The Arithmetics and Politics of Domestic Resource Mobilization for Poverty Eradication

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Abstract

The Addis Ababa Action Agenda stresses the importance of effective resource mobilization and use of domestic resources to pursue sustainable development. The first Sustainable Development Goal is to eradicate extreme poverty for all people everywhere by 2030. This paper explores how feasible it would be for developing countries to achieve the goal of eradicating poverty using only domestic resources, given their current tax base and political equilibrium. To answer this question, we propose two new metrics: a *Poverty Eradication Capacity Index* and a *Political Influence Concentration Index*. The first metric looks at the "arithmetics" of the issue, and uses an accounting approach to assess whether the existing tax base is rich enough to end poverty through monetary redistribution. The second metric looks at the "politics" of the issue, and approximates the degree to which political power is concentrated among the rich—following the notion that a high concentration of power would likely hinder the effective implementation of fiscal policies (in terms of both revenue collection and social spending). We calculate these two metrics using recent data for over 120 developing countries, and find that: (i) a large proportion of countries simply do not have an affluent enough tax base to finance their own poverty eradication through redistribution; (ii) countries with the same arithmetic capacity to mobilize resources for poverty eradication differ widely in terms of the political feasibility of such policies; and (iii) a higher capacity for poverty eradication and a lower concentration of political influence is associated with a higher collection of tax revenue as a share of GDP. These results suggest that countries facing binding arithmetic and/or political constraints may need to complement domestic resources with foreign aid in the short-term. Such financial flows, however, should be designed to support the reduction of these constraints in the long-term.

Keywords: domestic resource mobilization; poverty gap; fiscal capacity; taxation; political influence
JEL Codes: D63; I32; P16

Highlights

- This paper proposes two new metrics to assess whether countries could feasibly eliminate poverty using only domestic resources
- One metric looks at the "arithmetics" of the issue and assesses whether the existing tax base is rich enough to end poverty through redistribution
- The other looks at the "politics" of the issue and assesses potential policy challenges due to concentrated political influence among the rich
- Results show that the population of many developing countries are still not affluent enough to eradicate poverty using only domestic resources
- Among countries that are able to mobilize sufficient resources, there are large differences in the political feasibility of such policies

1. Introduction

Throughout history, taxation has been the backbone of the structure of the state. It is the channel through which citizens provide delegated authorities with the necessary resources to look after the public good. As early as the 4th Century BC, around the time when ancient Greece became the ideal model of the modern state in the West, in South Asia Kautilya wrote in the *Arthasashtra* (the ancient Indian treatise on the state and the economy) that:

> When there was no order in society and only the law of the jungle prevailed, people [were unhappy and being desirous of order] made Manu, the son of Vivasvat, their king; and they assigned to the king one-sixth part of the grains grown by them, one-tenth of other commodities and money. The king then used these to safeguard the welfare of his subjects. Those who do not pay fines and taxes take on themselves the sins of kings, while kings who do not look after the welfare of the people take on themselves the sins of their subjects [...] (Kautilya, 4th Century BC, 1.13.5-10)

Indeed, throughout history and across space, taxation has served as a fundamental link between the government and the governed—a foundational pillar of the social contract. Yet, in the world today there remains an astounding level of heterogeneity between countries in terms of tax collection. While the level of taxation that is considered desirable and feasible may differ across countries depending on factors such as the country's existing endowments or society's normative beliefs about the appropriate levels of taxation, increasing evidence suggests that tax revenues of at least 15 percent of GDP may be necessary in order to execute basic state functions and to sustain development progress (Gaspar et al., 2016). As of 2018, more than half of low-income countries were below this threshold (ICTD/UNU-WIDER, 2020)

Accordingly, there has been a growing consensus in the international development community around the need to improve the way that countries raise tax revenue (often referred to as "domestic resource mobilization," or DRM). This is reflected, for example, in the 2015 Addis Ababa Action Agenda (adopted at the Third International Conference on Financing for Development) which stresses the

importance of effective resource mobilization and use of domestic resources to pursue sustainable development (United Nations, 2015) With the cost of achieving the 2030 Agenda projected to be in the trillions of dollars, DRM in developing countries will be an increasingly necessary source of funding (Development Committee, 2015). Moreover, increasing reliance on resources generated from domestic sources rather than from foreign aid is a critical way in which countries can reclaim ownership of their national development agenda—shifting the goals of government spending away from donor priorities and toward citizen demands.

