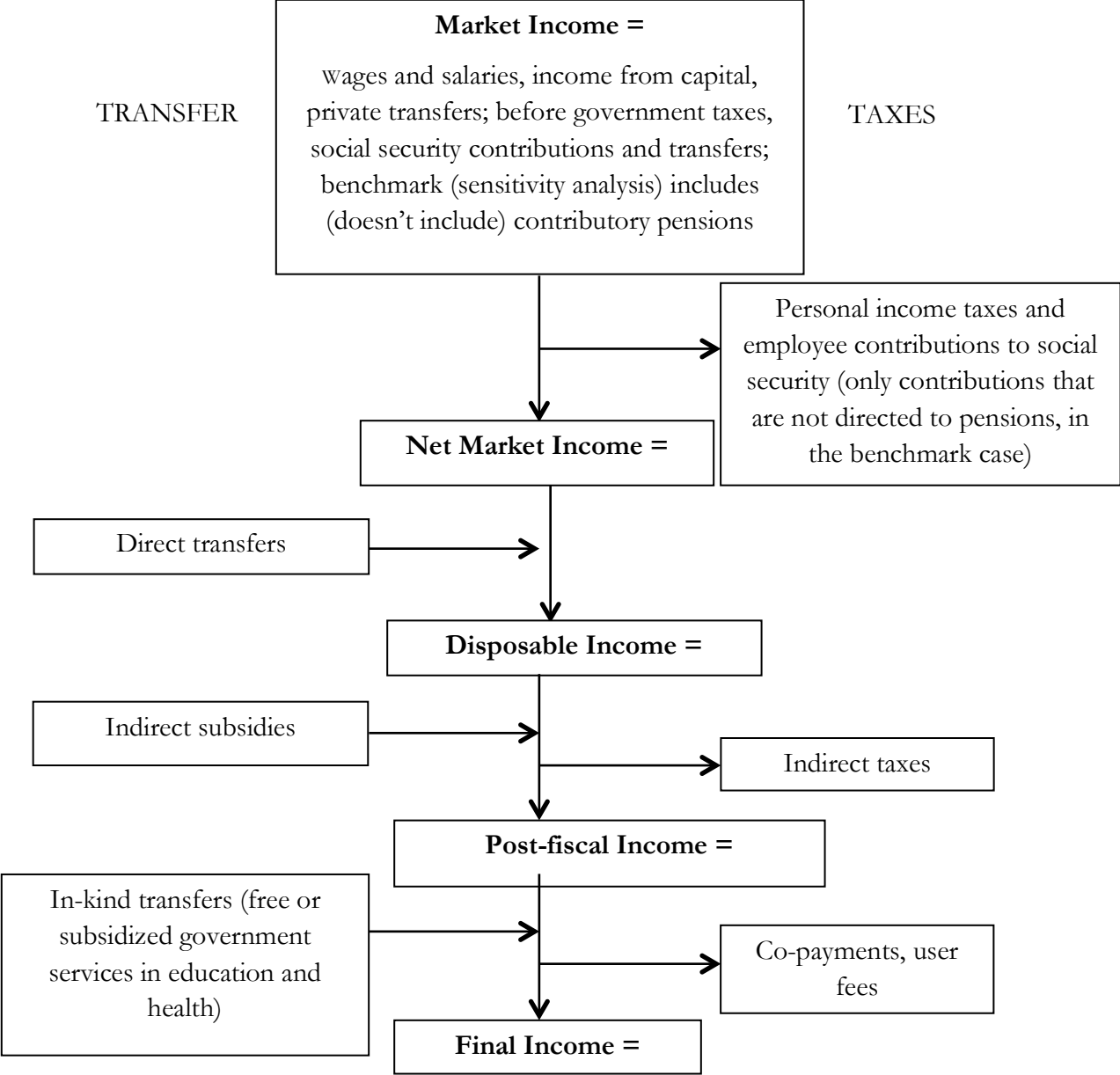
3. DATA AND METHODOLOGY

The micro data-set, *Encuesta Permanente de Hogares* (EPH) 2010, was the principal source of data for this analysis. The EPH collects a range of variables on 6000 families and their members and samples from all regions of Paraguay except Alto Paraguay and Boquerón, whose populations consist of less than two percent of the total.

Many of the key variables used in this analysis are available directly from the EPH survey, such as household income by source, conditions of the home, and the level of education of each family member. However, several vital variables were not included in the survey. Among them are indirect taxes, employee and employer contributions to social security, the value of health services received, and information on non-contributory pensions. Thus, these income sources had to be imputed, simulated, or taken from secondary sources. This section will briefly describe which variables were estimated and by what methodology. This information is summarized by Table A.1 in the Appendix.

These income sources are combined to form various income concepts. Diagram 1 summarizes the income concepts used in the incidence analysis.

DIAGRAM 1. DEFINITIONS OF INCOME CONCEPTS: A STYLIZED PRESENTATION



Source: Lustig and Higgins (2012)

Note: in some cases we also present results for “final income*” which is defined as disposable income plus in-kind transfers minus co-payments and user fees.

In this paper, social spending includes direct transfers plus government spending on education and health in the benchmark case; in the sensitivity analysis, it also includes spending on contributory pensions. Direct taxes include property taxes, municipal taxes, and other taxes. There were no income taxes in Paraguay at the time of the survey (see section 2). Indirect subsidies include the Social Tariff for Electric Energy (Tarifa Social de Energía Eléctrica). Indirect taxes include the value added tax and combustibles tax.

It is important to note that, for lack of data, non-contributory pensions are not separated from contributory pensions. The requirements for eligibility to receive non-contributory pensions are prohibitively

complicated¹⁰ and, without a variable in the EPH data set to distinguish non-contributory from contributory pensions, any attempt at “projecting” likely recipients would be misleading. As a result, all non-contributory pensions enter into market income along with contributory pensions in the benchmark case. Then, in the sensitivity analysis, these funds are not part of market income and instead enter into government transfers.

All family income sources are reported in the EPH survey, including income from government transfers. The variable used to record direct transfers is noisy and in practice is a catch-all for any regular monthly income from any local or national organization or charity. Tekoporã is by far the largest transfer program in Paraguay when pensions are not considered; however, the monetary values in the Direct Transfers variable were often lower or several times higher than the projected Tekoporã transfer. Additionally, the EPH reported far fewer enrolled persons than the national totals according to Ministerio de Hacienda (Ministry of Finance, MH). This analysis employed the methodology developed in Souza, Osorio, and Soares (2011) to identify additional Tekoporã beneficiaries and correct for some beneficiaries not reporting the transfer or under-reporting the amount received.

Essentially, individuals who report a direct transfer of an amount exactly equal to a possible amount of Tekoporã are considered recipients. Let the number of recipients identified using this method be S , and the (larger) number of recipients in national accounts be N . Finally, let the difference between the number of beneficiaries reported in national accounts and the number reported in the survey be denoted $H \equiv N - S$. The next step is to “identify” the H remaining beneficiary households in the survey. A probit model is used on all households to determine the probability of program participation. The coefficients from this probit predict the probability of program participation \hat{p} . Next, we randomly select H households out of the S beneficiary households (note that $H < S$), and match each of these H beneficiary households with the non-beneficiary household who has the closest probability of program selection \hat{p} (thus, the method is a propensity score matching type of technique) and identify those non-beneficiary households as beneficiaries. These imputed beneficiaries are then assigned the average benefit paid by the program, where the average benefit paid by the program refers to the mean benefit of the S households identified as beneficiaries in the first step. As a result of this imputation process, the total number of beneficiaries in the survey will equal N , the number of recipients reported in national accounts.

For individuals who are not identified as Tekoporã beneficiaries but have positive values reported under the direct transfers variable, the amount is attributed to a different government program labeled as “Other Direct Transfers.” For imputed Tekoporã beneficiaries who have amounts reported for the direct transfers variable exceeding their imputed Tekoporã benefit, the amount that is “left over” (the difference between the value reported for direct transfers and the imputed Tekoporã transfer) is considered a transfer from a different government program and labeled as “Other Direct Transfers.”

Direct taxes are reported in the EPH but are not scaled to MH national totals because they are collected at the local and regional level for which there is no reliable aggregate data on taxes.

¹⁰ The legal document explaining the requirements is “Ley 2345: DE REFORMA Y SOSTENIBILIDAD DE LA CAJA FISCAL. SISTEMA DE JUBILACIONES Y PENSIONES DEL SECTOR PÚBLICO.”

Indirect taxes are not reported in the EPH. This analysis imputes the indirect tax burden using incidence estimates provided in BID (2010), in which the tables are calculated by population decile and sorted by market income, with separate estimates for the value added tax (VAT) and the combustibles tax. The incidence by decile from BID (2010) is applied to the EPH population by decile and scaled proportionally to the MH reported total revenue for the VAT and combustibles tax.

Data on indirect subsidies, or more precisely the Social Tariff for Electric Energy program, are not included in the EPH survey. Fortunately, the impact of this program is relatively straightforward to estimate using the available data in the EPH. Families report total monthly electricity bill payments. A family will automatically qualify if they use below a threshold amount of wattage per month, at which point their electricity bill is automatically capped and a percentage is deducted by a ladder scale of increasing percentages for lower watt-usage. To impute the benefits of supposed Social Tariff for Electric Energy beneficiaries, households paying at or below this cap are assumed to be beneficiaries. These assumed recipients are assigned an indirect subsidy equal to the difference in value between their electricity usage and payment. For example, households that reported paying 8,747 guaraníes per month or less in electricity (the lowest rung of the ladder scale) were assigned a transfer value equal to the 2010 price of 100 kilowatts of electricity minus 8,747 guaraníes.

This analysis estimates in-kind education benefits using the cost-per-student by level of education as a proxy. The EPH collects data on each family member's level of education achieved and the current enrollment status. Students who report themselves as currently attending public school are assigned, as an in-kind transfer, the per-student spending on that education level, as reported by MH. For example, if a child reports currently attending public school and is within the age range for primary students, that student is assigned an in-kind benefit equal to the government's education spending per primary student. The same procedure is applied to all students at all levels of public education.

In-kind transfers of health services are estimated using a similar logic. Recipients of free health care are first distinguished from those who pay into the public health care system. If the individual said "no" to having insurance and "yes" to "received a medical service within the last 3 months", they are assigned a proportion of the national total spent on free health services reported by MH. Otherwise, if the individual received a medical service and said "yes" to having public Instituto Público de Salud (IPS) insurance, then they are assigned the per-beneficiary proportion of the total spent on IPS health care reported by MH.

