the review of income and wealth

Review of Income and Wealth
Series 62, Supplement 1, August 2016
DOI: 10.1111/roiw.12201

COMPARING THE INCIDENCE OF TAXES AND SOCIAL SPENDING IN BRAZIL AND THE UNITED STATES

by Sean Higgins,* Nora Lustig and Whitney Ruble

Tulane University

and

Timothy M. Smeeding

University of Wisconsin–Madison

We perform the first comprehensive fiscal incidence analyses in Brazil and the U.S., including direct cash and food transfers, targeted housing and heating subsidies, public spending on health and education, and taxes on personal income, payroll, corporate income, property, and expenditures. The countries share a number of similarities that make the comparison interesting, including high levels of inequality given their levels of development, high inequality of opportunity, large and racially diverse populations, and similar sizes of government. The U.S. achieves higher redistribution through direct taxes and transfers, primarily because Brazil underutilizes personal income taxes and keeps its progressive cash and food transfer programs small, while its larger transfer programs are less progressive. When public spending on health and non-tertiary education is added to income using the government cost approach, however, the two countries achieve similar levels of redistribution.

JEL Codes: D31, H22, I38

Keywords: fiscal policy, inequality, social spending, taxation

1. Introduction

Both Brazil and the United States have been persistently unequal given their levels of development. A quarter century ago, Brazil had one of the highest levels of inequality in the world, while the U.S. had one of the highest levels of inequality among developed countries. These high levels of inequality have persisted: although inequality in Brazil has recently fallen (Lustig *et al.*, 2013b), it is still among the 20 most unequal countries in the world (Alvaredo and Gasparini, 2015); inequality in the U.S. has been rising (Kenworthy and Smeeding, 2014), and it is now the third most unequal OECD country behind Chile and Mexico. Furthermore, when the U.S. had a similar level of development as Brazil today, it had

Note: We are grateful to Louise Cord, Conchita D'Ambrosio, Luis Felipe López-Calva, Branko Milanović, and two anonymous referees for providing very helpful comments that greatly improved our paper. We also thank seminar participants for useful comments and suggestions, Claudiney Pereira for collaboration on the Brazil analysis, Grant Driessen for collaboration on the U.S. analysis, and Adam Ratzlaff and David Roberts for research assistance. This paper is part of the Commitment to Equity (CEQ) project. Led by Nora Lustig, CEQ is designed to analyze the impact of taxes and social spending on inequality and poverty (www.commitmenttoequity.org). The paper does not necessarily reflect the opinions of the institutes and universities where the authors are employed or affiliated.

*Correspondence to: Sean Higgins, Department of Economics, Tulane University, 206 Tilton Hall, 6823 St. Charles Ave., New Orleans, LA 70118, USA (shiggins@tulane.edu).

similar levels of inequality (Plotnick *et al.*, 1998). In both countries, one key determinant of income inequality is the unequal distribution of human capital associated with high rates of school incompletion and, to some extent, race (Card and Krueger, 1992; Goldin and Katz, 2008; Ñopo, 2012). Both countries also face high inequality of opportunity (Bourguignon *et al.*, 2007; Brunori *et al.*, 2013), low levels of intergenerational mobility (Jäntti *et al.*, 2006; Corak, 2013), and similar income polarization (Ferreira *et al.*, 2013, figure F5.1C).

In this paper, we investigate an important aspect of the two countries' high inequality: the amount of redistribution and inequality reduction they achieve through social spending and taxes. Given each country's high inequality relative to its level of development, as well as other similarities (large geographic area, large and diverse population, and similar size of government[1]), policymakers in both countries might benefit from a comparison of the redistributive effects of taxes and social spending in the two countries. We perform comprehensive fiscal incidence analyses for both countries, including assessments of the progressivity of all major tax and transfer programs, to measure the impact of public spending and taxation on inequality in the two countries. Our analysis includes direct cash and food transfers, direct personal income, payroll, corporate income, and property taxes, indirect expenditure taxes, indirect subsidies for energy and housing, and spending on government-provided healthcare and non-tertiary education. By including government spending on health and education, we are able to assess whether these components change our conclusions substantially, as in Garfinkel *et al.*'s (2006, 2010) comparison between the United States and other OECD countries.

Our study of inequality in both the United States and Brazil makes several improvements over the existing literature. Existing studies usually omit indirect taxes and public spending on health and education (e.g., Immervoll *et al.*, 2009, for Brazil; and Kim and Lambert, 2009, for the United States). For the U.S., the one study we are aware of that includes *both* indirect taxes and these in-kind benefits (Garfinkel *et al.*, 2006, 2010) uses data from 2000. In the areas of allocating taxes and public spending on health and education, our study uses more robust methods than did earlier authors. For example, we use microsimulation results that take into account that different states in the U.S. have vastly different sales and property tax mixes—some much more regressive than others (Newman and O'Brien, 2011). For health and education spending, we use data on Medicare and Medicaid coverage to determine the distribution of health benefits, and use multiple household surveys to determine the distribution of education benefits given the lack of data on public vs. private school attendance in our main survey. In addition, we include imputed rent for owner-occupied housing, which is omitted from many studies on the U.S. despite being an important component of income for the elderly (Bradbury, 2013).

In the case of Brazil, we build on the comprehensive incidence analysis undertaken by Higgins and Pereira (2014). Our main improvements—in addition to comparing results for Brazil to those of the U.S.—are that we include the

[1]Combined primary spending by federal, state, and local governments is close to 40 percent of GDP in both countries. More specifically, Brazil's consolidated primary spending (total spending minus interest payments) was 41.4 percent of GDP in 2009 (Ministério da Fazenda, 2010), while it was 38.6 percent of GDP in the U.S. in 2011 (International Monetary Fund, 2013, Table 4a).

corporate income tax, use square root scale equivalized income rather than household per capita income, and use an improved method described in Lustig and Higgins (2013) when imputing public spending on health and education. The use of equivalized rather than household per capita income avoids taking the extreme stance that there are no economies of scale within households, which would imply that fulfilling the needs of each additional household member is just as costly as fulfilling the needs of the previous household member (Buhmann *et al*., 1988). Online Appendix A has robustness checks using the two extremes of no economies of scale and complete economies of scale.

Another contribution of our paper is to compare the redistributive effects of the revenue collection and social spending systems in the two countries using a consistent and comprehensive framework. Direct comparisons between the U.S. and Brazil are rare; Bourguignon *et al*. (2008) decompose differences in the two countries' household income distributions, but the only component of government spending and taxation they analyze is direct transfers. Multi-country studies that include both the U.S. and Brazil similarly tend to overlook subsidies, expenditure taxes, and public spending on health and education.

Our comparison leads to a number of new insights. Before adding government spending on health and education to income, Brazil's lower level of redistribution can be attributed to three main factors: Brazil's direct taxes are both considerably smaller as a percentage of GDP and less progressive than those in the U.S.; Brazil's highly progressive direct transfer programs are small, while its larger direct transfer programs are less progressive; and Brazil begins with a more unequal market income distribution (which limits redistributive capacity, as shown by Engel *et al*., 1999). When government spending on health and education is included, however, the two countries reduce inequality by a similar amount.

The next section overviews our methods, describing how we allocate and estimate specific taxes and benefits, define income concepts, and assume tax burdens are shifted. Section 3 presents results for the two countries and discusses them in comparison. Section 4 concludes.

2. Data, Methods, and Income Concepts

Using the methods proposed by Lustig and Higgins (2013) to ensure maximum comparability across countries in concept and estimate, we perform comprehensive fiscal incidence analyses to measure the effects of taxation and social spending on inequality in the two countries. These methods consist of conventions for harmonizing the household survey microdata for maximum comparability, a set of strategies to allocate taxes and benefits to households when these are not directly included as survey questions, definitions of income concepts, and assumptions about the economic incidence of taxes and benefits. We summarize each of these aspects in turn, then address limitations of our analysis. Our primary data sources are the 2011 Current Population Survey (CPS) for the U.S., and the 2008–09 Pesquisa de Orçamentos Familiares (POF) for Brazil; these are supplemented by the 2011 American Community Survey (ACS), 2011 American

Housing Survey (AHS), and 2007 National Household Education Survey (NHES) in the U.S., and the 2008 Pesquisa Nacional por Amostra de Domicílios (PNAD) in Brazil.

2.1. *Harmonization*

Following Lustig and Higgins (2013), we exclude "external" members of the household: boarders, live-in domestic servants, and their families (as well as their incomes) are dropped. Missing incomes due to item non-response are treated as zero, unless the household head's primary income source is missing, in which case the household is dropped from the analysis. Households with zero gross income are also dropped, but households with zero market income and positive gross income (i.e., they receive all of their income from government transfers) are included. Households with zero gross income are very rare since this income concept includes imputed rent for owner occupied housing, government cash and food transfers, and (in the case of Brazil) the value of own production.

The complex sampling designs of the surveys are accounted for in all calculations. Household sampling weights are multiplied by the size of the household, so that our inequality estimates correspond to individual- rather than household-level inequality. We do not inflate totals for various income components in the survey to match those available from national accounts because of fundamental differences between the two (Deaton, 2001); hence, to avoid overestimating the redistributive effect of health and education benefits (which are imputed based on spending from national accounts), we scale these benefits down to match survey magnitudes. Specifically, we ensure that the ratios of each component of health and non-tertiary education spending in national accounts to disposable income in national accounts equal the analogous ratios of these benefits to disposable income in our household surveys.