However, given the economic, social, and political reality in many developing countries—how feasible would it be for governments to actually raise enough revenue to finance the achievement of certain (often ambitious) development goals on their own? Answers to this question typically focus on the capacity to mobilize resources, with less emphasis on the fact that low fiscal revenues are themselves the result of a political equilibrium, and that the incentives for policymakers may not be in favor of fiscal reform. In other words, even if a country becomes "rich enough" to solve certain development challenges, it may not actually do so because of who has the power to influence decisions over how resources are collected and spent. Thus, when thinking of DRM as a means to finance development, it is important to disentangle constraints related strictly to capacity in terms of existing resources and those related to politics in terms of the political equilibrium. This paper seeks to contribute the existing literature on this by offering a quantitative perspective on how these distinct constraints manifest across countries in the developing world through the proposal of two new indices. Note that the analysis in this paper narrows its focus on "domestic resource mobilization" to include only those resources mobilized through personal income taxation (rather than other sources such as mineral rents) and it narrows its focus on "financing development" to include only the first Sustainable Development Goal of eradicating extreme poverty.

The first proposed index (the *poverty eradication capacity index)* measures what we refer to as "the arithmetics" of DRM. It is the result of an accounting exercise in which we calculate the marginal tax rates required to close the poverty gaps of all poor individuals in a society—essentially evaluating whether a country's population is affluent enough to eliminate monetary poverty simply through redistribution. The second proposed index (the *political influence concentration index)* measures what we refer to as "the politics" of DRM. It is the result of a second exercise in which we approximate the concentration of power in a country linked to the unequal control over resources—essentially evaluating whether the political equilibrium is one in which such redistributive rules would likely be hindered due to the outsized influence of the rich.

We apply these two approaches using data from the World Bank's PovcalNet database for over 120 developing countries and compare the differing sets of constraints that countries currently face. Our results show that, unfortunately, many countries do not yet have the domestic resources needed to finance their own development out of poverty from the perspective of monetary redistribution. Moreover, even among the countries that have a rich enough potential tax base, there are large differences in terms of the political feasibility of such an approach due to the concentration of power. Finally, when comparing these indices with countries' actual fiscal efforts (measured by tax revenue as a share of GDP), we see that those countries with a higher capacity for poverty eradication and lower concentration of political influence tend to also be those that collect more taxes (suggesting a possible association between these factors). While the approach in this paper is derived from a hypothetical tax collection and reallocation scenario, the results shed light on the very real challenge of raising and redistributing revenue in resource-scarce environments.

The rest of the paper is organized as follows. Section 2 offers a brief discussion on why DRM matters and why it might not yet be a feasibly sufficient source of financing for many developing countries,

distinguishing capacity constraints from political constraints. Section 3 describes the empirical approach used to develop the two new indices quantifying countries' capacity for poverty eradication and their concentration of political influence. Section 4 describes the data utilized in the analysis. Section 5 presents the results for each index individually as well as jointly. Section 6 concludes, reflecting on the role of foreign aid in filling DRM gaps in the short-term and reducing DRM constraints in the long-term.

2. DRM: Why it matters and why it might not yet be feasible

2.1 The case for DRM

While domestic resource mobilization has recently garnered attention in the international dialogue, its importance for both economic and state development has long been acknowledged—literally for thousands of years, as highlighted in the quote cited at the beginning of this paper. In addition to serving as an essential source of funding for governments to invest in delivering public goods and services, DRM can also reduce countries' dependency on aid donors, and, under the right conditions, it can serve as a means to strengthen the responsiveness and accountability of governments to their citizens.

The fiscal capacity of countries to pursue development objectives is often analyzed in terms of the dichotomy between domestic resource mobilization versus overseas development assistance. This dichotomy (or complementarity) has been mainly studied from the perspective of how it could potentially shift the accountability of recipient governments to donors' constituencies rather than to their own citizens. According to this argument, reliance on foreign financing to fill revenue gaps can have negative consequences on the ability of countries to maintain ownership of their development trajectories as the definition of policy priorities may be influenced by donors' political preferences rather than domestic needs (Alesina & Dollar, 2000; Qian, 2015). Ultimately, a core function of

institutions is to enable commitment to long-term national objectives (World Bank, 2017). However, if a country is dependent on external funding cycles, it may be unable to pursue such objectives if commitments are truncated in the face of changing donor priorities. Moreover, relying on foreign aid in place of DRM can also potentially reduce the answerability of politicians to society, as implementation becomes a donor-recipient negotiation rather than a state-citizen agreement. When states rely on their domestic tax base for funding, political leaders have more incentives to be responsive to the needs of their consistencies and may be more likely to include them in policy discussions (Bates & Lien, 1985). Over time, by broadening the bargaining space and reliably delivering public goods and services, states can build trust with citizens and strengthen their legitimacy in society (Levi, 1988). The feedback effect of improving taxation is thus also fundamental for improving the effectiveness of state institutions (Fjeldstad and Moore, 2008; Moore, 2004; Prichard, 2015).