4. RESULTS

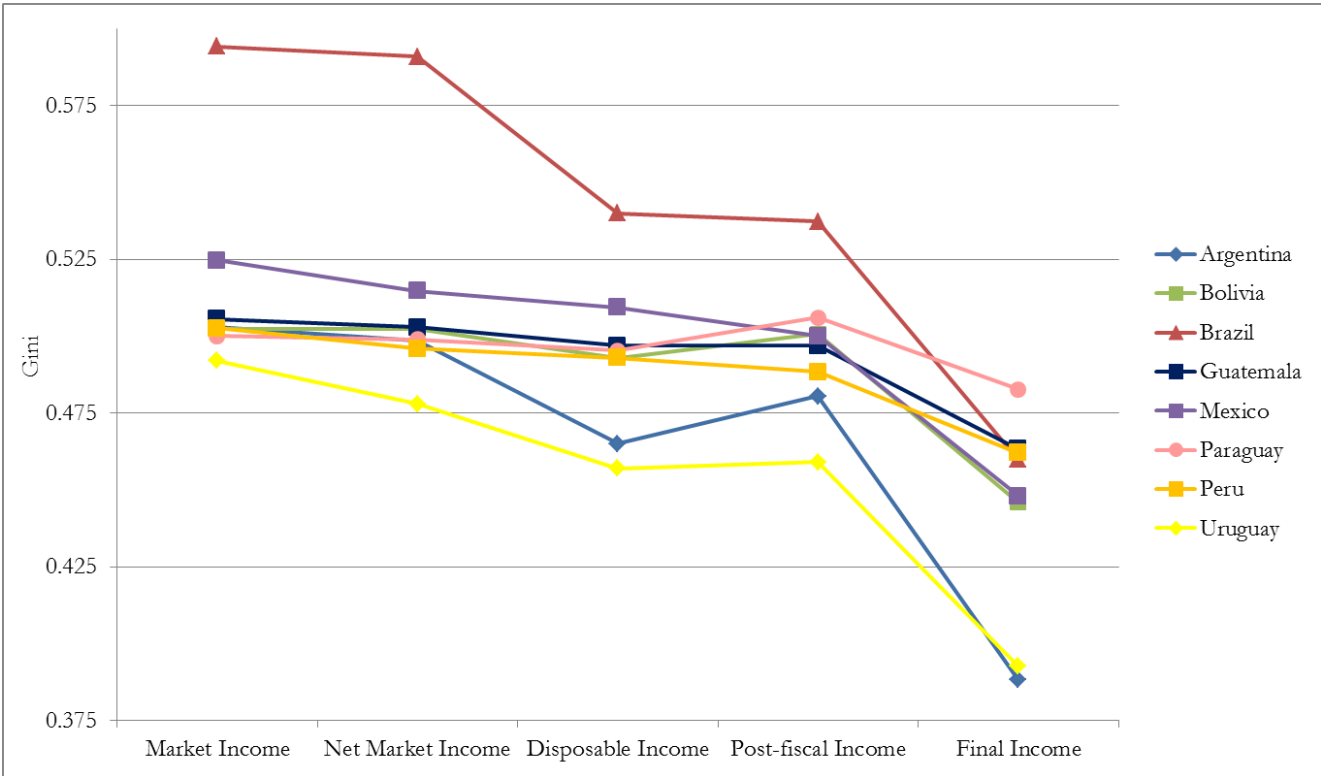
This section discusses the impact of taxes and social spending on poverty and inequality in Paraguay. It is divided into five subsections. The first subsection quantifies the reduction in poverty and inequality in Paraguay across income concepts, and contextualizes these results by placing Paraguay in comparative perspective with other Latin American countries. The second subsection uses effectiveness indicators to quantify redistributive effectiveness in Paraguay, again placing the results in comparative perspective with other Latin American countries. The third subsection presents the incidence of taxes and social spending. The fourth subsection assesses the progressivity of taxes and social spending. The fifth subsection addresses

the question of the underlying causes behind Paraguay’s low levels of inequality and poverty reduction.

i Impact of taxes and social spending on inequality and poverty

In comparison with other Latin American countries,¹¹ Paraguay redistributes relatively little through social spending and taxes. As shown in Figure 4, the market income Gini in Paraguay is 0.50, placing it at the less unequal end of our sample of countries (Argentina, Bolivia, Brazil, Guatemala, Mexico, Paraguay, Peru, and Uruguay) in terms of inequality before government intervention. However, direct taxes and transfers reduce the Gini coefficient by less than one percent, and indirect taxes reverse this progress: the post-fiscal income Gini coefficient is slightly higher than the market income Gini. Education and health spending are equalizing, but their effect is also limited compared to other counties. In terms of final income, Paraguay is the most unequal country, with a Gini coefficient of 0.48. From market income to final income, Paraguay only reduces inequality by 4.1%, which is less than all other countries in our sample: Guatemala reduces inequality by 5.2%, Peru by 7.6%, Bolivia by 12.4%, Mexico by 15.9%, Uruguay by 20.2%, Brazil by 24.1%, and Argentina by 25.2%.

FIGURE 4. GINI COEFFICIENT FOR EACH INCOME CONCEPT IN ARGENTINA, BOLIVIA, BRAZIL, GUATEMALA, MEXICO, PARAGUAY, PERU AND URUGUAY.



Source: For Paraguay, authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The Ginis in this figure correspond to the benchmark case. For definitions of income concepts see Diagram 1 and the

¹¹ The comparisons with other countries come from country studies in the Commitment to Equity (CEQ) project (see www.commitmenttoequity.com). These studies are synthesized in Lustig and Pessino (2013) for Argentina, Paz et al. (2013) for Bolivia, Higgins and Pereira (2013) for Brazil, Morán and Cabrera (2012) for Guatemala, Scott (2013) for Mexico, Jaramillo (2013) for Brazil, and Bucheli et al. (2013) and for Uruguay.

Table 3 shows the reduction in inequality and poverty across income concepts in Paraguay, in both the benchmark case and the sensitivity analysis. The table shows us that a significant number of the near-poor pay enough direct taxes to make them poor, as the headcount index for net market income using the \$4 PPP per day poverty line, at 28.3%, is over one percentage point higher than the market income headcount index. This is also unique to Paraguay among countries in our sample: the others have much smaller increases in poverty caused by direct taxes. Direct transfers reduce poverty slightly, but their impact is overshadowed by the poverty-increasing impact of direct and indirect taxes: post-fiscal income poverty is higher than market income poverty using both the \$2.50 and \$4 PPP per day poverty lines.

TABLE 3. TAXES, TRANSFERS, INEQUALITY AND POVERTY IN PARAGUAY, 2010.

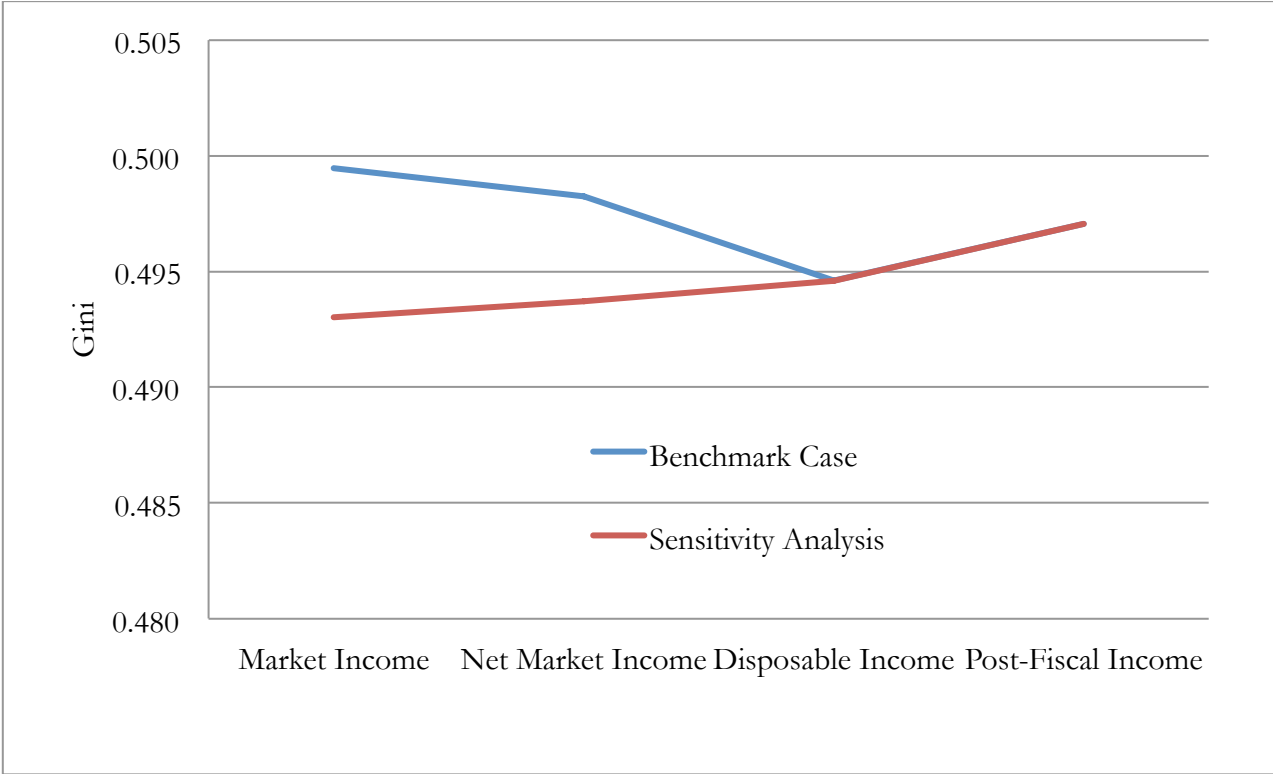
Benchmark: contributory pensions as part of market income					
<i>Indicator</i>	Market Income	Net Market Income	Disposable Income	Post-fiscal Income	Final Income
Gini	0.500	0.499	0.495	0.506	0.483
Headcount index at \$2.5 PPP/day	14.6%	14.9%	14.4%	16.2%	
Headcount index at \$4 PPP/day	27.2%	28.3%	28.0%	30.1%	
Sensitivity Analysis 1: pensions are treated as a government transfer					
<i>Indicator</i>	Market Income	Net Market Income	Disposable Income	Post-fiscal Income	Final Income
Gini	0.493	0.494	0.495	0.506	0.483
Headcount index at \$2.5 PPP/day	15.0%	15.3%	14.4%	16.2%	
Headcount index at \$4 PPP/day	28.0%	29.1%	28.0%	30.1%	

Source: Authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts.

Note: For definitions of income concepts see Diagram 1 and the Appendix.

Contributory pensions and non-contributory pensions (because the latter could not be separated from contributory pensions in the survey or by using program rules, as discussed in Section 3) are counted as part of market income in the benchmark case but considered a government transfer in the sensitivity analysis. Figure 5 presents the evolution of inequality across income concepts in the benchmark case and sensitivity analysis. Because pensions are unequalizing in Paraguay, and because they are large compared to other transfers, how they are treated changes the qualitative assessment of direct transfers. When they are not included in government transfers (the benchmark case), overall direct transfers are equalizing and the disposable income Gini is lower than the market income Gini. When they are instead considered a government transfer (the sensitivity analysis), overall direct transfers are unequalizing and the disposable income Gini coefficient is higher than the market income Gini.