2.2. *Allocation Methods*

When a survey includes a specific question about the amount a household paid or received of a certain tax or transfer, the tax or transfer is *directly identified*. In some cases, there is not a specific question for a particular transfer, but these are instead grouped into one question that also includes other sources of income. In this case, the transfer can sometimes be *inferred* based on whether the value the household reports in that income category matches a possible value of the transfer in question. When information available in the survey does not permit us to directly identify or infer the amount received as a transfer or paid as a tax, we sometimes *simulate* the amount by applying the relevant program rules or tax law. This involves identifying program-eligible or tax-paying households, but also incorporates adjustments for imperfect program take-up and tax non-compliance.[2] Another allocation method is the use of regression to *predict* benefits; a common

[2]In the U.S., we simulate income taxes and refundable tax credits (but only for those that report filing a tax return) as well as public child care (randomly selecting eligible households until we exhaust the program budget). In Brazil, we simulate payroll taxes paid by the employer (only for formal sector workers), corporate income taxes, expenditure taxes, and heating subsidies (using expenditure data from the household survey). See Garfinkel *et al.* (2006) for more on this method and its advantages.

example is predicting "imputed rent" for owner occupied housing by regressing rental rates on housing characteristics among those who rent their dwellings. For benefits that require information from national accounts, we *impute* benefits using some information from the survey—such as whether a child attends public school or whether anyone in a household used public health facilities—with information from national accounts, such as average per student primary spending in that student's state or per patient public spending in that state on a particular type of medical care.

When a survey lacks the necessary questions to adopt any of the above strategies, we search for the information in an *alternate survey*, use one of the above methods in the alternate survey, then implement some form of matching to allocate benefits back into the main survey. For example, our main survey in Brazil lacks a question about the use of public health facilities, so we use an alternate survey that does include this information, impute benefits in that survey, then distribute these benefits by ventiles (5 percent population groups) in our main survey. In the U.S., we lack data in our main survey about whether schoolchildren attend public or private school, so we combine the prediction and imputation methods using an alternate survey that does have this information.

Finally, when none of the above methods are possible, we use results from a *secondary source* and distribute the taxes or benefits at as fine-grained a level as possible. For example, for sales taxes in the United States, we use results on the percent of income spent on these taxes by each of seven income groups in each state calculated by Davis *et al*. (2013) using a microsimulation model. Within each of these 350 groups (seven income groups by 50 states), we assume each household paid the average proportional tax of that group estimated by Davis *et al*. (2013).

2.3. *Income Concepts and Assumptions*

We use definitions of five income concepts adapted from Lustig and Higgins (2013). Tables B.1 and B.2 in the online Appendix summarize the allocation methods used, and Table C.1 provides descriptive statistics for each income concept and component.

Market income includes wage and salary income, fringe benefits (including employer contributions to health insurance), non-farm business income, farm income, retirement income, investment income (interest, dividends, rent), income from private transfers (child support, alimony, remittances, other), imputed rent for owner-occupied housing, the value of own production, and—in some parts of the analysis—contributory pension income from the social security system. Since gross labor income reported in the survey is net of taxes paid by the employer, assuming these taxes are fully shifted forward resulting in lower wages, we gross up market income by adding taxes paid by the employer. Similarly, we gross up market income in the case of corporate income taxes.

With respect to contributory social security pensions, Lustig *et al*. (2014) explain that arguments exist for treating them as part of market income because they are deferred income similar to personal savings, as well as for treating them as government transfers since there may not be a deterministic link between the amount contributed and the benefit received, and many systems run a deficit

financed by general tax revenues. Hence, for a number of tables we present results under both scenarios: one in which they are treated as part of market income (the "benchmark case") and one in which they are treated as government transfers (the "sensitivity analysis"). In the benchmark case, we do not subtract contributions to social security out of income when moving from gross to disposable income because they are treated like any other form of personal savings. In the sensitivity analysis, we do subtract out contributions, treating them as taxes. The results and comparison are sensitive to how contributory pensions are treated, which is unsurprising given Bourguignon *et al.*'s (2008) finding that a large portion of the difference in inequality between the two countries is due to the distribution of pensions.

In Brazil, all components of market income are directly identified in the survey. The value of goods produced for own consumption uses the expenditure component of POF, which includes questions about the way each good was obtained or purchased. Survey respondents must still report the value of goods obtained through own production or from the household's business inventory; we use the reported values. Imputed rent for owner occupied housing uses the responses to a survey question asking each owner occupier how much her dwelling would be rented for if it were rented.

In the U.S., the components of market income are directly identified in the survey with the exception of private scholarships and imputed rent. For private scholarships, we use the survey question on scholarship income and infer that scholarships greater than $5,550 (the maximum amount for Pell grants, a scholarship funded by the federal government) are private scholarships. For imputed rent for owner occupied housing, we predict rental values of owner occupiers' homes using AHS and match these values to owner occupiers in the CPS. We do not include the value of own production in the U.S. due to data limitations, but take solace that own production of food is small in the U.S., accounting for around 0.1 percent of GDP (USDA, 2014, table 1). We do not attempt to value home production of *services* (e.g., time spent in child-rearing, caring for the sick and the elderly, house cleaning, cooking, and other household chores) in either country.

Gross income equals market income plus direct cash and food transfers. The economic incidence of these benefits is assumed to fall entirely on beneficiary households, and we ignore potential spillovers to other households. In the case of Brazil, direct cash transfers include the flagship anti-poverty conditional cash transfer (CCT) program Bolsa Família, the non-contributory pension program Benefício de Prestação Continuada (BPC), public scholarships, unemployment benefits, special circumstances pensions, and other direct transfers (including benefits from state and municipal level programs, such as São Paolo state's Renda Cidadã CCT). Because benefits from these programs are directly identified, non-take-up of benefits is not an issue (assuming survey reporting is accurate): we only attribute benefits to those who report receiving them in the survey. Milk transfers from the Programa de Aquisição de Alimentos (PAA) are inferred by assuming that households in the region of Brazil where the program operates who report the milk they consume as donated, receive that milk from the program.

In the case of the U.S., direct cash transfers include welfare and welfare-to-work payments at the federal and state levels, Temporary Assistance for Needy

Families (TANF), Aid for Families with Dependent Children (AFDC), non-contributory pensions from the Supplemental Security Income (SSI) program, veterans' benefits, unemployment benefits, Pell grants, and workers' compensation. Near-cash and food transfer programs in the U.S. include the Supplemental Nutrition Assistance Program (SNAP; more commonly known as "food stamps"), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and free and reduced-price school lunches for low-income families. Benefits from all cash transfer programs, as well as SNAP, are directly identified (except in the case of Pell grants, which are inferred); the value of WIC and school lunches are imputed to households responding that the mother or children receive benefits from the program. Since these benefits are, in all cases, based on a survey question identifying which households participate in the program, non-take-up of benefits is accounted for to the extent that households who do receive benefits report them, and households do not erroneously report participating in the program.[3] We also treat refundable tax credits—the federal and state Earned Income Tax Credit (EITC) and federal Child Tax Credit (CTC)—as direct transfers (and, hence, use pre-credit liabilities in the direct tax calculations).[4] We account for non-take-up of refundable tax credit benefits by only attributing benefits to eligible households in which at least one member reports filing a tax return in the CPS.

Disposable income equals gross income minus individual income taxes and payroll taxes (including those paid by the employer), corporate income taxes, and property taxes. Taxes at the federal, state, and local levels are included. Individual income taxes (including social security contributions) are assumed to be borne fully by labor in the formal sector, as are payroll taxes paid by the employer (which are borne by the formal labor sector in the form of lower wages). Corporate income taxes are assumed to fall partially on capital, and to be partially shifted forward to labor and consumers. Due to the theoretical and empirical uncertainty about who bears the burden of the corporate income tax (Auerbach, 2006), this is a middle of the road approach. Property taxes are assumed to be borne fully by property owners.

Individual income taxes and property taxes in Brazil are directly identified in the labor and expenditure modules of the survey, respectively; we simulate payroll taxes paid by employers and corporate income taxes. In the case of payroll taxes, we only simulate them for workers that we assume to be in the formal sector; since the survey lacks a question on whether a worker is in the formal sector, we assume that only those who report paying income taxes are in the formal sector. Under the assumption that those working in the informal sector do not erroneously report paying taxes, our analysis of direct taxes thus takes into account the role of the shadow economy by only subtracting taxes for those in the formal sector. In the U.S., individual and corporate income taxes are simulated, while property taxes are identified in an alternate survey, AHS, and matched to

[3]In both countries, we make a correction for the underestimation of the number of beneficiaries in our survey for the most effective anti-poverty programs for the non-elderly (Bolsa Família in Brazil and SNAP in the U.S.). See online Appendix B for more details.

[4]The OECD takes the same approach (Denk *et al*., 2013).

households in CPS. Our simulation of individual income taxes accounts for evasion by applying tax law only to households in which at least one member reports filing a tax return in the CPS.

Post-fiscal income equals disposable income plus indirect subsidies minus indirect taxes. The indirect subsidies included in our analysis are housing and household energy subsidies targeted to low-income families. Allocating other government subsidies to particular households proved to be intractable. In Brazil, the main housing subsidy program, Minha Casa Minha Vida, was not implemented until late 2009, after the survey was completed; hence, we do not include it in our analysis. In the U.S., a variety of targeted housing subsidies exist, which are all included in the analysis because the CPS question on housing assistance is ambiguous enough to include all programs; benefits are predicted by estimating the market value rent of the dwelling and subtracting reported rent paid, which is asked of those who receive housing subsidies.

Energy subsidies come from the Tarifa Social de Energia Elétrica (TSEE) in Brazil and the Low-Income Home Energy Assistance Program (LIHEAP) in the U.S. Indirect taxes are expenditure taxes at both the federal and state levels. We assume that the burden of indirect taxes is entirely shifted forward to consumers. In the case of Brazil, we estimate expenditure taxes paid by each household using the expenditure module of POF in combination with effective tax rates for nine categories of consumption items calculated by Nogueira *et al*. (2011) using an input–output matrix. In the U.S., CPS lacks consumption data, so we use microsimulation-based estimates of sales taxes paid by each of seven income groups in each state from a secondary source (Davis *et al*., 2013), thus accounting for the vastly different sales tax rates and tax mixes in different states (Newman and O'Brien, 2011).

Final income equals post-fiscal income plus government spending on public health and education services. We value these services at government cost because our objective is to analyze who receives the benefits of public spending. We impute benefits only to those who report using public health services, being covered by public health insurance, or attending public schools (either in our main survey or an alternate survey) in order to avoid overestimating take-up.