While countries can mobilize domestic resources through multiple instruments, this paper narrows its focus only to the use of personal income taxation. Compared to other sources of domestic resource revenue (such as trade taxes or rents generated from extractive industries), personal income taxation arguably offers a more stable and sustainable source of revenue (due to less volatility and less environmental damage) as well more potential positive feedback effects on governance (due to the direct link it generates between citizens and their state). Moreover, personal income taxation is deeply intertwined with the types of constraints explored in this paper's analysis, given that there are clear "winners" and "losers" involved in raising and redistributing revenue at the individual level. However, this is not to say that these other sources of revenue cannot foster positive development-governance dynamics or cannot be used for redistributive purposes. While some have argued that an overreliance on the extraction of resources to finance development fosters a "resource curse" (Auty, 1993) that precludes long-term developmental success, other scholars have argued that these models are not

necessarily doomed to fail but instead depend on the surrounding governance environment which determines how the revenue from those resources is captured and reallocated (Venables, 2016).

2.2. Constraints to DRM

Clearly, DRM is critical for achieving social and political progress in addition to economic progress. However, low-income countries systematically collect fewer taxes than higher income countries—despite significant progress in improving tax collection over the past two decades. In 2018, low-income countries collected tax revenues equivalent to 13% of GDP (up from 8% in 1980), while high-income countries collected tax revenues equivalent to 23% of GDP (a share that has remained steadily above 20% since 1980). If we restrict this to just personal income taxes, low-income countries collected the equivalent of just 3% of GDP compared to 7% in high-income countries (ICTD/UNU-WIDER, 2020). We see, for example, while personal income taxes comprised around 23% of total tax revenue on average in OECD countries in 2018, this share was far lower in developing regions such as Latin America and the Caribbean (10%) and Africa (18%) (OECD 2020).

There are many different factors which hold countries back from mobilizing more domestic resources—ranging from the size of the agricultural sector (Khan, 2001) to the degree of informality in the economy (La Porta & Shleifer, 2014) to global tax competition (Zucman, 2015) to public tax morale (Luttmer & Singhal, 2014) to colonial history (Mkandawire, 2010) to the efficiency and effectiveness of national tax collection systems (Bird, 2014). These constraints have been well documented in the economics, political science, and public administration literatures (see Besley & Persson, 2014 for an overview on why developing countries collect so few taxes). Moreover, there is a growing body of empirical and experimental research looking at how different interventions ranging from information provision to audits could be used to help tax authorities strengthen their capacity to collect more taxes (Pomeranz & Vila-Belda, 2019).

This paper, however, neither seeks to explain the reasons for low tax collection nor identify interventions to overcome them. Rather, this paper seeks to assess the extent to which countries face two very specific roadblocks in the proposed hypothetical scenario of being able to use personal income taxation as means to eradicate poverty through redistribution.[1] These roadblocks are: (i) the income of the potential tax base (is a country's population rich enough to eliminate poverty?) and (ii) the political equilibrium (would such a policy be feasible given the existing concentration of power in a country?). The first constraint, while rather obvious, remains a fundamental starting point. If there are not enough domestic resources to redistribute in the first place, then the politics of redistribution becomes a secondary issue. The second constraint, however, is more complicated and builds on the notion that the way in which existing resources and power are distributed in society centrally matter for the effectiveness of DRM. This type of resource-bargaining perspective views DRM "as a political process of contestation and bargaining over who pays and who benefits… marked by differences and asymmetries of power" (Hujo, 2020, p. 13).