FIGURE 5. INEQUALITY IN PARAGUAY, 2010.



Source: Authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts.

Note: For definitions of income concepts see Diagram 1 and the Appendix.

ii 4.2 Redistributive Effectiveness

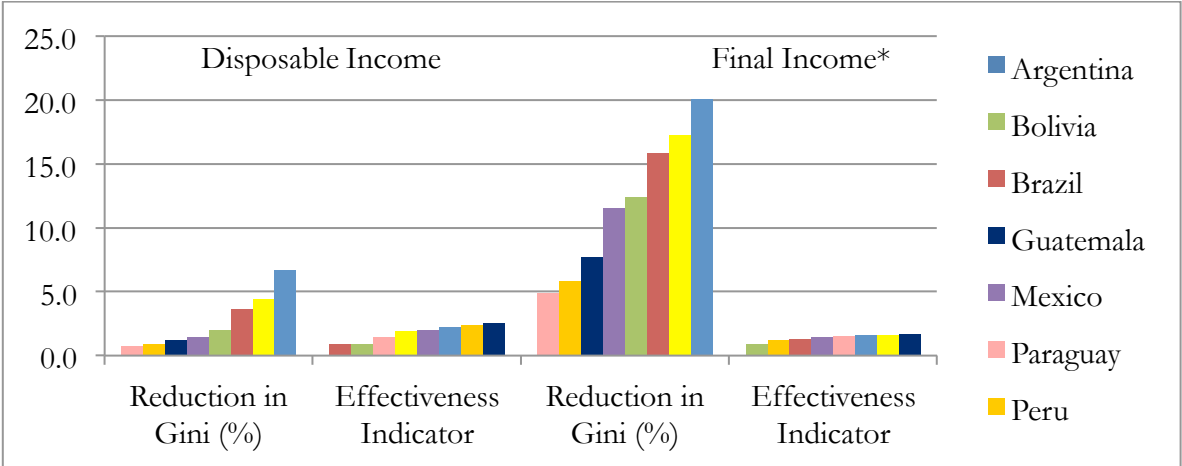
The effectiveness indicator is defined as the effect on inequality or effect on poverty of the transfers being analyzed divided by their relative size. Specifically, it is defined as follows for the Gini (and would be similarly defined for any other inequality or poverty measure by replacing the word Gini with the appropriate measure). For direct transfers, the effectiveness indicator is the proportional fall between the net market income and disposable income Ginis, divided by the size of direct transfers as a percent of GDP. Although the size of direct transfers is measured by budget size according to national accounts, only direct transfer programs that are captured by the survey (or otherwise estimated by the authors) are included, since they are the only programs that can lead to an observed change in income.¹² For direct and in-kind transfers, the effectiveness indicator is the proportional fall between the net market income and final income Ginis, divided by the size of the sum of direct transfers, education spending, and health spending as a percent of GDP. The formulas are in the Appendix.

Figures 6 shows the reductions in the Gini coefficient and the effectiveness of spending at reducing inequality, for Paraguay and the other seven Latin American countries included in the analysis. Given Paraguay’s low spending, although it always has the lowest or second-lowest reduction in inequality among the eight countries, it is not always the least effective. Its redistributive effectiveness indicator for direct transfers is higher than that of Bolivia and Brazil (two high-spending countries that accomplish low

¹² Thus, the denominator of the effectiveness indicator, direct transfers as a percent of GDP, does not include spending on pensions in the benchmark case, but does include them in the sensitivity analysis.

reduction relative to the amount they spend). Its redistributive effectiveness indicator for all (direct and in-kind) transfers is higher than Bolivia and Brazil, and similar to two small-government countries who achieve low inequality reductions given the amount they spend: Mexico and Peru. In other words, although Paraguay is the worst performer in terms of reducing inequality when both direct and in-kind benefits are considered, the country performs in the middle of the pack in terms of the efficiency of each dollar spent at reducing inequality.

FIGURE 6. REDUCTION IN GINI AND REDISTRIBUTIVE EFFECTIVENESS IN ARGENTINA, BOLIVIA, BRAZIL, GUATEMALA, MEXICO, PARAGUAY, PERU AND URUGUAY.

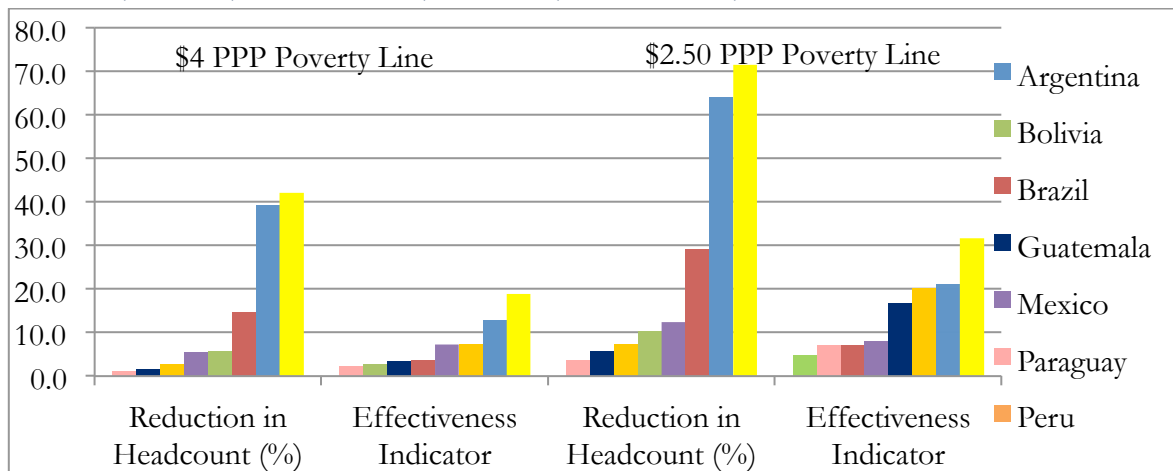


Source: For Paraguay, authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The Gini reductions and effectiveness indicators in this figure correspond to the benchmark case. Reduction in Gini is the percent change between the market and disposable (final) income Ginis for Direct Transfers (All Transfers). For definitions of effectiveness indicators see the Appendix. For definitions of income concepts see Diagram 1 and the Appendix.

Figure 7 shows the reductions in the headcount index and the effectiveness of spending at reducing poverty. Paraguay performs worse than the seven other countries in terms of poverty reduction, and it also has a low effectiveness of every dollar it spends (the lowest at the \$4 PPP per day poverty line and third-lowest at \$2.50 PPP per day).

FIGURE 7. DECLINE IN HEADCOUNT INDEX AND POVERTY REDUCTION EFFECTIVENESS IN ARGENTINA, BOLIVIA, BRAZIL, GUATEMALA, MEXICO, PARAGUAY, PERU AND URUGUAY.



Source: For Paraguay, authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The headcount reductions and effectiveness indicators in this figure correspond to the benchmark case. The reduction in headcount is the percent reduction between the net market income and disposable income headcount indices. For definitions of effectiveness indicators see the Appendix. For definitions of income concepts see Diagram 1 and the Appendix.

iii Incidence of Taxes and Social Spending

Looking at the changes in income caused by different income components at each market income decile provides additional information about both the progressivity of different taxes and transfers, as well as their relative weight in equalizing the income distribution and lifting individuals out of poverty. Table 4 provides the incidence of different taxes and transfer programs by decile (groups of 10% of the population ranked by market income, where the first decile indicates the poorest group and the tenth decile indicates the richest group).

TABLE 4. INCIDENCE OF TAXES AND TRANSFERS IN PARAGUAY, 2010.

Deciles	Direct Taxes	Net Market Income	Flagship CCT	Other Direct Transfers	All Direct Transfers	Disposable Income	Indirect Subsidies	Indirect Taxes	Post-Fiscal Income	In-kind Education	In-kind Health	In-kind Transfers	Final Income
1	-1.2%	-1.2%	5.6%	3.5%	9.1%	7.9%	0.4%	-43.1%	-34.8%	12.9%	18.6%	31.5%	-3.3%
2	-2.5%	-2.5%	1.7%	0.3%	2.0%	-0.5%	0.2%	-11.7%	-12.0%	6.5%	10.2%	16.7%	4.7%
3	-1.3%	-1.3%	0.7%	0.5%	1.1%	-0.2%	0.2%	-11.7%	-11.8%	4.7%	9.9%	14.6%	2.8%
4	-2.2%	-2.2%	0.4%	0.0%	0.4%	-1.8%	0.1%	-9.9%	-11.6%	4.4%	7.9%	12.4%	0.8%
5	-1.7%	-1.7%	0.3%	0.1%	0.3%	-1.4%	0.1%	-11.1%	-12.4%	3.2%	7.4%	10.6%	-1.8%
6	-2.9%	-2.9%	0.2%	0.1%	0.3%	-2.7%	0.1%	-9.6%	-12.2%	2.5%	5.5%	8.0%	-4.3%
7	-2.0%	-2.0%	0.1%	0.0%	0.1%	-2.0%	0.1%	-9.2%	-11.1%	2.9%	6.0%	8.9%	-2.3%
8	-2.9%	-2.9%	0.0%	0.0%	0.0%	-2.9%	0.0%	-8.2%	-11.0%	2.6%	6.0%	8.5%	-2.5%
9	-3.1%	-3.1%	0.0%	0.0%	0.0%	-3.0%	0.0%	-8.4%	-11.4%	2.3%	4.6%	6.9%	-4.6%
10	-4.8%	-4.8%	0.0%	0.0%	0.0%	-4.8%	0.0%	-7.9%	-12.7%	1.1%	1.9%	2.9%	-9.8%
Total Population	-3.3%	-3.3%	0.2%	0.1%	0.3%	-3.0%	0.1%	-9.4%	-12.4%	2.5%	4.9%	7.4%	-5.0%

Source: Authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts.

Note: The numbers in this figure correspond to the benchmark case. For definitions of income concepts see Diagram 1 and the Appendix.

Beginning with taxes, a grim picture emerges from the standpoint of reducing inequality and poverty. Although the rich pay a higher proportion of their income in direct taxes than the poor, all deciles pay between one and five percent of their income in direct taxes, which explains why net market income inequality is barely lower than market income inequality, and why net market income poverty is substantially higher. In most countries, the poorest deciles pay essentially none of their income in direct taxes. It is worth noting that in the case of Paraguay the amount of direct taxes paid by each household is determined using the direct identification method, i.e. the amount is taken directly from a survey question; in some of the other countries, direct taxes are not available in the survey and must be simulated according to the tax code. Indirect taxes are even more detrimental to the poor: the poorest decile spends 28% of its income, on average, on indirect taxes (VAT and combustibles tax). The amount of indirect taxes paid by each household is determined using incidence from a secondary source.