In Brazil, unlimited free access to public healthcare facilities is guaranteed by the 1988 Constitution; POF does not have data on who receives healthcare at public facilities, so we use an alternate survey: the 2008 PNAD, which has a detailed health supplement. Because spending on health services can vary in different geographic areas of a country, and because the amount of spending on different types of care can vary drastically, we follow the recommendation of O'Donnell *et al*. (2008) and take these into account to the extent possible. Specifically, from Brazil's national health accounts (NHA) we obtain spending by state for each of three broad categories of healthcare: preventative, basic, and in-patient care. We then map the 13 types of health services reported in PNAD into these three categories, and calculate the total number of visits for each category within each state according to PNAD. For each category–state pair, we divide total spending from NHA by total visits from PNAD to obtain per visit spending, and impute this value to each reported visit for that type of care in that state in our microdata.

In the U.S., social spending on healthcare takes the form of the Medicare and Medicaid programs, which are imputed at government cost to those who are covered. Specifically, for each age (because spending varies significantly by age), we divide total government Medicare spending on people of that age by the number of Medicare-insured of that age in CPS, and allocate this age-specific benefit amount to each insured individual. We follow the same procedure for Medicaid.

Education benefits are allocated to individuals who report attending a public day care center, preschool, primary or secondary school, and are valued at per pupil government spending for that education level. Public day care programs for low-income families (either in the form of free day care centers or subsidy vouchers) exist in both countries; in the U.S. they are funded by the Child Care and Development Fund (CCDF) and TANF. Public preschool is available (in theory) to all families in Brazil and low-income families in the U.S., where it usually takes the form of participation in the Head Start program. In Brazil, we obtain average per pupil public education spending at each level (day care, preschool, lower primary, upper primary, and secondary) from the Ministry of Education and impute these benefits to students who report attending public school at that level. Although tertiary education is free at all public universities in Brazil and highly subsidized at public universities in the U.S., the lack of data on who attends public universities in the U.S. led us to omit tertiary spending from our analysis for both countries.

CPS does not include a question about whether students attend public or private school, so for the U.S. we combine alternate surveys with the prediction and imputation methods. Specifically, for primary and secondary education we use ACS, which includes questions about income, student and household characteristics, and public vs. private school enrollment. For the subsample that attends primary or secondary school, we use a probit to estimate the probability of choosing public school conditional on covariates common to both surveys. The coefficients from this ACS regression are used to predict the probability of attending public school for each student in CPS who attends primary or secondary school. We then multiply each student's probability of attending public school by average per pupil spending in the student's state to calculate the expected public spending on education received by that student. As a check of our method, we verify that our average predicted probability of attending public school in CPS is almost identical to the proportion of students attending public school in administrative data. We follow a similar procedure for Head Start using NHES and restricting our probit to children aged 3–6. We again multiply the probability of receiving benefits from Head Start, predicted in CPS using coefficients from the NHES probit, by average per student state spending. More details are available in online Appendix B.

Each of these income concepts is aggregated at the household level and assumed to be shared equally among household members (relative to their needs). While there is no single equivalence scale commonly used in the U.S. and Brazil, there is one simple scale employed in most cross-national comparisons of income inequality (Johnson and Smeeding, 2015): the square root scale. This scale is a special case of the equivalence scales proposed by Buhmann *et al.* (1988), and was suggested by Atkinson *et al.* (1995). We apply this scale to both cash incomes

(including cash benefits) and public spending on health and education.[5] Online Appendix A explores the robustness of our results to the choice of equivalence scale, presenting results using household per capita and total household income.

2.4. *Limitations*

Although the implementation of a consistent method aspires to achieve a high degree of comparability, this can be compromised by differences across household surveys. The sampling designs differ in the two primary surveys, such that POF is representative at the state level but CPS is not; our estimates of consumption taxes in the U.S.—which take into account the largely different tax mixes of each state—are thus imperfect. The survey questions also differ: in the case of imputed rent for owner occupied housing, for example, POF asks owner occupiers how much their dwelling would be rented for if it were rented, while CPS only identifies who owns their home and even lacks data on rates paid by renters (which rules out the usual regression technique to predict imputed rent). Thus, we follow the method of Short and O'Hara (2008) and predict rental rates using a matching technique with AHS. In addition, it was not possible to account for the value of own food production in CPS; nevertheless, we still account for it in Brazil given its relatively higher importance there.

By restricting our analysis to taxation and social spending, we overlook government spending on public sector wages. Although higher public sector employment is associated with lower inequality on a global level (Milanović, 2000), public sector wages are regressive in Brazil (Medeiros and Souza, 2013). Public servants in both countries earn a wage premium over comparable private sector workers. In Brazil, this premium has been increasing over time (Souza and Medeiros, 2013), while it has been decreasing in the U.S. (Borjas, 2003); in addition, the levels and trends of the public–private wage differential differ substantially by education level (Poterba and Rueben, 1994; Braga *et al.*, 2009). Our analysis makes no attempt to capture this aspect of public spending, which could dampen the redistributive impact of the state.

Our results for final income and the imputations of public health and education benefits must be analyzed with the following perspectives in mind. First, the middle and upper classes might opt out of public health and education services due to quality concerns (Ferreira *et al.*, 2013), which would inflate inequality reduction relative to the counterfactual where the middle and upper classes also use public services. Second, spending amounts do not necessarily reflect quality (which comes into play in both the U.S. with inflated healthcare costs, and in Brazil with low quality services).[6] Third, although we account for between-state differences in per

[5]For a discussion of the merits of this approach and its alternative (applying the equivalence scale to cash incomes but not to public spending on health and education), see Garfinkel *et al.* (2006, 2010).

[6]Although quality is not accounted for, there is substantial evidence that in both countries, increased education spending *does* translate to better schooling outcomes on the margin (Card and Payne, 2002; Ferraz *et al.*, 2012; Litschig and Morrison, 2013). In Brazil, marginal increases in health spending also translate to better outcomes (e.g., Fujiwara, 2015). In the U.S., the marginal benefit of health spending is debated: for example, Garber and Skinner (2008) argue that the level of spending is allocatively inefficient, while Hall and Jones (2007) argue that by extending life, the marginal benefit of health spending is high and its level will optimally continue to increase.

student spending, state spending averages still overlook the large within-state variation of spending across localities and the fact that—unlike other OECD countries—the U.S. spends somewhat less on students from disadvantaged backgrounds than on other students (Wilson *et al.*, 2006; OECD, 2011).

3. Results

Tables 1 and 2 show the effects of taxation and social spending on inequality by country, as well as the progressivity of various components of the tax and spending systems. Combined, they provide the broad elements we need to compare redistribution through fiscal policy in the U.S. and Brazil.

3.1. *Direct Cash and Food Transfers*

If we consider the impact of just direct transfers, the U.S. reduces the Gini coefficient from 0.446 to 0.415, or by three percentage points or 7 percent (Table 1). Brazil has a much higher market income Gini than the U.S., at 0.548; direct transfers reduce inequality by even less than in the U.S., to a gross income Gini of 0.528, or by two percentage points or 3.7 percent. We analyze Gini reductions in both absolute and relative terms because percentage point (absolute) Gini reductions parallel improvements in social welfare using a Gini social welfare function (Duclos and Araar, 2006); on the other hand, in the simplified scenario of a proportional tax and lump-sum transfer, the absolute Gini reduction is a function of the pre-tax pre-transfer Gini, while the relative (percentage) Gini reduction is independent of the initial Gini (Luebker, 2014).

TABLE 1

Inequality by Income Concept in the United States (2011) and Brazil (2009)

	Market Income	Gross Income	Disposable Income	Post-Fiscal Income	Final Income
Benchmark case (pensions as market income)					
United States					
Gini	0.446	0.415	0.376	0.380	0.319
Reduction (pp)[a]		–0.031	–0.070	–0.065	–0.127
Reduction (%)[b]		–0.069	–0.157	–0.147	–0.285
Brazil					
Gini[a]	0.548	0.528	0.513	0.510	0.431
Reduction (pp)[a]		–0.020	–0.036	–0.038	–0.117
Reduction (%)[b]		–0.037	–0.065	–0.069	–0.214
Sensitivity analysis (pensions as transfers)					
United States					
Gini[a]	0.481	0.415	0.372	0.376	0.314
Reduction (pp)[a]		–0.067	–0.109	–0.105	–0.168
Reduction (%)[b]		–0.139	–0.227	–0.218	–0.348
Brazil					
Gini[a]	0.570	0.530	0.512	0.509	0.428
Reduction (pp)[a]		–0.040	–0.058	–0.061	–0.142
Reduction (%)[b]		–0.069	–0.102	–0.107	–0.250

Notes: [a]Percentage point reduction with respect to market income. [b]Percent reduction with respect to market income.

TABLE 2
KAKWANI INDICES AND BUDGET SIZES FOR DIFFERENT TAX AND TRANSFER CATEGORIES

	United States (2011)		Brazil (2009)	
	Kakwani[a]	% GDP[b]	Kakwani[a]	% GDP[b]
Benchmark case (pensions as market income)				
Direct transfers (excl. contributory pensions)	0.741	3.32	0.582	4.16
Public spending on health and non-tertiary ed.[c]	0.671	10.49	0.747	9.32
Indirect subsidies (heating and housing)	1.292	0.26	0.938	0.05
Social spending in analysis (excl. contrib. pens.)	0.699	14.07	0.696	13.53
Direct taxes (federal, state, local)	0.179	14.74	0.165	8.17
Indirect taxes (federal, state, local)	–0.293	3.61	–0.031	12.90
All taxes in analysis (excl. contrib. to pensions)	0.108	18.35	0.042	21.04
Sensitivity analysis (pensions as transfers)				
Direct transfers (incl. contrib. pens.)	0.749	8.08	0.482	13.22
Public spending on health and non-tertiary ed.[c]	0.739	10.49	0.730	9.32
Indirect subsidies (heating and housing)	1.308	0.26	0.952	0.05
Social spending in analysis (incl. contrib. pens.)	0.749	18.83	0.579	22.59
Direct taxes and contrib. (federal, state, local)	0.104	20.90	0.122	15.29
Indirect taxes (federal, state, local)	–0.347	3.61	–0.087	12.90
All taxes and contributions incl. in analysis	0.050	24.50	0.009	28.16

Notes: [a]For transfers, the Kakwani is defined as the market income Gini minus the transfer's concentration coefficient, so that a positive Kakwani indicates progressivity for both taxes and transfers. In the benchmark case (sensitivity analysis), Kakwani coefficients are calculated with respect to benchmark case (sensitivity analysis) market income. [b]Spending totals as a percent of GDP only include those taxes and transfers that are included in the analysis. [c]In Brazil, administrative education costs are listed as a separate line item, so we allocate them proportionally to each category of education spending.