In terms of the first constraint, developing countries by definition face a serious challenge in mobilizing enough revenue from personal income taxes to finance their development—as their populations both have lower incomes and their societies face larger development challenges. This paper asks how much this challenge is a binding constraint in the context of poverty reduction, and creates a metric to quantify this building on previous efforts to quantity countries' abilities to reduce poverty through redistribution. In particular, it builds on three recent approaches. Ravallion (2010a) measures the extent to which the existing distribution of income would constrain the redistribution needed to eliminate poverty in 90 countries, using a measure of the marginal tax rate on the rich. He finds that while the required tax burden would be prohibitive for most lower-income countries, poverty could be solved in richer countries with very low marginal tax rates—with implications for

the balance of growth and redistribution. Lind and Moene (2011) develop a miser index to measure the extent to which there is poverty in the midst of affluence, by comparing absolute poverty to the total amount of resources available. They find that the "most miserly" countries are those in Southern Africa and Latin America, and that "global miserliness" has been on the rise over the last 30 years. Finally, Ceriani and Verme (2014) develop an income lever index to measure the monetary capacity of countries to eliminate poverty by implementing different distribution rules. They apply this approach to a sample of countries in Sub-Saharan Africa and show the disconnect that exists between the size of countries' income levers and the actual allocations of aid they receive.

While having a rich enough population is a necessary condition for generating the required resources to end poverty through redistribution—it is hardly a sufficient condition. In terms of the second constraint, we know that the decision to collect and spend revenue in a certain way is ultimately the result of the governance environment which depends on the balance of power between different actors with different interests and incentives (World Bank, 2017). The relative political power of the winners and losers of any type of fiscal reform is thus crucial in determining whether the policy will be designed and implemented with the expected results. In the context of this paper, which looks at using taxation on the non-poor and on the rich to redistribute resources to the poor, it is clear that those below the poverty line would "win" while those above it would "lose."

As the actors with higher income levels also tend to have more bargaining power to directly influence policy decisions (as the distribution of wealth and resources is an important source of *de facto* power), it would be unsurprising to find that in places with low contestability of power (high concentration of political influence) fiscal policy is also less progressive and tax laws are more easily evaded by the wealthy (Besley & Persson, 2014). This dynamic is highlighted, for example, by Cárdenas (2010) in the case of Latin America. He shows that if those who are currently in power may benefit from future tax

avoidance, they are likely to under-invest in fiscal capacity—particularly when there is a high likelihood that a more progressive opposition government may be elected in the next term. Conversely, as contestability of power increases (and elites face greater social and economic pressures from below), elites' tax contributions tend to increase (Boix, 2003). These dynamics have the potential to be self-reinforcing, with greater economic equality giving way to more democratic systems. Note that even in a perfectly functioning democratic setting, where the policy makers are elected on a platform favoring a redistribution agenda, however, political elites tend to express a different attitude towards redistribution (i.e. less progressive) than the general population (Fisman et al., 2015).

Thus to complement the first metric on the capacity of countries to mobilize resources for poverty eradication, this paper constructs a second metric to quantify the degree to which this type of political dynamic might hinder the effective implementation of such a redistributive policy. It builds on previous efforts to quantify the links between economic power and political power. Gilens and Page (2014) use data from the United States to quantify the differences in policy influence between average citizens, economic elites, and business interests. They show that in the United States, economic and business elites are much more effective in having their preferred policies passed (or unfavored policies blocked) than mass-based interest groups. Karabarbounis (2011) measures the relationship between inequality and redistribution and finds a *one dollar, one vote* political characterization in which income is associated with political influence. Using a panel of OECD countries over the period 1975-2001, the author finds evidence to support the argument that political influence is not uniformly distributed across voters and that richer individuals' votes weigh more heavily. Finally, Igan and Mishra (2014) construct a database of political connections and contributions and find an impact on the likelihood of policymakers changing their issue stance. Using the case of the United States during the years 1999-2006, they find that lobbying expenditure from the financial sector are positively associated with the probability that legislators switch their position in favor of deregulation in that industry.

When policies are chosen because of money used to influence the political process, this a direct expression of income inequality. But it is important to note that inequality can also trump the political voice of the poor indirectly. In particular, Solt (2008) shows for the case of Europe that inequality depresses political interest and participation of everyone except the very affluent in the society. As Hirschman (1970) famously noted, when people (in this case, poor citizens) experience a persistent lack of responsiveness from the state with respect to issues of importance to them may decide to 'exit' from the political process rather than 'voice' their concerns—therefore further lowering the probability that redistributive policies would be passed.

3. Empirical approach: Measuring the arithmetics and the politics of DRM

This paper's primary contribution lies in its proposal for two new indices to understand the arithmetic and political constraints that developing countries face in the context of raising domestic resources for poverty reduction. While the existing literature cited above separately explores each of these constraints (calculating various measures of poverty eradication capacity or various measures of the concentration of political influence), this paper adds value by looking at them in tandem to jointly understand how they shape countries' policy feasibility contexts . Moreover, in applying this approach to a global dataset of 120 developing countries, this paper is able to offer a more global perspective than many of the previous applications of these types of measures. Indeed, much of the existing literature cited above (particularly in regard to measures of the concentration of political influence) limits its analysis to a few global regions or more developed contexts such as OECD countries or the United States. This section describes the general intuition behind the construction of the indices, with a more technical description included in Appendix 1 for those interested readers.