Turning to transfers, it is easy to see that direct transfers, indirect subsidies, and in-kind transfers in the form of free education and health services all benefit individuals in the poorer deciles more than those in richer deciles. However, when compared to other countries in Latin America, the percent increase in income for the poor from these transfers is low. For example, individuals in the poorest decile experience an income increase of 6%, on average, from the CCT Tekoporã. Although this figure is similar to the increase experienced by the poorest decile from CCTs in Bolivia in Peru, it is much lower than the increase in other countries: in Brazil, Bolsa Família increases the incomes of the poorest decile by 29% on average (Higgins and Pereira, 2013). Furthermore, it is far below the amount that the extreme poor would need to have their incomes increased, on average, in order to be lifted out of extreme poverty (a 72% increase would be required).

Considering only direct taxes and direct transfers, individuals become net payers to the fiscal system in the second decile on average (this can be seen in the column labeled “Disposable income” in Table 4). This means that many poor individuals are paying more in direct taxes than they receive in direct benefits, which further impoverishes them despite the fact that they may already be unable to buy a basket of basic needs. In other countries, the poorest three deciles are always net recipients from the fiscal system when only direct taxes and direct transfers are taken into account: the poorest decile that is a net payer ranges from the fourth decile (Mexico) to the tenth (Brazil). When indirect taxes are taken into account, all deciles are net payers to the fiscal system, on average, in Paraguay. This is the only country where this occurs: in the other countries, the poorest decile that is a net payer to the fiscal system including indirect taxes is usually the third or fourth decile.

iv Progressivity of Taxes and Social Spending

The terms “progressive” and “regressive” are used in two different senses in the literature on taxes and transfers (Lustig, Pessino, and Scott, forthcoming). We borrow their concise summary here:

The progressivity/regressivity of a transfer can be measured in absolute terms, by comparing taxes/transfers between quantiles, or in relative terms, by comparing taxes/transfers as a percentage of the (pre-tax/transfer) income of each quantile. In the tax incidence literature, where the fiscal application of the term “progressive/regressive” originated, it is used exclusively in the relative sense, while in the benefit (and tax-benefit) incidence literature it is common practice to

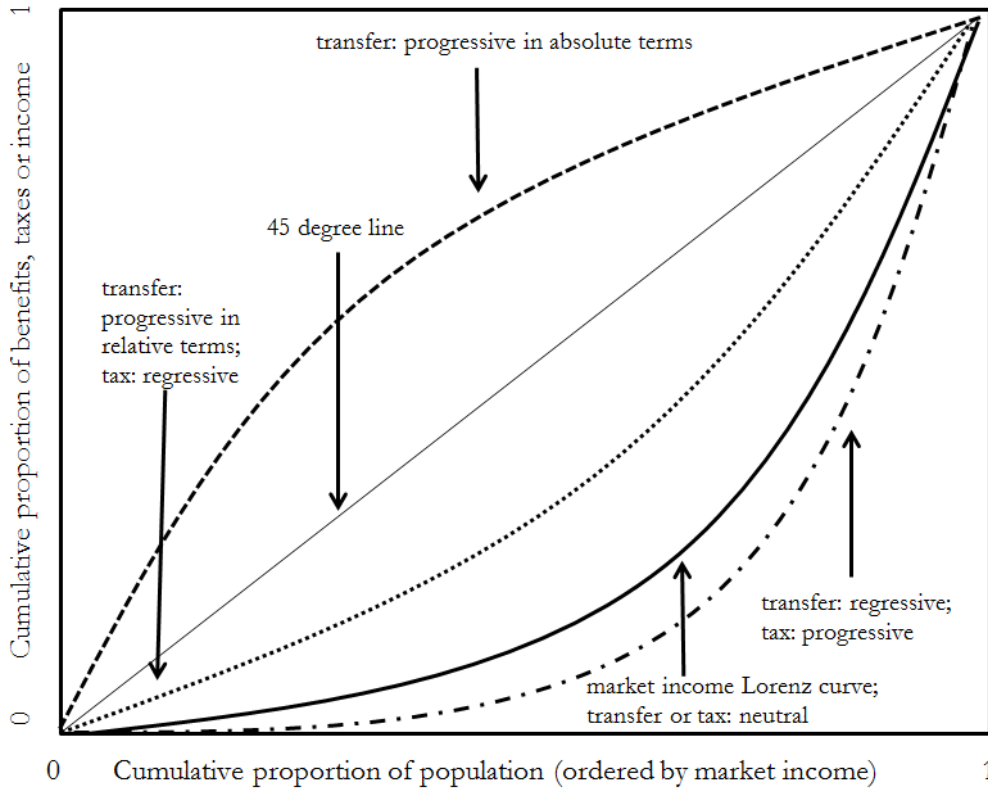
use the absolute as well as the relative concepts, distinguishing these two terms explicitly (e.g. Lindert, Skoufias, and Shapiro, 2006; Scott, 2011) or equivalent ones: “weakly/strongly progressive,” “pro-poor/pro-rich” (e.g. O’Donnell et al., 2008; Wagstaff, 2012). The reason for the latter practice is that the issue of practical interest in the case of transfers is not regressivity in relative terms, which is rarely observed for transfers (making the description of a transfer as progressive in relative terms barely informative in benefits incidence analysis contexts), but the concentration of benefits on higher or lower income groups, or their redistributive efficiency. (Lustig, Pessino, and Scott, 2013)

Since this paper assesses the progressivity of both taxes and transfers, we have opted for the relative definition. Hence, a transfer is progressive when the proportion received (as a percentage of market income) decreases with income. This is consistent with an intuitively appealing principle: a transfer or tax is defined as progressive (regressive) if it results in a less (more) unequal distribution than that of market income.¹³ We distinguish between transfers that are progressive in absolute terms and progressive in relative terms. A transfer will be progressive in absolute terms if the per capita amount received decreases as income rises. A transfer will be progressive in relative terms if the proportion received in relation to market income decreases as income rises but not so the per capita transfer.

Diagram 2 presents concentration curves that correspond to progressive, neutral, and regressive taxes and transfers. A more detailed discussion is included in Lustig and Higgins (2012). Note that when the concentration curve of a tax or transfer crosses the market income Lorenz curve, it cannot be considered everywhere progressive or regressive. Similarly, when the concentration curve of a transfer program crosses the 45 degree line, it cannot be considered everywhere progressive in relative or absolute terms (but is still everywhere progressive, as long as it does not also cross the market income Lorenz curve).

¹³ This claim only holds for transfers that are small relative to market income. If the transfer is large and enough redistribution occurs, even a transfer that is progressive in absolute terms can result in a more unequal income distribution: for example, if there are two individuals with market income vector (1,2) and they are given a large direct transfer (6,1)—which is progressive in absolute terms because the poorer individual gets more than half of total transfers—the new income distribution (7,3) is more unequal than the original distribution (1,2).

DIAGRAM 2. CONCENTRATION CURVES AND PROGRESSIVITY



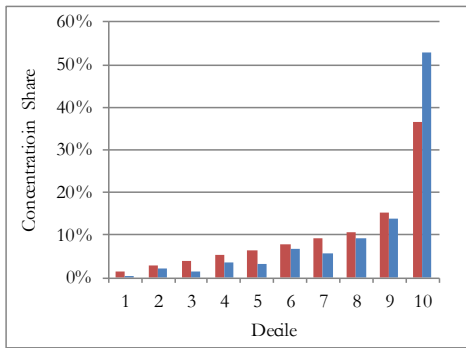
Source: Lustig and Higgins (2012).

In terms of concentration shares by decile, taxes are progressive (regressive) if the proportion paid is lower (higher) than the share of income for the poor and the opposite happens at the top of the income scale. A transfer is progressive (regressive) if the proportion received is higher (lower) than the share of income for the poor and the opposite happens at the top of the income scale. Furthermore, a transfer is progressive in absolute terms if the proportion received is higher than not only the share of income, but also the population share for the poorest decile, and this relationship declines as we move up to higher deciles. Figure 8 shows that direct taxes are progressive (panel a) and indirect taxes are regressive (panel b). Overall taxes appear to be very slightly regressive: the bottom decile pays a larger share of overall taxes than its income share, and the second-poorest decile pays an equal share of taxes to its income share (panel c). We verify that overall taxes are slightly regressive by calculating their Kakwani coefficient, which is -0.02. In contrast, overall taxes in some countries, such as Guatemala, Mexico, Peru, and Uruguay, are progressive. The figure also shows that direct transfers are progressive in absolute terms (panel e). Total spending on education (panel f) and health (panel g), however, are progressive in relative terms only. When direct and in-kind transfers are added together, social spending is also progressive in relative terms only (panel h). Paraguay's social spending is less progressive than in the other countries in our sample, which is discussed in more detail below.

FIGURE 8. CONCENTRATION SHARES OF TAXES AND TRANSFERS IN PARAGUAY, 2010.

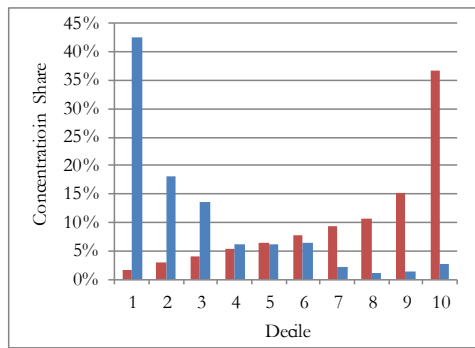
TAXES

(a) Direct Taxes (Blue) and Market Income (Red)

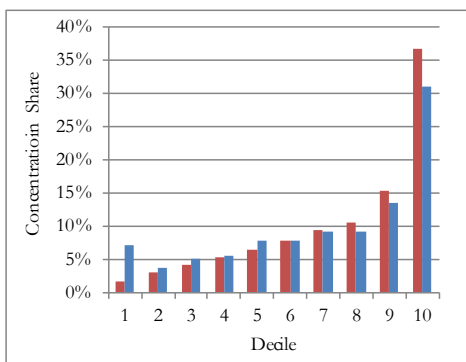


TRANSFERS

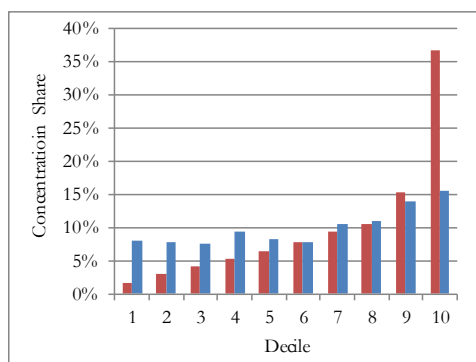
(e) Direct Transfers (Blue) and Market Income (Red)