Why does Brazil achieve less redistribution than the United States through direct cash and food transfers, despite spending a larger share of GDP on these programs? Brazil spends 4.2 percent of GDP on direct transfers, compared to 3.3 percent in the U.S. (including the relatively large refundable tax credits and food assistance programs such as SNAP). This difference is even more pronounced if contributory pensions are considered government transfers, in which case Brazil spends 13.2 percent of GDP compared to 8.1 percent in the U.S. Transfer spending is much more progressive, however, in the U.S.: the Kakwani (1977) index for direct transfers in the U.S. is 0.741 (0.749), while in Brazil it is 0.582 (0.482), when pensions are not (are) counted as government transfers (Table 2).

Furthermore, every direct transfer program in the U.S. except social security pensions (if the latter are considered government transfers) is progressive in absolute terms—that is, per capita transfers tend to decrease with income. In contrast, in Brazil the larger direct transfer programs are progressive only in relative terms—that is, benefits as a proportion of income, but not per capita benefits, tend to decrease with income. This can be seen in Tables 3 and 4, where the concentration coefficients for all direct transfer programs in the U.S., except contributory pensions, are negative, while for some programs in Brazil they are positive (but less than the market income Gini, indicating that these programs are still equalizing).

One reason Brazil is not able to achieve more redistribution through direct transfers is that its highly progressive programs—such as its flagship CCT, non-contributory pension program for the elderly poor, and milk transfer

TABLE 3

Concentration Coefficients and Sizes of Transfer Programs, United States 2011

Program	Concentration Coefficient		Program Size	
	w.r.t. Benchmark Case Market Income	w.r.t. Sensitivity Analysis Market Income	in Billions of U.S. Dollars	as a Percent of GDP
Total social spending incl. pensions	–0.182	–0.268	2822.9	18.83
Total social spending excl. pensions	–0.253	–0.267	2109.6	14.07
Direct transfers incl. pensions	–0.120	–0.267	1210.9	8.08
Total health spending[a]	–0.307	–0.416	949.0	6.33
Contributory pensions (SS)	0.018	–0.271	713.3	4.76
Total non-tertiary educ. spending[b]	–0.134	–0.082	623.9	4.16
Primary and secondary education	–0.124	–0.072	602.6	4.02
Medicare	–0.107	–0.317	545.1	3.64
Direct transfers excl. pensions[c]	–0.295	–0.262	497.6	3.32
Medicaid	–0.528	–0.524	403.9	2.69
Unemployment benefits	–0.213	–0.177	108.0	0.72
SNAP (food stamps)	–0.721	–0.673	72.7	0.49
Veterans' benefits	–0.093	–0.221	63.6	0.42
Federal EITC	–0.566	–0.476	62.9	0.42
SSI (non-contributory pensions)	–0.627	–0.620	50.4	0.34
Pell grants	–0.204	–0.154	34.8	0.23
Housing subsidies	–0.858	–0.836	34.2	0.23
Federal CTC	–0.133	–0.066	28.5	0.19
State EITC	–0.623	–0.554	24.8	0.17
Welfare, TANF, AFDC	–0.767	–0.725	21.1	0.14
Workers' compensation	–0.082	–0.128	15.8	0.11
Public child care	–0.264	–0.195	13.7	0.09
School lunch	–0.508	–0.439	10.1	0.07
Head Start	–0.708	–0.639	7.6	0.05
WIC	–0.628	–0.549	4.9	0.03
Energy subsidies	–0.720	–0.714	4.8	0.03

Notes: SS = Social Security; w.r.t. = with respect to. Programs are listed from largest to smallest. Market incomes and transfers are measured in equivalized terms using the square root scale. [a]Medicare and Medicaid. [b]Primary and secondary education, Head Start, and public child care. [c]Welfare, TANF, AFDC, SSI, Pell grants, veterans' benefits, unemployment benefits, workers' compensation, SNAP, WIC, school lunch, federal EITC, federal CTC, and state EITC.

program—are small: combined, the three programs make up less than 1 percent of GDP. Even for the poorest 10 percent of the population, they only increase market incomes by 29.4 percent, 11.0 percent, and a paltry 0.2 percent, respectively.[7] This can be compared to the United States, where non-contributory SSI pensions increase the market incomes of the bottom decile by 28.9 percent on average, while (the monetized values of) food assistance transfers (SNAP, WIC, and the school lunch program) increase their incomes by 38.6 percent.

Meanwhile, the majority of Brazil's larger transfer programs, such as unemployment benefits, are progressive only in relative terms (Table 4)—that is, the

[7]Part of the reason that Brazil's non-contributory pension program only increases incomes of the poorest decile by 11 percent could be that recipients do not know which program they receive benefits from and hence do not report their benefits as coming from this program. Indeed, only 40 percent of the total number of BPC beneficiaries according to administrative records were identified in the 2004 PNAD, which had a special supplement that asked three questions specifically about BPC (Soares *et al*., 2007).

TABLE 4

Concentration Coefficients and Sizes of Transfer Programs, Brazil 2009

Program	Concentration Coefficient		Program Size	
	w.r.t. Benchmark Case Market Income	w.r.t. Sensitivity Analysis Market Income	in Billions of U.S. Dollars[a]	as a Percent of GDP
Total social spending incl. pensions	0.152	–0.010	420.4	22.59
Total social spending excl. pensions	–0.149	–0.140	251.8	13.53
Direct transfers incl. pensions	0.380	0.088	246.0	13.22
Contributory pensions	0.545	0.161	168.6	9.06
Total health spending	–0.125	–0.107	97.0	5.21
Direct transfers excl. pensions[b]	–0.033	–0.092	77.3	4.16
Total non-tertiary educ. spending[c]	–0.277	–0.216	76.4	4.11
Primary education	–0.287	–0.226	59.4	3.19
Special circumstances pensions	0.121	0.008	42.4	2.28
Unemployment	0.152	0.213	10.9	0.58
BPC (non-contributory pensions)	–0.479	–0.488	9.9	0.53
Secondary education	–0.179	–0.134	9.5	0.51
Public child care[d]	–0.266	–0.193	7.6	0.41
Preschool[d]	–0.328	–0.258		
Bolsa Família (CCT)	–0.560	–0.492	7.3	0.39
Other direct transfers	0.121	0.176	4.8	0.26
Scholarships	0.252	0.285	2.1	0.11
Energy subsidies	–0.390	–0.382	1.0	0.05
Milk transfers	–0.407	–0.372	0.1	0.01

Notes: BPC = Benefício de Prestação Continuada. CCT = Conditional Cash Transfer. GDP = Gross Domestic Product. Programs are listed from largest to smallest. Market incomes and transfers are measured in equivalized terms using the square root scale. [a]Conversion to U.S. dollars uses the consumption-based purchasing power parity (PPP) adjusted exchange rate for 2009. [b]Bolsa Família, BPC, scholarships, unemployment benefits, special circumstances pensions, milk transfers, and other direct transfers. [c]Public day care and preschool, primary, and secondary education. Administrative costs are a separate line item in Brazil, so they are distributed proportionally to each education category (including tertiary which is not included in our analysis). [d]The program sizes for public child care and preschool are combined in national accounts.

ratio of transfer to income tends to decline with income, but the absolute size of the transfer does not decline with income. The effect of these large and only relatively progressive programs can be seen in the solid dark gray concentration curve for direct transfers in Figure 1b: it begins concave and above the 45 degree line due to well-targeted programs like Bolsa Família, but then becomes convex and crosses the 45 degree line due to the larger, less progressive programs. In fact, if contributory pensions are considered government transfers, total direct transfers are progressive in relative terms only (as seen by their concentration coefficient in Table 4, which is positive but less than the market income Gini): direct transfers benefit the better off more than the poor in absolute terms.

It is worth noting that the U.S. economy was in recovery in 2011, with an adult employment to population ratio still three percentage points below pre-recession levels (Kenworthy and Smeeding, 2014) and a budget deficit larger than before the recession (Congressional Budget Office, 2013). These circumstances likely increased the amount of redistribution observed, especially given the countercyclical nature of transfer programs such as food stamps (Ziliak, forthcoming).

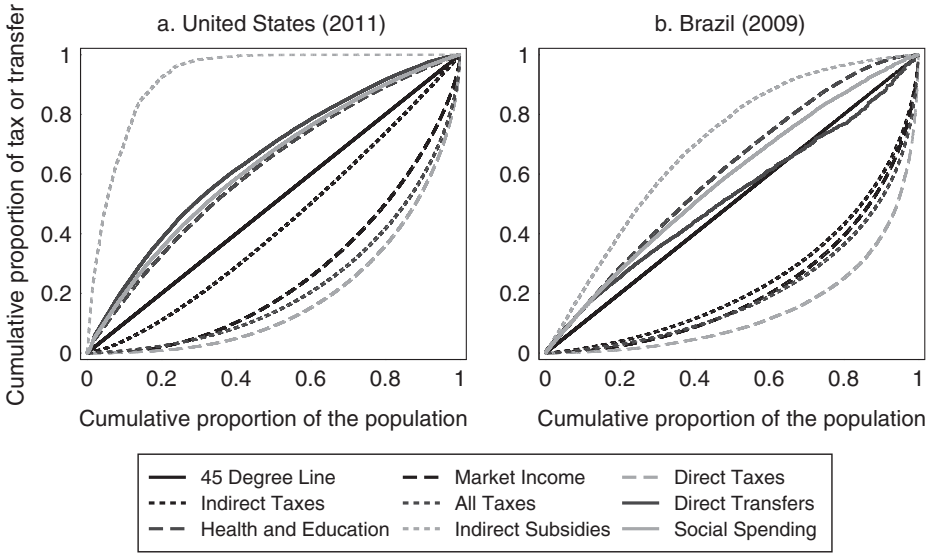

Figure 1. Concentration Curves for Tax and Spending Categories

Notes: Concentration curves are for the benchmark case; population ordered by market income.