3.1 The arithmetics: Measuring poverty eradication capacity

To develop a method to measure the potential DRM constraints related to poverty eradication capacity, this paper looks at the arithmetics of DRM from the perspective of the income of the potential tax base. We start by ordering all individuals in a country by their level of welfare (here this reflects the monetary value according to which poverty is measured, and it can either be income or consumption according to the prevailing methodology in the country). The population can then be divided into two groups: *poor individuals* and *non-poor individuals*. Poor individuals are defined as those whose welfare is below the poverty line and non-poor individuals are defined as those whose welfare is greater than or equal to the poverty line. Moreover, within the group of non-poor individuals, we also identify the sub-group of *rich individuals*—defined as those are whose welfare is above the affluence line. In this analysis we use a poverty line of $2.00 a day (2005 PPP), and an affluence line of $13 a day (2005 PPP). The poverty line is higher than the extreme poverty line of $1.25 a day (2005 PPP) so as to be more relevant for upper middle-income countries, yet not so high as to become an excessive living standard floor for low-income countries. The affluence line reflects the upper bound of the developing world middle class as defined in Ravallion (2010b) (reflecting the official poverty line in the US for a family of four in 2005): those who are deemed 'not poor' by the standards of rich countries, may be defined as 'rich' by the standards of developing countries.

In a static setting, where there is no growth and we allow only redistribution to happen, the domestic resources to eradicate poverty are to be found among the group of non-poor individuals.[2] In this setting, we consider that the taxation policy for poverty eradication comprises a set of transfers from those above the poverty line to those below it. This policy would aim at narrowing (and potentially closing) the poverty gaps of all poor individuals, without making anyone else poor and avoiding the re-ranking of individuals across the distribution. The *optimal* taxation policy for poverty eradication is

thus defined by a marginal tax rate such that the total transfer equals the sum of the poverty gaps of all poor individuals. It is possible, however, that the optimal policy might not be achievable in a given country, if the sum of the poverty gaps exceeds the pool of available resources for any feasible level of the marginal tax rate.

The decision of whether all non-poor individuals or only the subgroup of rich individuals should be responsible for providing the resources necessary for redistribution depends on a normative policy decision—which, in turn, depends on the preferences of policymakers (Ceriani & Verme, 2014). Therefore in this paper, we consider two possible tax scenarios. In Tax Scenario 1, each *non-poor individual* would transfer the same proportion of their welfare in excess of the poverty line to the poor. Thus, the marginal tax rate would be levied on the sum of the welfare levels in excess of the poverty line. In Tax Scenario 2, each *rich individual* would transfer the same proportion of their welfare in excess of the affluence line to the poor.[3] Thus, the marginal tax rate would be levied on the sum of the welfare levels in excess of the affluence line.

The relationship between the size of the marginal tax rate and its potential for reducing the depth of poverty under a given tax scenario can be summarized in a *Poverty Eradication Capacity Curve* (a generic curve is shown in Figure 1). This curve plots the share of the sum of poverty gaps that a country is able to fill for each level of the marginal tax rate levied on the relevant group of non-poor individuals. A country enjoys the maximum possible capacity for poverty eradication when the Poverty Eradication Capacity Curve is Γ-shaped. A curve of this shape would indicate that a marginal tax rate close to zero would be enough for a country to fully eradicate poverty (closing 100% of the poverty gaps). Conversely, a country faces the minimum possible capacity for poverty eradication when the curve coincides with the x-axis. A curve of this shape would indicate even when the marginal tax rate approaches one, a country is unable to close any poverty gaps. If the curve fails to reach the full height

of the y-axis in the plot, this suggests that no marginal tax rate would be high enough to fully eradicate poverty in that country, given its existing resources.