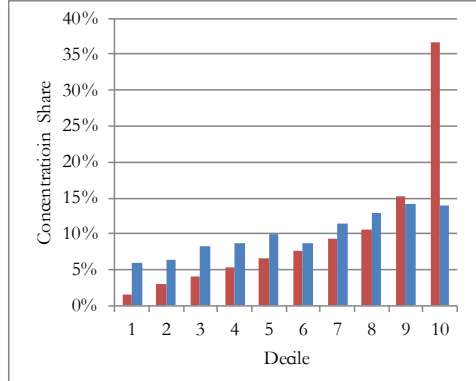
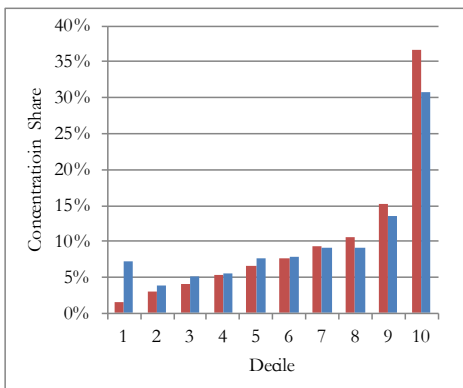
(b) Indirect Taxes (Blue) and Market Income (Red)



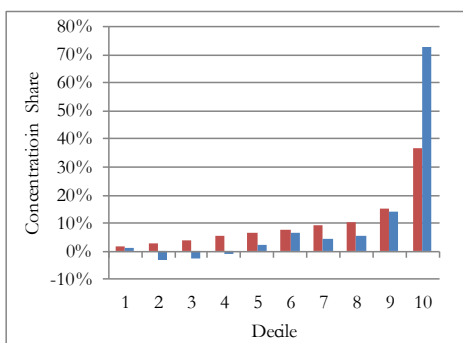
(f) Education Spending (Blue) and Market Income (Red)



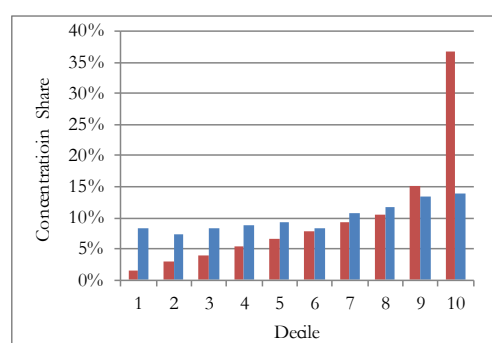
(c) Direct + Indirect Taxes (Blue) and Market Income (Red) (g) Health Spending (Blue) and Market Income (Red)



(d) Net Taxes (Blue) and Market Income (Red)



(h) Direct + In-kind Transfers (Blue) and Market Income (Red)



Source: Authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts.

As panel h of Figure 8 showed, social spending is progressive in relative terms in Paraguay. An analysis of the concentration coefficients of its components allows a more detailed comparison with other countries in Latin America. Figure 9 shows the concentration coefficients of various components of social spending. Social spending overall is progressive in relative terms in both the benchmark case (where social spending does not include pensions) and sensitivity analysis (where it includes pensions), with a concentration coefficient of 0.14 in the benchmark case.¹⁴ In other countries, social spending is more progressive, with a concentration coefficient ranging from -0.17 (Uruguay) to 0.06 (Guatemala) in the benchmark case. Social spending is progressive in absolute terms in all countries except Guatemala and Paraguay.

Paraguay's flagship conditional cash transfer program Tekoporã is highly progressive in absolute terms, with a concentration coefficient of -0.47; this is more progressive than Bolivia's universal CCT Bono Juancito Pinto (-0.25) and Guatemala's Mi Familia Progresiva (-0.41), and less progressive than Argentina's Asignación Universal por Hijo (-0.52), Mexico's Oportunidades (-0.54), Brazil's Bolsa Família (-0.58), Uruguay's Asignaciones Familiares (-0.61), and Peru's Juntos (-0.65).

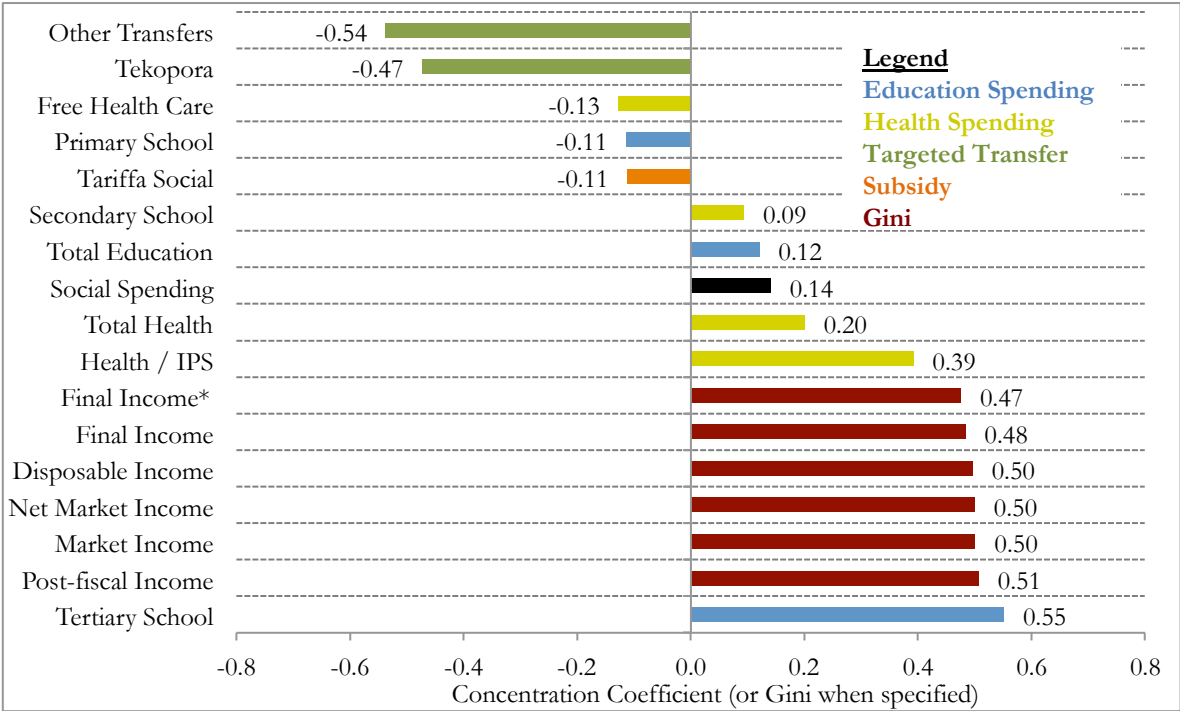
Overall education spending is progressive in relative terms, with a concentration coefficient of 0.12. In contrast, in all of the other countries included in the analysis, total education spending is progressive in absolute terms and has a negative concentration coefficient, ranging from -0.17 in Peru to -0.01 in Guatemala. Note that the concentration coefficients of total education spending include tertiary education; the absolute progressivity of education spending at lower levels is somewhat counterbalanced by tertiary education spending. In Paraguay, education spending at lower levels is not as progressive as it is in other countries: primary education spending is progressive in absolute terms, with a concentration coefficient -0.11. This is less progressive than in any other country in the analysis, where the concentration coefficients for primary education range from -0.43 (Uruguay) to -0.18 (Bolivia). Secondary education is progressive in relative terms, with a concentration coefficient of 0.27, making it less progressive than in any other country. Tertiary education is regressive, with a concentration coefficient of 0.55. This is abhorrent, especially when put in comparative perspective: all other countries in the analysis have tertiary education spending that is progressive in relative terms except Guatemala (0.59), ranging from only slightly progressive (0.47 in Uruguay) to substantially progressive in relative terms (0.24 in Argentina).

Total health spending is progressive only in relative terms, with a concentration coefficient of 0.20. The relative progressiveness of overall health spending stems from a combination of the absolutely progressive public health services and the benefits received from the public health insurance system IPS, which are

¹⁴ In the sensitivity analysis, the concentration coefficient of social spending (including pensions) is 0.20. In the remainder of this section, concentration coefficients always refer to the benchmark case. Concentration coefficients measure twice the area between the 45 degree line and the concentration curves pictured in Diagram 2. As a convention, any concentration curve that lies above the 45 degree line is treated as having a negative area between it and the 45 degree line. Hence, concentration curves range from -1 to 1, with a negative value indicating that the transfer is progressive in absolute terms, with -1 indicating the maximum degree of progressivity. A concentration curve that lies between the 45 degree line and the market income Lorenz curve will have a concentration coefficient that is positive but less than the market income Gini coefficient, indicating that the transfer is progressive in relative terms (i.e., the benefit as a share of income decreases with income, but not so for the absolute benefit). Finally, a concentration curve that lies below the market income Lorenz curve will have a concentration coefficient that is greater than the market income Gini and is regressive.

progressive in relative terms. The public health systems in other Latin American countries range from having similar levels of progressivity in Guatemala and Peru to being progressive in absolute terms in Argentina, Bolivia, Brazil, and Uruguay.

FIGURE 9. CONCENTRATION COEFFICIENTS BY SPENDING CATEGORY IN PARAGUAY, 2010.



Source: Authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts.

v Improving Inequality and Poverty Reduction, Effectiveness, and Progressivity

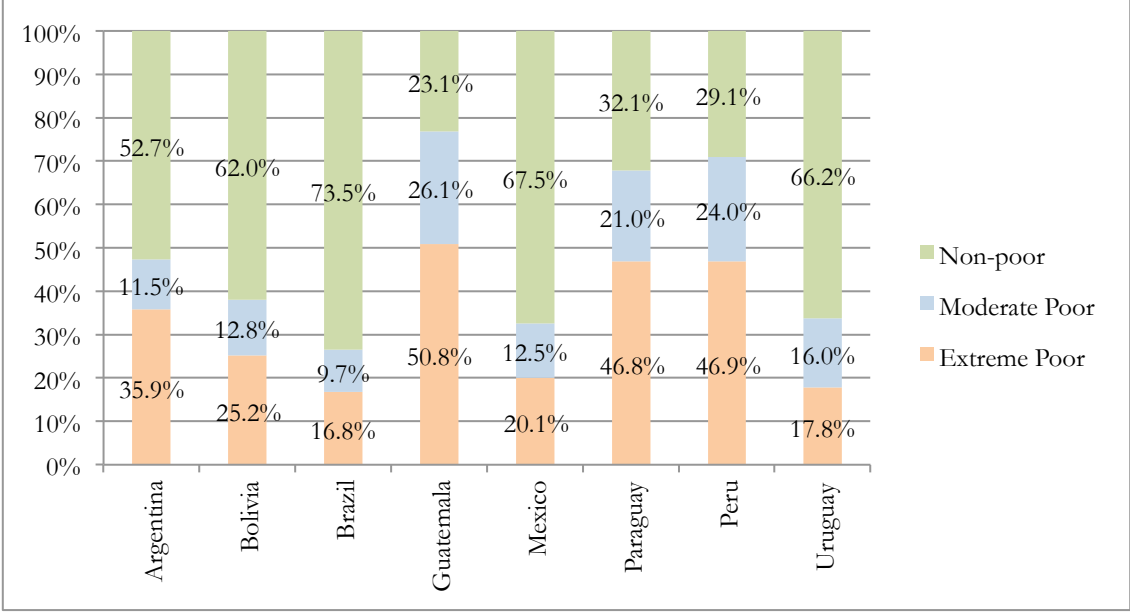
Here we highlight the areas in which the Paraguayan government could look to determine if there is space to improve its reduction of inequality and poverty, its redistributive effectiveness, and the progressivity of its taxes and social spending. An important caveat is that the results we have presented in this paper are standard incidence analysis with no behavioral, inter-temporal, or general equilibrium effects, and without a discussion of macro-sustainability. In addition, it is a one-year snapshot that does not analyze marginal effects.