3.2. *Direct Taxes*

Direct taxes reduce the U.S. Gini by another four percentage points when moving from gross to disposable income, compared to a two percentage point reduction in Brazil (Table 1). The discrepancy is slightly larger when pensions are treated as government transfers (and hence contributions to the pension system are treated as taxes). Because the order in which taxes and transfers are analyzed is somewhat arbitrary and the relative contribution of each to inequality reduction can be sensitive to the order chosen (Kim and Lambert, 2009), we also test the sensitivity of our comparisons to adopting the opposite order and first subtracting taxes from market income to arrive at *net market income*. The net market income benchmark case Ginis for the U.S. and Brazil are 0.414 and 0.534, respectively, meaning that under this alternate path, direct taxes reduce the Gini coefficient by 3.1 percentage points in the U.S. and 1.5 percentage points in Brazil.

Throughout Latin America, the individual income tax is underutilized as a revenue collection and redistributive tool (Corbacho *et al*., 2013). Direct taxes in Brazil are both smaller and less progressive than in the U.S. Revenues from individual income taxes (at the federal, state, and local levels) amount to only 2.1 percent of GDP in Brazil, compared to 9.3 percent in the U.S. Total direct taxes analyzed in this study—including individual income, corporate income, and property taxes at the federal, state, and local levels—are 8.2 percent of GDP in Brazil and 14.7 percent in the U.S. Furthermore, direct taxes are more progressive in the U.S., with a Kakwani index of 0.179, compared to 0.165 in Brazil (Table 2).

High levels of informality in Brazil may limit the country's ability to increase revenue collection from the individual income tax, considering that around 50 percent of Brazilian workers are informal and Brazil already collects personal income taxes at levels comparable to other middle-income countries (Corbacho *et al*., 2013). While some assume that the income tax's existence *per se* encourages informality, the evidence on whether personal income taxes have increased informality in Latin America is mixed (Lora and Fajardo, 2012a); furthermore, the benefits of evasion are diminished in a general equilibrium framework (Alm and Sennoga, 2010), possibly to zero (Alm and Finlay, 2013). Two likely causes of Brazil's persistent informality are that labor productivity has not increased at the same pace as minimum wages and contribution requirements, and that the effective rate on capital is significantly lower than that on labor, which can discourage firms from creating labor-intensive employment in the formal sector (Lora and Fajardo, 2012b).

Social programs can also be double-edged swords by encouraging informality. Evidence exists that these programs have increased informality in Argentina (Garganta and Gasparini, 2015), Colombia (Camacho *et al*., 2014), and Mexico (Bosch and Campos-Vázquez, 2014). In Brazil, per beneficiary non-contributory pension benefits are larger than in any other Latin American country; these large benefits could discourage formal employment by reducing the relative benefits of enrollment in the contributory pension system (Levy and Schady, 2013).

An additional factor working against Brazil is that the higher initial income inequality is—and it is much higher in Brazil than in the U.S.—the more difficult it is to reduce inequality through progressive taxes and transfers (Engel *et al*., 1999).

To put our results for direct taxes and transfers into international perspective, we compare the U.S. to EU countries using an analysis that broadly follows the same method (EUROMOD, 2014), and Brazil to other developing countries using studies that also follow Lustig and Higgins (2013). When pensions are considered part of market income, the direct tax and transfer system in the U.S. redistributes more than some EU-27 countries (six Eastern European countries, as well as Italy, Greece, Cyprus, and Malta), but less than most. The eight European countries with the largest redistribution through direct taxes and transfers reduce their Gini coefficients by between 10 and 25 percentage points—compared to seven percentage points in the U.S. When pensions are considered government transfers, the U.S. redistributes less through direct taxes and transfers than all EU-27 countries. This result is robust to comparisons with other rich countries and EU results from other studies (e.g., Morelli *et al*., 2015). We compare our results for Brazil to studies of Armenia, Bolivia, Costa Rica, El Salvador, Ethiopia, Guatemala, Indonesia, Mexico, Peru, South Africa, and Uruguay.[8] Brazil

[8]We use our per capita results (available in online Appendix A) rather than square root scale results for consistency with these studies. The references for these studies are Afkar *et al*. (forthcoming), Beneke *et al*. (2015), Bucheli *et al*. (2014), Cabrera *et al*. (2014), Inchauste *et al*. (2015), Jaramillo (2014), Paz Arauco *et al*. (2014), Sauma and Trejos (2014), Scott (2014), World Bank (2015), and Younger and Khachatryan (2014).

redistributes more through direct taxes and transfers than all of these countries except South Africa and Uruguay, which reduce inequality by 7.7 and 3.5 percentage points, respectively.

Compared to previous studies on Brazil and the U.S. (e.g., Immervoll *et al.*, 2009; Kim and Lambert, 2009), we find higher levels of redistribution due to direct taxes and transfers. This is likely due to the comprehensiveness of our analysis (including, for example, food transfers, corporate income taxes, and payroll taxes paid by the employer), as well as the more recent years we use. In Brazil, cash transfers have grown significantly; in the U.S., large transfer programs such as EITC and SNAP were extremely responsive to the recession (Immervoll and Richardson, 2013; Ziliak, forthcoming). Our results for Brazil are consistent with Higgins and Pereira (2014), who find that direct taxes and transfers result in a 3.5 percentage point drop in inequality; the levels of inequality are higher in their analysis than in Table 1 because they use per capita rather than square root scale income, but are consistent with our per capita results in online Table A.1.

3.3. *Expenditure Taxes*

Expenditure taxes are fairly regressive in the United States and slightly regressive in Brazil, with Kakwani coefficients of –0.293 and –0.031, respectively. Poterba (1989) and Capéau *et al.* (2014) argue that the progressivity of indirect taxes should be measured with respect to consumption rather than income. Although this changes the assessment of indirect taxes from regressive to progressive in many Latin American countries (Corbacho *et al.*, 2013, table 9.3), this is not the case for Brazil: the Kakwani index of indirect taxes with respect to consumption is –0.098, indicating that indirect taxes are regressive in Brazil even when their progressivity is calculated with respect to consumption. For the U.S., our CPS data do not include consumption, but given how regressive indirect taxes are with respect to income, it is safe to assume that they would still be regressive with respect to consumption.

Comparing the concentration curves for indirect taxes in the two countries emphasizes the extent to which they are more regressive in the United States than Brazil (see the dotted black lines in Figure 1). They are larger, however, in Brazil, making up more than half of total tax revenue at the federal, state, and local levels combined. This can also be seen in Figure 1: the dotted dark gray curve for all taxes in Brazil is closer to the regressive dotted black curve for indirect taxes than the progressive dashed light gray curve for direct taxes, while in the U.S. it is pulled largely by the progressive concentration curve for direct taxes, since these make up a larger share of the tax mix.

In both countries, the poor spend a significant portion of their incomes on consumption taxes: those in the poorest decile in Brazil spend 24 percent of their market incomes on consumption taxes, on average; in the U.S., they spend 16 percent. In March 2013, Brazil announced that it would end federal (but not state) taxes on a number of basic food items, which will likely mitigate this large effect on the poor. In contrast, in the U.S., many states have been moving in the opposite direction by increasing their regressive sales taxes and, in some cases, decreasing income and property taxes. These sales taxes place a large burden on the poor, a

burden that is not merely financial: Newman and O'Brien (2011) exploit within-state variation over time in the tax burden on the poor (in the U.S.) and find that a higher tax burden on the poor has a statistically and economically significant impact on mortality, obesity, and violent crime.

The high burden of indirect taxes on the poor in both countries can also be seen by the dotted dark gray concentration curves for all taxes in Figure 1: although the overall tax mix is summarized as progressive by the Kakwani index in each country, it is not progressive across the entire distribution. The concentration curve for all taxes lies *above* the market income Lorenz curve at the lower end of the distribution—for at least the poorest 20 percent of the population in each country—indicating that these individuals pay a larger proportion of total taxes than their proportion of total market income. We verify the statistical significance of this result by testing a null hypothesis of non-dominance on this restricted domain, using the asymptotic sampling distributions for Lorenz and concentration curves derived by Davidson and Duclos (1997).

3.4. *Indirect Subsidies*

Subsidies are highly progressive in both the U.S. and Brazil (see the dotted light gray curves in Figure 1). These programs, which are among the best-targeted in each country, include housing subsidies for low-income families and energy subsidies for households that consume below a certain quantity of kilowatt-hours per month (and, in some cases, also have income below a certain threshold). In the U.S., housing subsidies are more progressive and well-targeted than any other program, with a concentration coefficient of –0.858 (Table 3) and 94 percent of benefits going to the poorest 20 percent (bottom quintile) of the population. Household energy subsidies are also very progressive in the U.S., with a concentration coefficient of –0.720, making them the third most progressive program in the country behind heating subsidies and welfare benefits. They are also well-targeted, with 73 percent of benefits going to the bottom quintile.