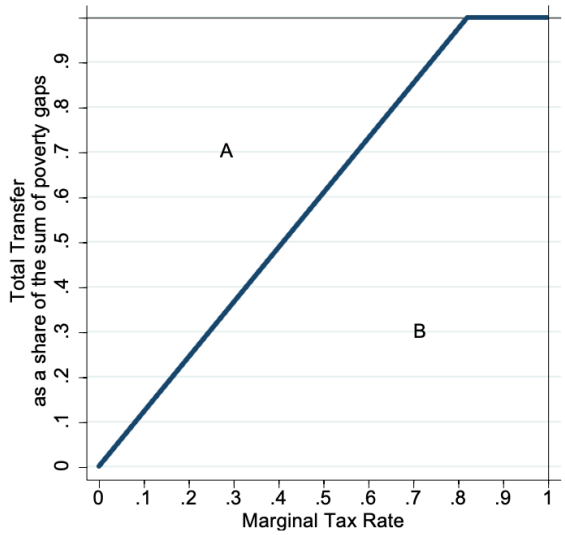


Figure 1: Generic Poverty Eradication Capacity Curve

As Figure 1 shows, the arc of the Poverty Eradication Capacity curve divides the space of analysis into two areas: A above the curve and B below the curve. In a country where the poverty eradication capacity is maximum, A will be zero. In a country where the poverty eradication capacity is minimum, B will be zero. Using this intuition, and the fact that A + B = 1, we can summarize the information contained in the Poverty Eradication Capacity Curve in a single number: the *Poverty Eradication Capacity Index*. An index level of one would indicate a maximum capacity for poverty eradication and an index level of zero would indicate a minimum capacity. Any index value below 0.5 (suggesting the curve never reaches the full height of the y-axis in the plot, and thus the area of A is greater than the area of B) suggests that a country would be unable to fully eradicate poverty through this type of redistribution.

3.2 The politics: Measuring the concentration of political influence

Similarly, to develop a method to measure the potential DRM constraints related to the political equilibrium of countries, this paper looks at the politics of DRM from the perspective of the

concentration of resources in the hands of a few rich individuals. It builds on two key findings from the political science and economics literature. First, that economic inequality is essentially political inequality, and thus a disproportionate concentration of income and wealth (particularly at the very top of the distribution) may result in disproportionate power that makes it difficult to implement pro-poor reforms (Atkinson et al., 2011; Gilens, 2014). Second, that concentrated minority interests tend to trump diffuse majority interest due to increasing difficulties of inducing coordination and fostering cooperation as the group becomes larger (Olson, 1965). These findings imply that the concentration of political power in the hands of a rich elite may not easily be counterweighted by the diffuse political power of the poor, as it might be difficult for the latter to organize given the challenge of collective action. Therefore, we can think that political influence is positively associated with the amount of economic resources a group of individuals controls, and negatively associated with the number of individuals in that group.

Our metric to assess the concentration of political influence thus, again, starts from the distribution of income in society. It relies on the assumptions that the capacity to influence the political agenda is linear in the income levels of individuals (in line with the *one dollar, one vote* theory empirically tested by Karabarbounis (2011) referenced above), and that as individuals form coalitions to support the implementation of a policy their influence is linear in the total income of the members of the coalition. In our setting, this would translate into the notion that the poorest individuals (the "winners" of the redistributive reforms) would need to form a coalition large enough to outweigh the influence of the richest individuals (the "losers" of the redistributive reforms), such that the sum of their incomes is equal. A society can thus be said to have a higher concentration of political influence when, for each rich individual at the top, a larger coalition of poor individuals at the bottom would need to be created. Therefore we start by ordering all individuals in a country by their level of welfare and then calculating

how large the coalition of those at the bottom would need to be in order for the sum of their incomes to outweigh the income of each individual at the top.

This relationship can be summarized in the *Political Influence Concentration Curve* (a generic curve is shown in Figure 2) which plots the share of individuals at the bottom of the distribution needed to equalize the income levels of each quantile of individuals at the top of the distribution. In the case of a minimum level of political influence concentration (where perfect equality in the distribution of welfare translates into each individual having the same political influence), the curve would correspond to the 45-degree line. In the case of a maximum level of political influence concentration (where extreme inequality in the distribution of income translates into a single individual having so much political influence that no group of other individuals could counterweigh them), the curve would be Γ-shaped.