First, the government could look to its direct transfer programs. Could the low reduction of inequality and absolute poverty caused by direct transfers be improved? To answer this question, we will address three sub-questions. First, are a large proportion of direct transfers going to the non-poor? Second, are a large portion of the poor covered by direct transfer programs? Third, what is the per capita benefit among members of beneficiary households that are poor?

Figures 10 and 11 seek to answer the first question for Paraguay, as well as provide comparative perspective. Figure 10 shows that 47% of direct transfers in Paraguay reach the extreme poor (those living on less than \$2.50 PPP per day, in terms of household per capita market income), which is among the highest of the countries analyzed. Furthermore, 68% of direct transfers reach the moderate or extreme poor (those living on less than \$4 PPP per day), again among the highest of the countries analyzed. Figure 11 shows that 85%

of beneficiaries are moderately or extremely poor in Paraguay, making direct transfers more pro-poor by this metric than in any other country. Thus, to answer the first question, the problem of low poverty reduction caused by direct transfers is *not* a result of a large proportion of direct transfers going to the non-poor.

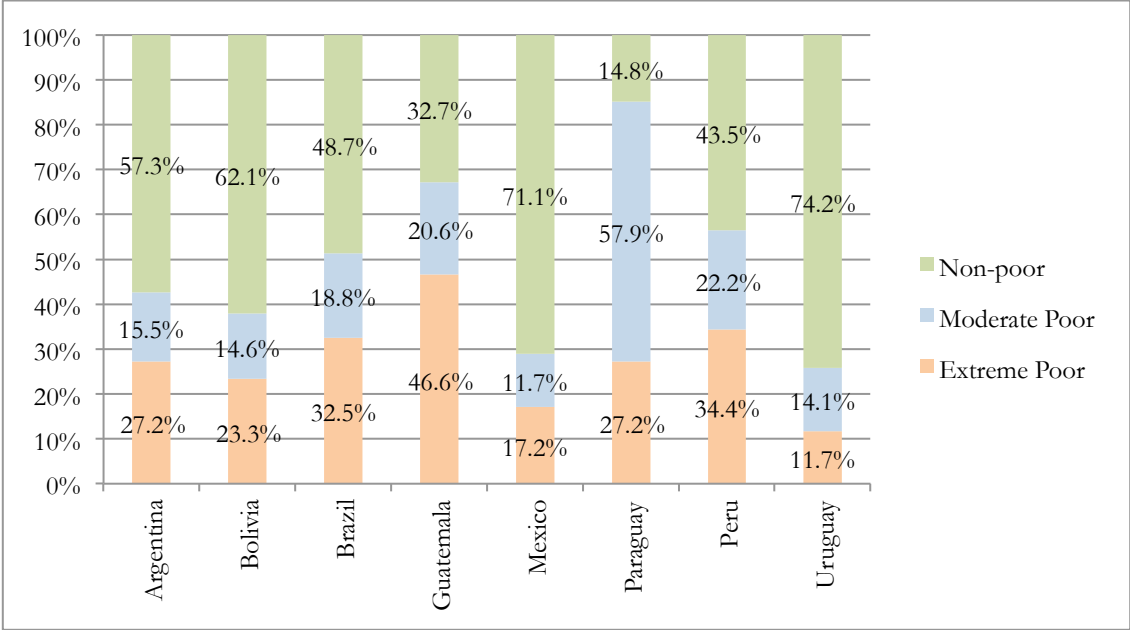
FIGURE 10. PERCENT OF DIRECT TRANSFER BENEFITS GOING TO THE POOR IN ARGENTINA, BOLIVIA, BRAZIL, GUATEMALA, MEXICO, PARAGUAY, PERU AND URUGUAY.



Source: For Paraguay, authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The extreme poor have household per capita market income below \$2.50 PPP per day. The moderate poor have household per capita market income between \$2.50 PPP per day and \$4 PPP per day.

FIGURE 11. PERCENT OF DIRECT TRANSFER BENEFICIARIES WHO ARE POOR IN ARGENTINA, BOLIVIA, BRAZIL, GUATEMALA, MEXICO, PARAGUAY, PERU AND URUGUAY.

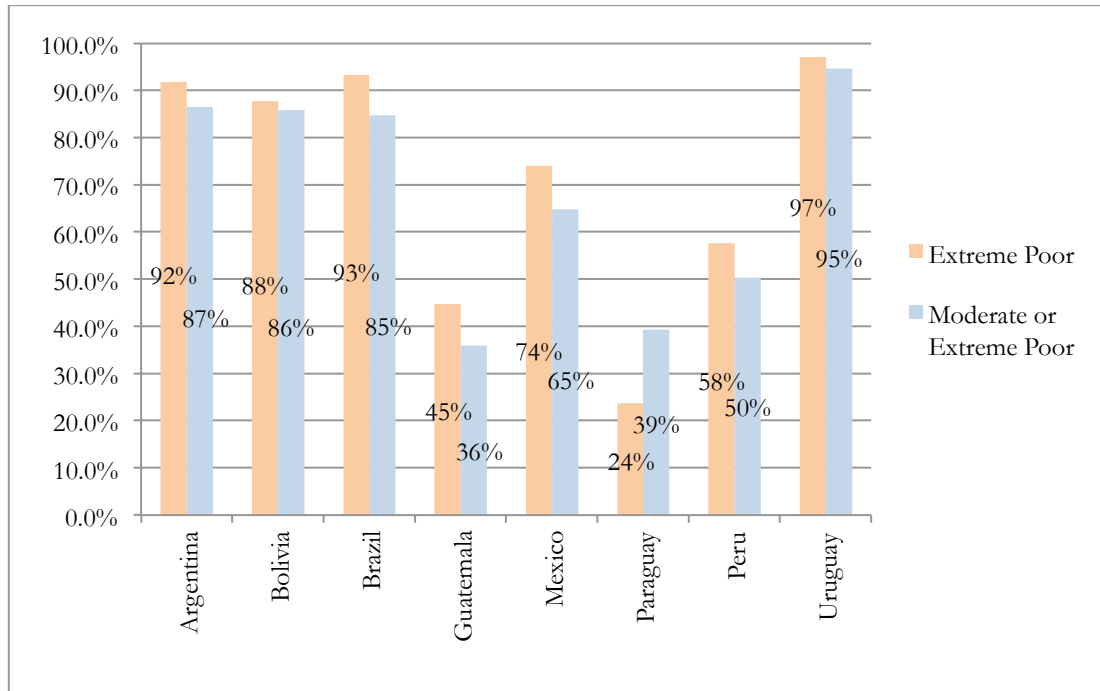


Source: For Paraguay, authors’ calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The extreme poor have household per capita market income below \$2.50 PPP per day. The moderate poor have household per capita market income between \$2.50 PPP per day and \$4 PPP per day.

Figure 12 seeks to answer the second question: are a large portion of the poor covered by direct transfer programs? In Paraguay, just 24% of the extreme poor are beneficiaries of direct transfer programs. This proportion is significantly lower than in any other country analyzed here. Furthermore, just 39% of the extreme or moderate poor are beneficiaries of direct transfer programs, which is a lower proportion than in all of the other countries except Guatemala. So, to answer the second question, one reason that poverty is not reduced much by direct transfers is that most of the poor are *not covered* by a direct transfer program.

FIGURE 12. PERCENT OF POOR RECEIVING AT LEAST ONE DIRECT TRANSFER



Source: For Paraguay, authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: The extreme poor have household per capita market income below \$2.50 PPP per day. The moderate poor have household per capita market income between \$2.50 PPP per day and \$4 PPP per day.

For those who *are covered*, do they receive enough to escape poverty? Table 5 shows that the answer to this question is no. An extremely poor individual whose household benefits from at least one direct transfer program receives, on average, just \$0.38 PPP per day in household per capita terms. In many cases, this transfer will not be enough to raise the household above the \$2.50 PPP per day extreme poverty line. So, to answer the third question, another reason that poverty is not reduced much by direct transfers is that the per capita benefits reaching beneficiary poor households are low.

TABLE 5. AVERAGE BENEFITS PER MEMBER OF A BENEFICIARY HOUSEHOLD IN PARAGUAY, 2010.

Groups:	y < 1.25	1.25 < y < 2.5	y < 2.5	2.5 < y < 4	y < 4	4 < y < 10	10 < y < 50	y > 50	y > 4	Total
Tekoporã	\$0.32	\$0.37	\$0.35	\$0.40	\$0.36	\$0.47	\$0.80	\$0.50	\$0.52	\$0.02
Other Direct Transfers	\$0.71	\$0.67	\$0.69	\$0.68	\$0.69	\$0.20	\$0.62	\$0.00	\$0.25	\$0.00
Tekoporã + Other Direct	\$0.38	\$0.39	\$0.38	\$0.08	\$0.18	\$0.43	\$0.78	\$0.50	\$0.48	\$0.03
Tarifa Social	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.02	\$0.04	\$0.02	\$0.08
Education: primary	\$0.81	\$0.86	\$0.84	\$0.72	\$0.79	\$0.72	\$0.76	\$0.84	\$0.73	\$0.76
Education: secondary	\$1.67	\$2.18	\$1.95	\$2.14	\$2.03	\$1.96	\$2.25	\$2.54	\$2.07	\$2.06
Education: tertiary	\$16.65	\$13.96	\$15.46	\$6.53	\$9.62	\$9.55	\$10.93	\$13.97	\$10.81	\$10.75
Health	\$1.99	\$0.80	\$1.06	\$22.02	\$4.77	\$1.16	\$1.46	\$1.54	\$1.34	\$1.41
Pensions	\$6.33	\$2.65	\$3.23	\$9.48	\$4.08	\$2.79	\$7.06	\$40.95	\$8.30	\$8.18
Average Income	\$0.72	\$1.88	\$1.45	\$3.23	\$2.29	\$6.70	\$18.14	\$114.40	\$14.14	\$10.77

Population Shares by group	5.6%	9.4%	15.0%	13.4%	28.4%	38.9%	31.0%	1.7%	71.6%	100.0%
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Source: For Paraguay, authors' calculations using *Encuesta Permanente de Hogares* (2010) and National Accounts; for Argentina, Lustig and Pessino (2013); for Bolivia, Paz et al. (2013); for Brazil, Higgins and Pereira (2013); for Guatemala, Morán and Cabrera (2013); for Mexico, Scott (2013); for Peru, Jaramillo (2013); for Uruguay, Bucheli et al. (2013).