In Brazil, the main housing subsidy program, Minha Casa Minha Vida, was not implemented until late 2009 (after the household survey had already taken place), so it is not included in our analysis. Targeted energy subsidies constitute the fourth-most progressive program in Brazil, behind its well-targeted cash transfer programs (Bolsa Família and BPC) and its milk transfer program. Energy subsidies are less well-targeted than in the U.S., with 40 percent of benefits going to the poorest quintile of the population. In addition, the program is extremely small, at 0.05 percent of GDP, which limits its redistributive impact.

3.5. *Public Spending on Health and Non-Tertiary Education*

As noted in Garfinkel *et al*. (2006, 2010), public spending on health and non-tertiary education is a particularly important part of redistribution in the U.S.: when it is included in income, the gap between the U.S. and Europe is significantly reduced. In our analysis, this manifests itself in the finding that, when adding government spending on public child care, the Head Start preschool program, primary and secondary education, and health spending on the poor and elderly through Medicaid and Medicare, the Gini is reduced by a further six

percentage points, from a post-fiscal income Gini coefficient of 0.380 to a final income Gini of 0.319 in the benchmark case. No adjustment is made for quality of service; the public spending allocated to households is inflated by astronomically high healthcare costs in the U.S., which do not translate to better health outcomes compared to European countries where healthcare is significantly less expensive (Anderson *et al*., 2003). Keeping this caveat in mind, taxation and social spending (excluding contributory pensions) result in a 13 percentage point reduction in the Gini coefficient between market and final income, from 0.446 to 0.319. When pensions are considered as transfers and contributions treated as taxes, social spending and taxation reduce income inequality by 17 percentage points, from 0.481 to 0.314.

All components of education spending (public child care, Head Start, primary, and secondary) are progressive in absolute terms, meaning that the poor benefit more than proportionally to their population size. This result is not always desirable, however: the absolute progressivity of primary and secondary education, for example, may be the result of rich families choosing to send their children to private schools due to quality concerns. In contrast, the high absolute progressivity of the Head Start program (with a concentration coefficient of –0.708) is due to the government's deliberate targeting of a program with limited resources. Under the current (and tightening) budget constraints of the program, its high level of progressivity indicates that it is reaching the neediest families, for whom returns to investment in early childhood education are highest (Heckman, 2011), and whose children often otherwise reach kindergarten already possessing large cognitive gaps that persist throughout their education (Heckman, 2008).

In Brazil, government health spending and non-tertiary education have an even larger impact on the income distribution: when adding them to income, the Gini coefficient is reduced by nearly eight additional percentage points, from a post-fiscal income Gini of 0.510 to a final income Gini of 0.431 (Table 1). Final income does not include tertiary education for comparability with the U.S., where data limitations prevent us from identifying the beneficiaries of public university spending. When the distribution of tertiary benefits in Brazil is analyzed, however, the results are abhorrent: tertiary education spending has a concentration coefficient of 0.470. This is fairly close to the Gini coefficient for income, indicating that the rich benefit from tertiary education about proportionally to their incomes. Furthermore, Higgins and Pereira (2014) find that, while 39 percent of the population aged 18–23 is poor (with household per capita income less than $4 per day), only 9 percent of 18–23 year-olds attending tertiary institutions are poor.

Overall, taxes and social spending (excluding pensions) reduce the Gini coefficient by slightly less in Brazil than in the U.S.: Brazil reduces inequality by 12 percentage points (21 percent) compared to 13 percentage points (29 percent) in the U.S. In contrast with that of the U.S., Brazil's Gini reduction (from a market income Gini of 0.548 to a final income Gini of 0.431) is due mostly to public spending on health and education. When contributory pensions are treated as government transfers and contributions as taxes, the Brazilian Gini is reduced from 0.570 to 0.428, or by 14 percentage points (25 percent)—slightly less than the 17 percentage point (35 percent) reduction in the U.S.

4. Conclusions

This paper presents the first direct comparison of fiscal incidence in Brazil and the United States, using household survey data and a combination of allocation techniques including direct identification, inference, simulation, prediction, and imputation. Such comparisons are indeed of interest because income inequality is high in both countries given their levels of development. Although Brazilian inequality is higher, its GDP per capita is much lower, at about one fourth of the U.S. level. But inequality in America was at a level similar to current inequality in Brazil when it had a similar GDP per capita: Plotnick *et al.* (1998) estimate the Gini for the U.S. in monetary gross income terms to be around 0.55 in 1940, roughly the same level as in Brazil today. Furthermore, the levels of inequality in the two countries are getting closer, with inequality declining in Brazil over the last decade (Lustig *et al.*, 2013b) and persistently rising in the U.S. (Kenworthy and Smeeding, 2014).

The two nations also have other similarities. They have low intergenerational mobility (Jäntti *et al.*, 2006; Corak, 2013) and low equality of opportunity (Brunori *et al.*, 2013). More obviously, they are both relatively large, western hemisphere nations with substantial interregional inequality and large racial and ethnic minorities. The unequal distribution of human capital across races is an important determinant of income inequality in both countries (Card and Krueger, 1992; Ñopo, 2012).

So how well does each nation reduce market income inequality, once we account for the incidence of almost all government social spending and taxes? The pre-fisc (market income) Gini in the United States is 0.446 and in Brazil it is 0.548. In the U.S. it is reduced by 6.5 percentage points by direct transfers, indirect subsidies, and direct and indirect taxes, but by only 3.8 percentage points in Brazil. Neither nation is high on the list of OECD countries in inequality reduction through the fiscal system (Joumard *et al.*, 2012; Immervoll and Richardson, 2013), which explains in part the high poverty rates in both countries (Morelli *et al.*, 2015).

Public spending on health and education is larger than on cash and near cash transfers in both countries. When we add public spending on health and education to income, the decline in inequality is similar across the two countries. This result must be analyzed with some caveats in mind: specifically, that inequality reduction may be inflated if middle and upper class citizens opt out of the public health and education sectors, and that spending amounts do not reflect quality (which comes into play in both the U.S. with inflated healthcare costs and in Brazil with low quality services).

In the United States, the market income Gini coefficient declines by 12.7 percentage points when direct cash and food transfers, housing and energy subsidies, individual and corporate income taxes, property taxes, expenditure taxes, and public spending on health (Medicare and Medicaid) and education (public primary and secondary school, Head Start, and public day care through CCDF and TANF) are included in the income concept. When contributory pensions are counted as government transfers, the Gini declines by 16.8 percentage points.

In Brazil, the Gini coefficient is reduced by 11.7 percentage points when we include all of these components in income, where health spending takes the form of free care received at public health facilities and education spending takes the form of public primary and secondary school, public preschool, and free public day care for low-income families. When pensions are considered transfers, the Gini declines by 14.2 percentage points. The conclusions from our comparison are robust to other adjustments for family size (online Appendix A).

The lessons from this exercise are instructive. Transfers that maintain consumption are usually in cash or near-cash terms. Transfers that can be seen as investments in human capital (health and education) are most often in-kind. In the United States the systems are separate, but generally targeted to the poor. In Brazil, the relatively massive Bolsa Família delivers *both* consumption (to families) *and* education and healthcare to their children, in a well-targeted program. Some have argued that the United States ought to consider a similar program; conditional cash transfers modeled after Bolsa Família and Mexico's Oportunidades have in fact been piloted in New York City, Memphis, and the Bronx—their expansion at the national level could prove to be an important redistributive instrument.

Meanwhile, Brazil could benefit from higher quality schools and healthcare (though not at U.S. prices). In addition, now that Brazil's extreme poor are almost universally covered by at least one cash transfer program (Lustig *et al.*, 2013a), the country might consider incentivizing formality through refundable tax credits. The EITC has been shown to increase labor force participation (Eissa and Liebman, 1996) and intergenerational mobility (Chetty *et al.*, 2013), perhaps because recipients use a portion of the benefits for expenses that help improve economic and social mobility (Smeeding *et al.*, 2000). The EITC also improves infant health among beneficiary mothers, with a larger improvement for blacks (Hoynes *et al.*, 2015). Brazil might also consider implementing a targeted large-scale food assistance program like SNAP, which is the United States' most effective anti-poverty program for the non-elderly (Tiehen *et al.*, forthcoming). Furthermore, both EITC and SNAP were exceptionally responsive to the recession (Immervoll and Richardson, 2013; Ziliak, forthcoming), and had an increasing impact on poverty reduction between 2011 and 2012 (Short, 2013).

Perhaps each country could benefit by mimicking the best aspects of the social spending and taxation systems in the other country. Nevertheless, we would rather suggest that *both* countries look at the way that other large nations such as Australia and Canada finance and deliver public services with better and more pro-poor redistribution and more equality, resulting in higher levels of intergenerational mobility (Ermisch *et al.*, 2012).

References

Afkar, R., J. Jellema, and M. Wai-Poi, "Fiscal Policy, Redistribution, and Inequality in Indonesia," in G. Inchauste and N. Lustig (eds), *The Distributional Impact of Fiscal Policy: Experience from Developing Countries*, World Bank, Washington DC, forthcoming.

Alm, J. and K. Finlay, "Who Benefits from Tax Evasion?" *Economic Analysis and Policy*, 43, 139–54, 2013.