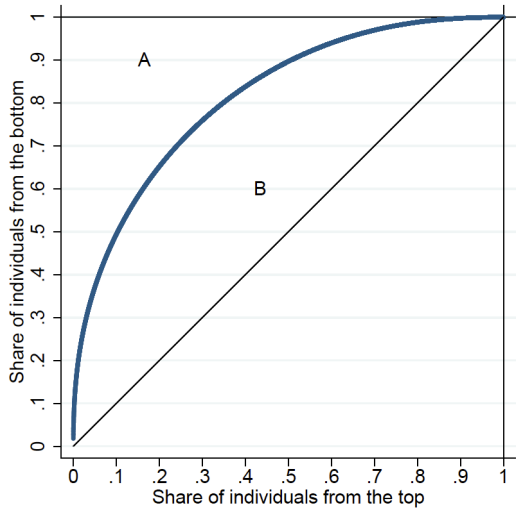


Figure 2: Generic Political Influence Concentration Curve

As shown in Figure 2, the arc of the Political Influence Concentration Curve divides the space of analysis into two areas: A above the curve and B below the curve. In a country where political influence concentration is maximum, A will be zero. On the other hand, in a country where political influence

concentration is minimum, B will be zero. Similar to the definition of the Poverty Eradication Capacity Index, and noticing that A + B = 0.5, we can summarize the information embedded in the curve in a single index: the *Political Influence Concentration Index*. An index value of zero would indicate a minimum level of political influence concentration (reflecting that no coalition would need to be formed). An index value of one would indicate a maximum level of political influence concentration (reflecting that no coalition could be large enough to outweigh the political influence of the single richest individual in the society).

4. Data

In this paper, we use the World Bank PovcalNet database, in the form put together by Dykstra et. al (2014a). PovcalNet is a computational tool developed by the World Bank to allow researchers to replicate the official poverty estimates, as well as develop new estimates under different assumptions, namely, different poverty lines and different groupings of countries.[4] By automatizing the sourcing of results from the World Bank website, Dykstra et. al collected 10,000 data points from the underlying distribution of income or consumption for each country and each year in the PovcalNet database. The resulting data set is, using the words of the authors, a data set of distributions, not the original micro survey data (Dykstra et al., 2014b, p. 1).

We are aware of the disclaimer posted on PovcalNet which advises against using the tool for tracing out the entire distribution of income or consumption. We are also aware of issues related to the use of secondary databases for distributional analysis (Atkinson & Brandolini, 2001; Smeeding and Latner, 2015). Nevertheless, the data set made available from this effort is an incredible asset to researchers, as it provides an approximation of the welfare distribution for all available countries and available years, in a relatively computationally lean form. Despite its acknowledged limitations, PovcalNet has

been used extensively for distributional analysis (some recent examples include Ravallion, 2020a and 2020b; Dhongde and Minoiu, 2013; Edward, 2006). Additionally, as researchers often only have access to grouped income or consumption data (rather than the original underlying household-level data) for many developing countries, it is a common (if second best) practice to estimate income distributions based on grouped data information (see Eckernkemper and Gribisch, 2021 for an up-to-date review of the literature on the use of grouped data for distributional analysis, with an application to PovcalNet). We are aware that any results reported here, therefore, should be validated by using the underlying microdata whenever available for the analysis. We do conduct this type of validation analysis for four countries (Ethiopia, Nigeria, Peru, and South Africa). The results are summarized in Table A2.1, and Figures A2.1, A2.2, and A2.3 in Appendix 2, and show that the values of the estimated indices do not differ greatly when they are calculated using the PovcalNet data versus the underlying microdata. Moreover, as this paper is more interested in exploring broader cross-country patterns rather the individual results for a single country, we do not think that this limitation of the data is of great concern for the accuracy of the results presented here.

We use data for the most recent year available (at the time of analysis) for the 127 countries featured in the database. Note that while there are 127 countries, results are reported for 129 units of analysis as India and Indonesia are separated into Rural and Urban areas. Only for 10 countries in the dataset is the available survey older than 2000, while for 44 countries it is from 2010 or more recent. The survey year for each country along with all the index estimations are listed in Appendix 3. The countries represented in the data set cover all income groups and developing regions—Europe & Central Asia (ECS) Latin America & Caribbean (LCN), Middle East & North Africa (MEA), Sub-Saharan Africa (SSF), South Asia (SAS), East Asia & Pacific (EAS).

5. Results: Is poverty eradication feasible through DRM?

5.1 The arithmetics

Poverty Eradication Capacity Curves were traced out for all countries in the dataset for both described tax scenarios: taxing all non-poor individuals (Tax Scenario 1) or taxing only the rich (Tax Scenario 2). Appendix 4 shows these curves for each country in the dataset. As an example for how to read the curves, Figure 3 illustrates the case of urban India in 2011. If we consider the first tax scenario (shown here in blue), we see that a marginal tax rate of about 20% levied on the excess-poverty gaps of the non-poor would be sufficient to compensate the sum of poverty gaps in the population. If we consider the second tax scenario (shown here in red), we see that even if the full affluence gaps of rich individuals were taxed, the society could at most collect enough revenue to compensate 60% of the total sum of poverty gaps—and therefore no optimal taxation policy for poverty eradication exists under this tax scenario.