Note: Benefits are in purchasing power parity (PPP) adjusted dollars of 2005. Groups indicate income groups; for example, “1.25 < y < 2.5” indicates individuals with household per capita income between \$1.25 and \$2.50 PPP per day.

As a result of the above discussion, two policy measures can be recommended on the spending side if they are within the fiscal capacity of the government: first, to seek to expand coverage of direct transfer programs among the poor, and second, to increase the transfer sizes paid to the beneficiaries of targeted anti-poverty programs.

On the tax side, taxes should be made more progressive. Overall taxes are regressive, mainly due to the fact that regressive indirect taxes make up a large component of overall taxes.

5. CONCLUSIONS

We presented results of applying a standard incidence analysis of taxes and social spending in Paraguay using the *Encuesta Permanente de Hogares* (2010). The analysis was conducted for a benchmark case, in which pensions were considered part of market income, and a sensitivity analysis, in which they were considered a government transfer. The results were placed in comparative perspective with seven other countries for which a comparable incidence analysis has been undertaken as part of the Commitment to Equity project. The main results are as follows.

1. Paraguay achieves only a small reduction in inequality and poverty when direct and indirect taxes, direct and in-kind transfers, and indirect subsidies are considered. In comparison with seven other Latin American countries, it performs worst or among the worst in terms of poverty reduction, inequality reduction and poverty reduction effectiveness, and closer to the middle of the pack in terms of redistributive effectiveness.
2. Direct transfers are progressive, indirect taxes are somewhat regressive and overall taxes are slightly regressive.
3. Social spending is progressive in relative terms, but less so than in any of the other countries analyzed. (In most of the other countries, social spending is progressive in absolute terms.) Education spending and health spending are each progressive in relative terms, but also less progressive than in other countries. Spending on tertiary education is regressive, which only occurs in Paraguay and Guatemala.
4. The small reduction in extreme and moderate poverty is not a result of a large proportion of direct transfer benefits going to the non-poor. Instead, it is a result of low coverage among the poor by direct transfer programs, and low per capita transfers to those who are covered. A larger reduction in poverty might be achieved by attempting to expand coverage and increase transfer sizes, if these policy measures are fiscally possible.

REFERENCES

- Banco Central del Paraguay. Informe Económico Mensual (Central Bank of Paraguay. Monthly Economic Report). December 2012.
- BID (Banco Interamericano de Desarrollo). 2009. Equidad Fiscal en Brasil, Chile, Paraguay y Uruguay. Serie de Equidad Fiscal en América Latina del BID.
- Bucheli, Marisa, Nora Lustig, Máximo Rossi and Florencia Amábile. Forthcoming. “Social Spending, Taxes and Income Redistribution in Uruguay.”
- Galeano, Luis. *El Impacto del Programa Tekoporã de Paraguay en la Nutrición, el Consumo y Economía* (The Impact of the Tekoporã Program of Paraguay on Nutrition, Consumption and the Economy). 2008. <http://www.rlc.fao.org/es/prioridades/seguridad/ingreso3/pdf/mejorando.pdf>
- Guillen, S. *El gasto social en Paraguay: una mirada detallada del periodo 2002/2010* (Social spending in Paraguay: a detailed view of the period 2002-2010). Asunción. CADEP-OFIP: December 2010.
- Higgins, Sean and Claudiney Pereira. Forthcoming. “The Effects of Brazil’s High Taxation and Social Spending on the Distribution of Household Income.”
- Imas, Victor. *Las Transferencias Monetarias con Corresponsabilidad y la Disminución de la Pobreza en el marco de las Políticas de Protección Social* (Conditional Cash Transfer Programs and Poverty Reduction within the framework of Social Protection Policies). 2011. <http://idlbnc.idrc.ca/dspace/bitstream/10625/47110/1/133485.pdf>.
- Jaramillo, Miguel. Forthcoming. “The Incidence of Social Spending and Taxes in Peru.”
- Lindert, Kathy, Emmanuel Skoufias, and Joseph Shapiro. 2006. “Redistributing Income to the Poor and Rich: Public Transfers in Latin America and the Caribbean.” Social Protection Discussion Paper 0605. Washington, D.C.: The World Bank.
- Lustig, Nora and Carola Pessino. Forthcoming. “Social Spending and Income Redistribution in Argentina During the 2000s: the Rising Role of Noncontributory Pensions.”
- Lustig, Nora, Carola Pessino, and John Scott. Forthcoming. “The Impact of Taxes and Social Spending on Inequality and Poverty in Argentina, Bolivia, Brazil, Mexico and Peru: An Overview.”
- Morán, Hilcías and Maynor Cabrera. 2012. “Comparing the incidence of taxes and transfer son inequality and poverty in rural and urban areas of Guatemala.” Prepared for the International Fund for Agricultural Development.
- O’Donnell, Owen, Eddy van Doorslaer, Adam Wagstaff and Magnus Lindelow. 2008. “Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation.” WBI Learning Resources Series. Washington, DC: The World Bank.
- Paz Arauco, Verónica, George Gray Molina, Wilson Jiménez Pozo, and Ernesto Yáñez Aguilar.

Forthcoming. “Explaining Low Redistributive Impact in Bolivia.”

Ribas, Rafael Perez, Guilherme Issamu Hirata, and Fábio Veras Soares. April 2010. “El programa Tekoporã de transferencias monetarias de Paraguay: un debate sobre métodos de selección de beneficiarios.” CEPAL Review.

<http://www.eurosocialfiscal.org/uploads/documentos/centrodoc/6449893fc621b9dbdf16df6e7a3ca293.pdf>

Scott, John. Forthcoming. “Redistributive Impact and Efficiency of Mexico's Fiscal System.”

Scott, John. 2011. “Gasto Público y Desarrollo Humano en México: Análisis de Incidencia y Equidad.” Working Paper for Informe sobre Desarrollo Humano México 2011. Mexico City: UNDP.

Souza, Pedro, Rafael Osorio, and Sergei Soares. 2011. “Uma metodologia para simular o Programa Bolsa Família.” Instituto de Pesquisa Econômica Aplicada (IPEA) Working Paper 1654.

Wagstaff, Adam. 2012. “Benefit-incidence analysis: Are government health expenditures more pro-rich than we think?” *Health Economics* 21: 351-366.

APPENDIX

A1. Definitions of Income Concepts¹⁵

As usual, any incidence study must start by defining the basic income concepts. In our study we use five: market, net market, disposable, post-fiscal and final income. One area in which there is no agreement is how pensions from the contributory system should be considered. Some authors treat them as part of market income and others place them under government transfers, and others exclude them altogether. Since this is an unresolved issue, in our study we defined a benchmark case in which contributory pensions are part of market income. We also did a sensitivity analysis where pensions are classified under government transfers.

In what follows, we present the precise definitions of each income concept used in the benchmark case and the sensitivity analysis.

Market income is defined as:

$$I^m = W + IC + AC + IROH + PT + SSP \text{ (benchmark)}$$

$$I^{ms} = W + IC + AC + IROH + PT \text{ (sensitivity analysis)}$$

Where,

I^m, I^{ms} = market income¹⁶ in benchmark and sensitivity analysis, respectively.

W = gross (pre-tax) wages and salaries in formal and informal sector; also known as earned income.

IC = income from capital (dividends, interest, profits, rents, etc.) in formal and informal sector; excludes capital gains and gifts.

AC = autoconsumption; also known as self-production.

IROH = imputed rent for owner occupied housing; also known as income from owner occupied housing.

PT = private transfers (remittances and other private transfers such as alimony).

SSP = retirement pensions from contributory social security system.

Net Market income is defined as:

$$I^n = I^m - DT - SSC \text{ (benchmark)}$$

$$I^{ns} = I^{ms} - DT - SSC^s \text{ (sensitivity analysis)}$$

Where,

I^n, I^{ns} = net market income in benchmark and sensitivity analysis, respectively.

DT = direct taxes on all income sources (included in market income) that are subject to taxation.

SSC/ SSC^s = respectively, all contributions to social security except portion going towards pensions¹⁷ and all contributions to social security without exceptions.

¹⁵ For more details on concepts and definitions, see Lustig and Higgins (2012).

¹⁶ Market income is sometimes called primary income.

¹⁷ Since here we are treating contributory pensions as part of market income, the portion of the contributions to social security going towards pensions are treated as 'saving.'

Disposable income is defined as:

$$I^d = I^n + GT \text{ (benchmark)}$$
$$I^{ds} = I^{ns} + GT^s \text{ (sensitivity analysis)}$$

Where,

I^d, I^{ds} = disposable income in benchmark and sensitivity analysis, respectively.
 GT = direct government transfers; mainly cash but can include transfers in kind such as food.
 $GT^s = GT + SSP$

Post-fiscal income is defined as:

$$I^f = I^d + \text{IndS} - \text{IndT} \text{ (benchmark)}$$
$$I^{fs} = I^{ds} + \text{IndS} - \text{IndT} \text{ (sensitivity analysis)}$$

Where,

I^f, I^{fs} = post-fiscal income in benchmark and sensitivity analysis, respectively.
 IndS = indirect subsidies (e.g., lower electricity rates for small-scale consumers).
 IndT = indirect taxes (e.g., value added tax or VAT, sales tax, etc.).

Final income is defined as:

$$I^f = I^{fs} + \text{InkindT} - \text{CoPaym} \text{ (benchmark)}$$
$$I^{fs} = I^{fs} + \text{InkindT} - \text{CoPaym} \text{ (sensitivity)}$$

Where,

I^f, I^{fs} = final income in benchmark and sensitivity analysis, respectively.
 InkindT = government transfers in the form of free or subsidized services in education and health; urban and housing.
 CoPaym = co-payments, user fees, etc., for government services in education and health.¹⁸

Because some countries do not have data on indirect subsidies and taxes, we also defined *Final income** = $I^{f*} = I^d + \text{InkindT} - \text{CoPaym}$.

A2. Construction of Income Concepts

i. Allocating Taxes and Transfers at the Household Level¹⁹

Unfortunately the information on direct and indirect taxes, transfers in cash and in-kind, and subsidies cannot always be obtained directly from household surveys. Thus, one of the most important aspects of CEQ is a detailed description of how each component of income is calculated (for example, directly drawn from the survey or simulated) and the methodological assumptions that are made while calculating them.

¹⁸ One may also include participation costs such as transportation costs or foregone incomes because of use of time in obtaining benefits. In our study, they were not included.

¹⁹ Taken from Lustig and Higgins (2012).

When taxes and transfers can be obtained directly from the household survey, we call this the Direct Identification Method. When the direct method is not feasible, one can use the inference, simulation, imputation or alternate survey methods (described in more detail below). As a last resort, one can use secondary sources: e.g., incidence or concentration shares by quintiles or deciles that have been calculated by other authors as is done by Goñi et al. (2011) for instance. Finally, if none of these options can be used for a specific category, the analysis for that category will have to be left blank. The six methods one can use to allocate taxes and transfers are described below.