Alm, J. and E. B. Sennoga, "Mobility, Competition, and the Distributional Effects of Tax Evasion," *National Tax Journal*, 63, 1055–84, 2010.
Alvaredo, F. and L. Gasparini, "Recent Trends in Inequality and Poverty in Developing Countries," in A. B. Atkinson and F. Bourguignon (eds), *Handbook of Income Distribution*, Volume 2, Elsevier, Oxford, 697–805, 2015.
Anderson, G. F., U. E. Reinhardt, P. S. Hussey, and V. Petrosyan, "It's the Prices, Stupid: Why the United States is so Different from Other Countries," *Health Affairs*, 22, 89–105, 2003.
Atkinson, A. B., L. Rainwater, and T. M. Smeeding, "Income Distribution in OECD Countries: Evidence from the Luxembourg Income Study (LIS)," Social Policy Studies 18, Organization for Economic Cooperation and Development, Paris, 1995.
Auerbach, A. J., "Who Bears the Corporate Tax? A Review of What We Know," in J. M. Poterba (ed.), *Tax Policy and the Economy*, Volume 20, MIT Press, Cambridge, MA, 2006.
Beneke, M., N. Lustig, and J. A. Oliva, "El impacto de los impuestos y el gasto social en la desigualdad y la pobreza en El Salvador," CEQ Working Paper 26, 2015.
Borjas, G. J., "Wage Structures and the Sorting of Workers into the Public Sector," in J. S. Nye, Jr. and J. D. Donahue (eds), *For the People: Can We Fix Public Service?* Visions of Governance in the 21st Century and Brookings Institution Press, Washington DC, 29–54, 2003.
Bosch, M. and R. M. Campos-Vázquez, "The Trade-Offs of Welfare Policies in Labor Markets with Informal Jobs: The Case of the 'Seguro Popular' Program in Mexico," *American Economic Journal: Economic Policy*, 6, 71–99, 2014.
Bourguignon, F., F. H. G. Ferreira, and M. Menéndez, "Inequality of Opportunity in Brazil," *Review of Income and Wealth*, 53, 585–618, 2007.
Bourguignon, F., F. H. G. Ferreira, and P. G. Leite, "Beyond Oaxaca-Blinder: Accounting for Differences in Household Income Distributions," *Journal of Economic Inequality*, 6, 117–48, 2008.
Bradbury, B., "The Fourth Retirement Pillar in Rich Countries," in J. C. Gornick and M. Jäntti (eds), *Income Inequality: Income Disparities and the Middle Class in Affluent Countries*, Stanford University Press, Palo Alto, CA, 334–61, 2013.
Braga, B., S. Firpo, and G. Gonzaga, "Escolaridade e o Diferencial de Rendimentos entre o Setor Privado e o Setor Público no Brasil," *Pesquisa e Planejamento Econômico*, 39, 431–64, 2009.
Brunori, P., F. H. G. Ferreira, and V. Peragine, "Inequality of Opportunity, Income Inequality and Economic Mobility: Some International Comparisons," in E. Paus (ed.), *Getting Development Right: Structural Transformation, Inclusion, and Sustainability in the Post-Crisis Era*, Palgrave Macmillan, New York, 85–116, 2013.
Bucheli, M., N. Lustig, M. Rossi, and F. Amábile, "Social Spending, Taxes and Income Redistribution in Uruguay," *Public Finance Review*, 42, 413–33, 2014.
Buhmann, B., L. Rainwater, G. Schmauss, and T. M. Smeeding, "Equivalence Scales, Well-Being, Inequality, and Poverty: Sensitivity Estimates across Ten Countries Using the Luxembourg Income Study Database," *Review of Income and Wealth*, 34, 115–42, 1988.
Cabrera, M., N. Lustig, and H. E. Morán, "Fiscal Policy, Inequality and the Ethnic Divide in Guatemala," CEQ Working Paper 20, 2014.
Camacho, A., E. Conover, and A. Hoyos, "Effects of Colombia's Social Protection System on Workers' Choice between Formal and Informal Employment," *World Bank Economic Review*, 28, 446–66, 2014.
Capéau, B., A. Decoster, and D. Phillips, "Consumption and Indirect Tax Models," in C. O'Donoghue (ed.), *Handbook of Microsimulation Modelling*, Emerald Group Publishing, Bingley, UK, 223–58, 2014.
Card, D. and A. B. Krueger, "School Quality and Black-White Relative Earnings: A Direct Assessment," *Quarterly Journal of Economics*, 107, 151–200, 1992.
Card, D. and A. A. Payne, "School Finance Reform, the Distribution of School Spending, and the Distribution of Test Scores," *Journal of Public Economics*, 83, 49–82, 2002.
Chetty, R., N. Hendren, P. Kline, and E. Saez, "The Economic Impacts of Tax Expenditures: Evidence from Spatial Variation across the U.S.," Mimeo, 2013 (http://obs.rc.fas.harvard.edu/chetty/tax_expenditure_soi_whitepaper.pdf).
Congressional Budget Office, "The 2013 Long-Term Budget Outlook," 2013 (http://www.cbo.gov/sites/default/files/cbofiles/attachments/44521-LTBO-1Column_0.pdf).
Corak, M., "Inequality from Generation to Generation: The United States in Comparison," in R. S. Rycroft (ed.), *The Economics of Inequality, Poverty, and Discrimination in the 21st Century*, ABC–CLIO, Santa Barbara, CA, 107–26, 2013.
Corbacho, A., V. F. Cibils, and E. Lora, *More than Revenue: Taxation as a Development Tool*, Palgrave Macmillan, New York, 2013.
Davidson, R. and J.-Y. Duclos, "Statistical Inference for the Measurement of the Incidence of Taxes and Transfers," *Econometrica*, 65, 1453–65, 1997.

Davis, C., K. Davis, M. Gardner, H. Heimovitz, R. S. McIntyre, R. Phillips, A. Sapozhnikova, and M. Wiehe, *Who Pays? A Distributional Analysis of the Tax Systems in All 50 States*, 4th edition, Institute on Taxation and Economic Policy, Washington DC, 2013.
Deaton, A., "Counting the World's Poor: Problems and Possible Solutions," *World Bank Research Observer*, 16, 125–47, 2001.
Denk, O., R. Hagemann, P. Lenain, and V. Somma, "Inequality and Poverty in the United States: Public Policies for Inclusive Growth," Economics Department Working Paper 1052, Organisation for Economic Co-operation and Development (OECD), Paris, 2013.
Duclos, J.-Y. and A. Araar, *Poverty and Equity: Measurement, Policy, and Estimation with DAD*, Springer, New York, 2006.
Eissa, N. and J. B. Liebman, "Labor Supply Response to the Earned Income Tax Credit," *Quarterly Journal of Economics*, 112, 605–37, 1996.
Engel, E. M. R. A., A. Galetovic, and C. E. Raddatz, "Taxes and Income Redistribution in Chile: Some Unpleasant Redistributive Arithmetic," *Journal of Development Economics*, 59, 155–92, 1999.
Ermisch, J., M. Jäntti, T. Smeeding, and J. Wilson, "Advantage in Comparative Perspective," in J. Ermisch, M. Jäntti, and T. Smeeding (eds), *From Parents to Children: The Intergenerational Transmission of Advantage*, Russell Sage Foundation, New York, 3–31, 2012.
EUROMOD, "Effect of Tax-Benefit Components on Inequality," EUROMOD Statistics, 2014 (https://www.iser.essex.ac.uk/files/euromod/Statistics/WebStatistics_July1_2014_Gini_Datasets_Population_Exchangerates.xlsx).
Ferraz, C., F. Finan, and D. B. Moreira, "Corrupting Learning: Evidence from Missing Federal Education Funds in Brazil," *Journal of Public Economics*, 96, 712–26, 2012.
Ferreira, F. H. G., J. Messina, J. Rigolini, L. F. López-Calva, M. A. Lugo, and R. Vakis, *Economic Mobility and the Rise of the Latin American Middle Class*, World Bank, Washington DC, 2013.
Fujiwara, T., "Voting Technology, Political Responsiveness, and Infant Health: Evidence from Brazil," *Econometrica*, 83, 423–64, 2015.
Garber, A. M. and J. Skinner, "Is American Health Care Uniquely Inefficient?" *Journal of Economic Perspectives*, 22, 27–50, 2008.
Garfinkel, I., L. Rainwater, and T. M. Smeeding, "A Re-Examination of Welfare States and Inequality in Rich Nations: How In-Kind Transfers and Indirect Taxes Change the Story," *Journal of Policy Analysis and Management*, 25, 897–919, 2006.
———, *Wealth and Welfare States: Is America a Laggard or Leader?* Oxford University Press, Oxford, 2010.
Garganta, S. and L. Gasparini, "The Impact of a Social Program on Labor Informality: The Case of AUH in Argentina," *Journal of Development Economics*, 115, 99–110, 2015.
Goldin, C. and L. Katz, *The Race Between Education and Technology*, Harvard University Press, Cambridge, MA, 2008.
Hall, R. E. and C. I. Jones, "The Value of Life and the Rise in Health Spending," *Quarterly Journal of Economics*, 122, 39–72, 2007.
Heckman, J. J., "Schools, Skills, and Synapses," *Economic Inquiry*, 46, 289–324, 2008.
———, "Effective Child Development Strategies," in E. Zigler, W. S. Gilliam, and W. S. Barnett (eds), *The Pre-K Debates: Current Controversies and Issues*, Paul H. Brookes Publishing Co., Baltimore, MD, 2011.
Higgins, S. and C. Pereira, "The Effects of Brazil's Taxation and Social Spending on the Distribution of Household Income," *Public Finance Review*, 42, 346–67, 2014.
Hoynes, H., D. Miller, and D. Simon, "Income, The Earned Income Tax Credit, and Infant Health," *American Economic Journal: Economic Policy*, 7, 172–211, 2015.
Immervoll, H. and L. Richardson, "Redistribution Policy in Europe and the United States: Is the Great Recession a 'Game Changer' for Working-Age Families?" Social, Employment and Migration Working Papers 150, OECD Publishing, Paris, 2013 (http://dx.doi.org/10.1787/5k44xwtc0txp-en).
Immervoll, H., H. Levy, J. R. B. Nogueira, C. O' Donoghue, and R. Bezerra, "The Impact of Brazil's Tax-Benefit System on Inequality and Poverty," in S. Klasen and F. Nowak-Lehmann (eds), *Poverty, Inequality, and Policy in Latin America*, MIT Press, Cambridge, MA, 271–301, 2009.
Inchauste, G., N. Lustig, M. Maboshe, C. Purfield, and I. Woolard, "The Distributional Impact of Fiscal Policy in South Africa," Policy Research Working Paper 7194, World Bank, Washington DC, 2015.
International Monetary Fund, "United States 2013 Article IV Consultation," Country Report 13/236, International Monetary Fund, Washington DC, 2013 (http://www.imf.org/external/pubs/ft/scr/2013/cr13236.pdf).
Jäntti, M., K. Røed, R. Naylor, A. Björklund, B. Bratsberg, O. Raaum, E. Österbacka, and T. Eriksson, "American Exceptionalism in a New Light: A Comparison of Intergenerational