Direct Identification Method

On some surveys, questions specifically ask if households received cash benefits from (paid taxes to) certain social programs (tax and social security systems), and how much they received (paid). When this is the case, it is easy to identify transfer recipients and taxpayers, and add or remove the value of the transfers and taxes from their income, depending on the definition of income being used.

Imputation Method

The imputation method uses some information from the survey, such as the respondent reporting attending public school or receiving a direct transfer in a survey that does not ask for the amount received, and some information from either public accounts, such as per capita public expenditure on education by level, or from the program rules.

Inference Method

In some cases, transfers from social programs are grouped with other income sources (in a category for “other income,” for example). In this case, it might be possible to infer which families received a transfer based on whether the value they report in that income category matches a possible value of the transfer in question.

Simulation Method

In the case that neither the direct identification nor the inference method can be used, transfer benefits can sometimes be simulated, determining beneficiaries (taxpayers) and benefits received (taxes paid) based on the program (tax) rules. For example, in the case of a conditional cash transfer that uses a proxy means test to identify eligible beneficiaries, one can replicate the proxy means test using survey data, identify eligible families, and simulate the program’s impact. However, this method gives an upper bound, as it assumes perfect targeting and no errors of inclusion or exclusion. In the case of taxes, estimates usually make assumptions about informality and evasion.

The four methods described above rely on at least some information taken directly from the household survey being used for the analysis. As a result, some households receive benefits, while others do not, which is an accurate reflection of reality. However, in some cases the household survey analyzed lacks the necessary questions to assign benefits to households. In this case, there are two additional methods.

Alternate Survey

When the survey lacks the necessary questions, such as a question on the use of health services or health insurance coverage (necessary to impute the value of in-kind health benefits to households), an alternate survey may be used by the author to determine the distribution of benefits. In the alternate survey, any of

the four methods above could be used to identify beneficiaries and assign benefits. Then, the distribution of benefits according to the alternate survey is used to impute benefits to all households in the primary survey analyzed; the size of each household’s benefits depends on the quantile to which the household belongs. Note that this method is more accurate than the secondary sources method below, because although the alternate survey is somewhat of a “secondary source,” the precise definitions of income and benefits used in CEQ can be applied to the alternate survey.

Secondary Sources Method

When none of the above methods are possible, secondary sources that provide the distribution of benefits (taxes) by quantile may be used. These benefits (taxes) are then imputed to all households in the survey being analyzed; the size of each household’s benefits (taxes) depends on the quantile to which the household belongs.

ii. Construction of Income Concepts: Paraguay

The methods used in Paraguay are presented in Table A1.

TABLE A1. CONSTRUCTION OF INCOME CONCEPTS IN PARAGUAY.

MARKET INCOME	
Autoconsumption	Not included
Imputed rent for owner occupied housing	Included
Earned and Unearned Incomes of All Possible Sources Including Social Security Pensions and Excluding Government Transfers	Included. Pensions are only included in market income in the benchmark case.
NET MARKET INCOME=MARKET INCOME - (DIRECT TAXES AND EMPLOYEE CONTRIBUTIONS TO SOCIAL SECURITY)	
Direct Taxes	Subtracted from Market Income to generate Net Market Income. <u>Direct Identification Method.</u> The survey question for this variable appears on the survey as, “Algún miembro del hogar pagó por impuesto inmobiliario, tasas municipales, asfalto, tasa de cementerio, etc. ?. Cuánto?”
Employee contributions to social security	Not included.
DISPOSABLE INCOME = NET MARKET INCOME + DIRECT GOVERNMENT TRANSFERS	
Tekoporã (Flagship CCT)	<u>Inference and Simulation Methods.</u> See explanation in section 3.
Other direct transfers	<u>Inference and Simulation Methods.</u> This variable was calculated as follows: (Other Regular Monthly Income) minus (Estimated Tekopora Contributions), where the latter is estimated as described in section 3. Zeroes are placed in all observations where the (Other Reg...) is smaller than (Estimated Tek...)
Pensions	<u>Direct identification.</u> In the benchmark case, pensions were already included in market income so they are not added here. In the sensitivity analysis, they were not included in market income, and are added here. As described in section 3, there is no reliable way to separate contributory from non-contributory pensions in EPH.

POST-FISCAL INCOME = DISPOSABLE INCOME + INDIRECT SUBSIDIES - INDIRECT TAXES	
Indirect subsidies	<u>Imputation Method.</u> This is equivalent to Paraguay's Tarifa Social, a public program that discounts electricity bills for families with low usage. Using the current price of electricity per 100kw/h in Paraguay, and the variable in our survey for "money spent on electricity," we estimate who would be eligible as a Tarifa recipients. Then working backwards from how much they spent, we estimate the likely benefits they have received. Concern: This has an obvious problem: the reported electricity usage already includes the subsidy. There are three tariff subsidies (75%, 50%, 25%) depending on electricity usage. So when working backwards to find the original amount of usage, on the cusps (between 75%--50%, 50%--25% and 25%--0%) there is overlap, that is, they have two possible original-electricity usages. In these cases we always chose the lower electricity usage.
Indirect taxes	<u>Secondary Sources.</u> There are two Indirect Taxes in Paraguay. There is the Value Added Tax and a tax on combustibles. Incidence for both comes from BID (2009).
FINAL INCOME = POST-FISCAL INCOME + GOVERNMENT IN-KIND TRANSFERS/FINAL INCOME* = DISPOSABLE INCOME + GOVERNMENT IN-KIND TRANSFERS	
In-kind education	<u>Imputation Method.</u> The education benefit is based on cost per student by level. This benefit is applied to students who report attending public school. If they attend Primary School (imputed by their age, and if they said "yes" to currently attending school), they are assigned an in-kind benefit equal to the government's per student spending on Primary school. We did the same for Secondary and Tertiary.
In-kind health	<u>Imputation Method.</u> There are two types of in-kind health: free and paid. If the individual said "no" to having insurance and "yes" to "received a medical service within the last 3 months", they are assigned a proportion of National total spent on free health services. Otherwise, if the individual said "yes" to having insurance then they are assigned a proportion of the National sum spent on recipients of IPS health care (Instituto Publico de Salud), which is the public health administration system.
Housing and urban	Not included.
SCALED-UP INCOMES, TAXES AND TRANSFERS FOR INCIDENCE ANALYSIS INCLUDING GOVERNMENT IN-KIND TRANSFERS	
Scaling up factor and method	All variables on Taxes, Spending are scaled proportionally to national totals. That is, the original (unscaled) variables provides the proportion of the National total amount. Scaled totals are used for calculating inequality, effectiveness, incidence, concentration shares, and progressivity (Figures 4, 5, 6, 8, 9, Table 4, and the Ginis in Table 3). Non-scaled totals are used for calculating poverty and transfer sizes (Figures 7, 10, 11, 12, and Table 5).

A3. Effectiveness Indicators²⁰

In mathematical notation, let $X(I^j)$ be the inequality or poverty measure of interest (e.g., the Gini coefficient or headcount index), which is defined at each benchmark case income concept $j = m, n, d, pf, f, f^*$ (market income, net market income, disposable income, post-fiscal income and final income) and each sensitivity analysis income concept $j = ms, ns, ds, pfs, fs, f^*s$. Let S^D be total public spending on the direct transfer programs captured by the survey or otherwise estimated by the authors, measured by budget size in national accounts (note that in the sensitivity analysis this concept includes spending in social security pensions), and let S^H, S^E and S^U be total public spending on health, education, and (where included) housing programs, respectively. Then the effectiveness indicator for direct transfers is defined as:

$$\frac{(X(I^n) - X(I^d))/X(I^n)}{S^D/GDP}$$

and the effectiveness indicator for direct and in-kind transfers is defined as:

$$\frac{(X(I^n) - X(I^{f^*}))/X(I^n)}{(S^D + S^H + S^E + S^U)/GDP}$$

Note that in the sensitivity analysis, when contributory pensions are considered a government transfer, they are not part of net market income but are part of disposable income, thus some of the change between $X(I^{ns})$ and $X(I^{ds})$ is attributable to contributory pensions, and therefore in the sensitivity analysis S^D must include spending on contributory pensions. In the benchmark case, however, contributory pensions are already included in net market income, so S^D does not include any spending on contributory pensions. Also note that S^U should only be included in the denominator of the effectiveness indicator for direct and in-kind transfers if housing programs are included in the analysis.

²⁰ Taken from Lustig and Higgins (2012).

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Alvaredo, Facundo and Juliana Londoño Vélez. 2013. *[High Incomes and Personal Taxation in a Developing Economy: Colombia 1993-2010](#)*. CEQ Working Paper No. 12, Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue, March.

WORKING PAPER NO. 13

Lustig, Nora, and Carola Pessino and John Scott. 2013. *[The Impact of Taxes and Social Spending on Inequality and Poverty in Argentina, Bolivia, Brazil, Mexico, Peru and Uruguay: An Overview](#)*. CEQ Working Paper No. 13, Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue, April.

WORKING PAPER NO. 14

Higgins, Sean and Nora Lustig. 2013. *[Measuring Impoverishment: An Overlooked Dimension of Fiscal Incidence](#)*. CEQ Working Paper No. 14, Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue, April.

WORKING PAPER NO. 15

Tanzi, Vito. 2013. *[Tax Reform in Latin America: A long term assessment](#)*. CEQ Working Paper No. 15, Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue, April.

WORKING PAPER NO. 16

Higgins, Sean and Nora Lustig, Whitney Ruble and Timothy Smeeding. 2013. *[Comparing the Incidence of Taxes and Social Spending in Brazil and the United States](#)*. CEQ Working Paper No. 16, Center for Inter-American Policy and Research and Department of Economics, Tulane University and Inter-American Dialogue, November.

<http://www.commitmentoequity.org>



WHAT IS CEQ?

Led by Nora Lustig (Tulane University) and Peter Hakim (Inter-American Dialogue), the Commitment to Equity (CEQ) project is designed to analyze the impact of taxes and social spending on inequality and poverty, and to provide a roadmap for governments, multilateral institutions, and nongovernmental organizations in their efforts to build more equitable societies. CEQ/Latin America is a joint project of the Inter-American Dialogue (IAD) and Tulane University's Center for Inter-American Policy and Research (CIPR) and Department of Economics. The project has received financial support from the Canadian International Development Agency (CIDA), the Development Bank of Latin America (CAF), the General Electric Foundation, the Inter-American Development Bank (IADB), the International Fund for Agricultural Development (IFAD), the Norwegian Ministry of Foreign Affairs, the United Nations Development Programme's Regional Bureau for Latin America and the Caribbean (UNDP/RBLAC), and the World Bank. <http://commitmenttoequity.org>



**COMMITMENT
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The CEQ logo is a stylized graphical representation of a Lorenz curve for a fairly unequal distribution of income (the bottom part of the C, below the diagonal) and a concentration curve for a very progressive transfer (the top part of the C).