Earnings Mobility in the Nordic Countries, the United Kingdom, and the United States," Discussion Paper 1938, Institute for the Study of Labor (IZA), Bonn, 2006.
Jaramillo, M., "The Incidence of Social Spending and Taxes in Peru," *Public Finance Review*, 42, 291–412, 2014.
Johnson, D. S. and T. M. Smeeding, "Income Distribution and Inequality: Measurement Issues," in J. D. Wright (ed.), *International Encyclopedia of Social & Behavioral Sciences*, 2nd edition, Volume 11, Elsevier, Oxford, 732–38, 2015.
Joumard, I., M. Pisu, and D. Bloch, "Tackling Income Inequality: The Role of Taxes and Transfers," *OECD Journal: Economic Studies*, 2012, 37–70, 2012.
Kakwani, N. C., "Measurement of Tax Progressivity: an International Comparison," *The Economic Journal*, 87, 71–80, 1977.
Kenworthy, L. and T. Smeeding, "The United States: High and Rapidly-Rising Inequality," in B. Nolan and W. Salverda (eds), *Inequality and Its Impacts*, Volume 2, Oxford University Press, Oxford, 695–717, 2014.
Kim, K. and P. J. Lambert, "Redistributive Effect of U.S. Taxes and Public Transfers, 1994–2004," *Public Finance Review*, 37, 3–26, 2009.
Levy, S. and N. Schady, "Latin America's Social Policy Challenge: Education, Social Insurance, Redistribution," *Journal of Economic Perspectives*, 27, 193–218, 2013.
Litschig, S. and K. M. Morrison, "The Impact of Intergovernmental Transfers on Education Outcomes and Poverty Reduction," *American Economic Journal: Applied Economics*, 5, 206–40, 2013.
Lora, E. and J. Fajardo, "Employment and Taxes in Latin America: An Empirical Study of the Effects of Payroll, Corporate Income and Value-added Taxes on Labor Outcomes," Working Paper IDB-WP-334, Inter-American Development Bank, Washington DC, 2012a.
———, "¿Hay un Sesgo Anti-Laboral en los Impuestos en América Latina?", Resumen de Políticas IDB-PB-177, Inter-American Development Bank, Washington DC, 2012b.
Luebker, M., "Income Inequality, Redistribution, and Poverty: Contrasting Rational Choice and Behavioral Perspectives," *Review of Income and Wealth*, 60, 133–54, 2014.
Lustig, N. and S. Higgins, "Commitment to Equity (CEQ): Estimating the Incidence of Social Spending, Subsidies, and Taxes Handbook," CEQ Working Paper 1, 2013.
Lustig, N., F. Amábile, M. Bucheli, G. Gray Molina, S. Higgins, M. Jaramillo, *et al*., "The Impact of Taxes and Social Spending on Inequality and Poverty in Argentina, Bolivia, Brazil, Mexico, Peru and Uruguay: An Overview," CEQ Working Paper 13, 2013a.
Lustig, N., L. F. López-Calva, and E. Ortiz-Juárez, "Declining Inequality in Latin America in the 2000s: The Cases of Argentina, Brazil, and Mexico," *World Development*, 44, 129–41, 2013b.
Lustig, N., C. Pessino, and J. Scott, "The Impact of Taxes and Social Spending on Inequality and Poverty in Argentina, Bolivia, Brazil, Mexico, Peru and Uruguay," *Public Finance Review*, 42, 287–303, 2014.
Medeiros, M. and P. H. G. F. Souza, "The State and Income Inequality in Brazil," Institute for Research on Labor and Employment Working Paper, University of California at Berkeley, Berkeley, CA, 2013.
Milanović, B., "Determinants of Cross-Country Income Inequality: An 'Augmented' Kuznets Hypothesis," in V. Franičević and M. Uvalić (eds), *Equality, Participation, Transition*, Macmillan Press, London, 48–79, 2000.
Ministério da Fazenda, *Balanço do Setor Público Nacional: Exercício de 2009*, 2010 (http://www3.tesouro.gov.br/contabilidade_governamental/downloads/Balanco_Setor_publico_Nacional.pdf).
Morelli, S., J. Thompson, and T. M. Smeeding, "Post-1970 Trends in Within-Country Inequality and Poverty: Rich and Middle Income Countries," in A. Atkinson and F. Bourguignon (eds), *Handbook of Income Distribution*, Volume 2, Elsevier, Oxford, 593–696, 2015.
Newman, K. and R. O'Brien, *Taxing the Poor: Doing Damage to the Truly Disadvantaged*, University of California Press, Berkeley, CA, 2011.
Nogueira, J. R. B., R. Bezerra, and E. S. de Souza, "A Brazilian Tax-Benefit Microsimulation Model," in C. M. Urzúa (ed.), *Microsimulation Models for Latin America*, International Development Research Center and United Nations Development Programme and Tecnológico de Monterrey, Mexico City, 19–50, 2011.
Ñopo, H., *New Century*, *Old Disparities: Gender and Ethnic Earnings Gaps in Latin America and the Caribbean*, Inter-American Development Bank and World Bank, Washington DC, 2012.
O'Donnell, O., E. van Doorslaer, A. Wagstaff, and M. Lindelow, *Analyzing Health Equity Using Household Survey Data*, World Bank, Washington DC, 2008.
OECD, *Strong Performers and Successful Reformers in Education: Lessons from PISA for the United States*, OECD Publishing, Paris, 2011.

Paz Arauco, V., G. Gray Molina, E. Yáñez Aguilar, and W. Jiménez Pozo, "Explaining Low Redistributive Impact in Bolivia," *Public Finance Review*, 42, 326–45, 2014.
Plotnick, R., E. Smolensky, E. Evenhouse, and S. Reilly, "Inequality, Poverty, and the Fisc in Twentieth-Century America," *Journal of Post Keynesian Economics*, 21, 51–75, 1998.
Poterba, J. M., "Lifetime Incidence and the Distributional Burden of Excise Taxes," *American Economic Review Papers and Proceedings*, 79, 325–30, 1989.
Poterba, J. M. and K. S. Rueben, "The Distribution of Public Sector Wage Premia: New Evidence using Quantile Regression Methods," Working Paper 4734, National Bureau of Economic Research, Cambridge, 1994.
Sauma, P. and J. D. Trejos, "Gasto Público Social, Impuestos, Redistribución del Ingreso y Pobreza en Costa Rica," CEQ Working Paper 18, 2014.
Scott, J., "Redistributive Impact and Efficiency of Mexico's Fiscal System," *Public Finance Review*, 42, 368–90, 2014.
Short, K., *The Research Supplemental Poverty Measure: 2012*, U.S. Census Bureau, Washington DC, 2013 (http://www.census.gov/prod/2013pubs/p60-247.pdf).
Short, K. and A. O'Hara, "Valuing Housing in Measures of Household and Family Economic Well-Being," prepared for the Annual Meeting of the Allied Social Sciences Associations, 2008 (http://www.census.gov/housing/ahs/files/valuing_housing.pdf).
Smeeding, T. M., K. R. Phillips, and M. O'Conner, "The EITC: Expectation, Knowledge, Use, and Economic and Social Mobility," *National Tax Journal*, 53, 1187–210, 2000.
Soares, F. V., S. Soares, M. Medeiros, and R. G. Osório, "Programas de Transferência de Renda no Brasil: Impactos sobre a Desigualdade," in R. Paes de Barros, M.N. Foguel, and G. Ulyssea (eds), *Desigualdade de Renda no Brasil: uma Análise da Queda Recente*, Volume 2, Instituto de Pesquisa Econômica Aplicada, Brasilia, 87–129, 2007.
Souza, P. H. G. F. and M. Medeiros, "The Decline in Inequality in Brazil, 2003–2009: The Role of the State," Institute for Research on Labor and Employment Working Paper, University of California at Berkeley, Berkeley, CA, 2013.
Tiehen, L., D. Jolliffe, and T. Smeeding, "The Effect of SNAP on Poverty," in J. Bartfeld, C. Gundersen, T. Smeeding, and J. Ziliak (eds), *SNAP Matters: How Food Stamps Affect Health and Well Being*, Stanford University Press, Palo Alto, CA, forthcoming.
USDA (United States Department of Agriculture), "Food Expenditures," 2014 (http://www.ers.usda.gov/data-products/food-expenditures.aspx#.VCNp-fl5NAG).
Wilson, K., K. Lambright, and T. M. Smeeding, "School Finance, Equivalent Educational Expenditure and Income Distribution: Equal Dollars or Equal Chances for Success?" *Education Finance and Policy*, 1, 396–424, 2006.
World Bank, *Ethiopia Poverty Assessment 2014*, World Bank, Washington DC, 2015.
Younger, S. D. and A. Khachatryan, "Fiscal Incidence in Armenia," Background Paper for World Bank Armenia Public Expenditure Review, 2014 (http://documents.worldbank.org/curated/en/2014/05/19884965/armenia-public-expenditure-review-expanding-fiscal-envelope).
Ziliak, J. P., "Why Are So Many Americans on Food Stamps? The Role of the Economy, Policy, and Demographics," in J. Bartfeld, C. Gundersen, T. Smeeding, and J. Ziliak (eds), *SNAP Matters: How Food Stamps Affect Health and Well Being*, Stanford University Press, Palo Alto, CA, forthcoming.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix A: Robustness Checks
Table A.1: Inequality by Income Concept Using Household Per Capita Income
Table A.2: Inequality by Income Concept Using Total Household Income
Appendix B: Additional Methodological Details
Table B.1: Construction of Income Concepts and Allocation Methods in the United States
Table B.2: Construction of Income Concepts and Allocation Methods in Brazil
Appendix C: Descriptive Statistics
Table C.1: Descriptive Statistics of Income Concepts and Components