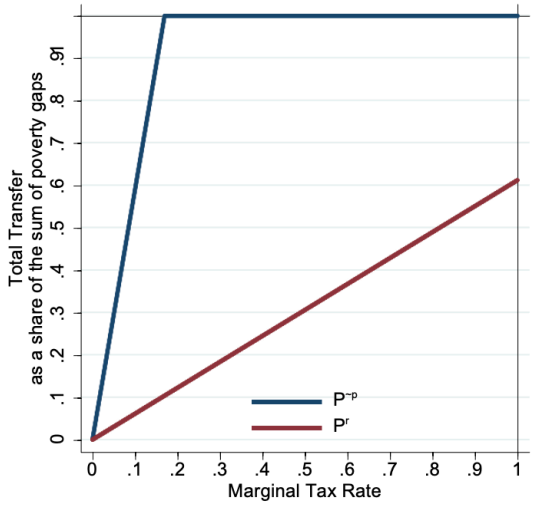
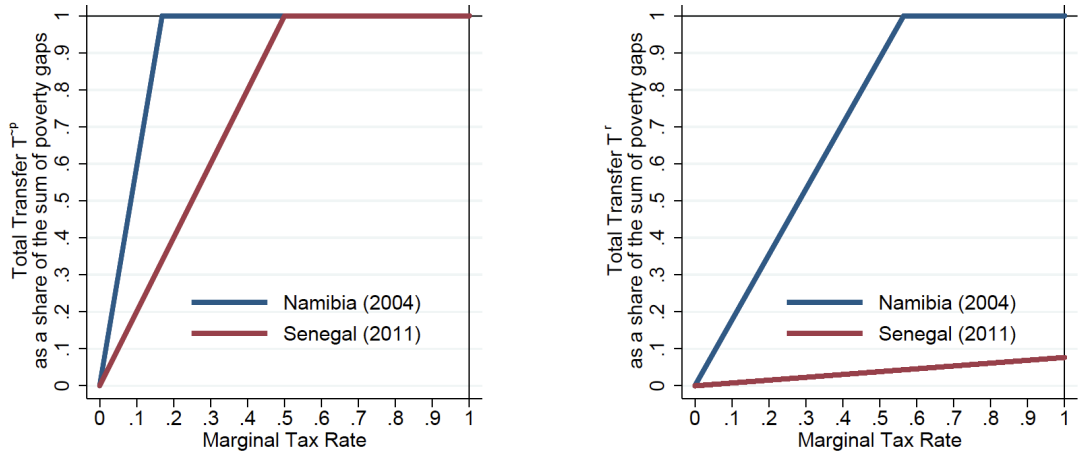


Figure 3: Poverty Eradication Capacity Curve (Example: Urban India 2011)

Looking across countries, unsurprisingly the results suggest that the empirical relationship between poverty incidence and the optimal marginal tax rate on the non-poor to eradicate poverty is positive

and increasing: the higher the share of the population below the poverty line, the higher the marginal tax rate needs to be in order to eradicate poverty. Nevertheless, the same poverty rate may correspond with very different shapes of the Poverty Eradication Capacity Curve (and thus optimal tax policies). Take, for example, the cases of Namibia and Senegal, which have approximately the same share of individuals living below the poverty line of $2 dollars per day in 2005 purchasing power parity (51% in Namibia and 55% in Senegal). While they face a similar incidence of poverty, they differ very much with respect to the arithmetics of their redistributive capacity. Namibia's poverty eradication capacity curve lays above Senegal's regardless of the tax scenario considered (Figure 4). This means that for any possible marginal tax rate on excess-poverty or excess-affluence gaps, Namibia would be able to close a larger share of poverty gaps than Senegal. Under Tax Scenario 1, the optimal marginal tax rate to fully eradicate poverty is about 16% in Namibia and 50% in Senegal (Figure 4, panel a). Under Tax Scenario 2, Namibia's optimal marginal tax rate is about 55%, while Senegal would be unable to fully eradicate poverty (Figure 4, panel b). Even by levying a marginal tax rate of 100% on the excess affluence gaps of the rich individuals, Senegal would be able to close less than 10% of the total sum of poverty gaps.

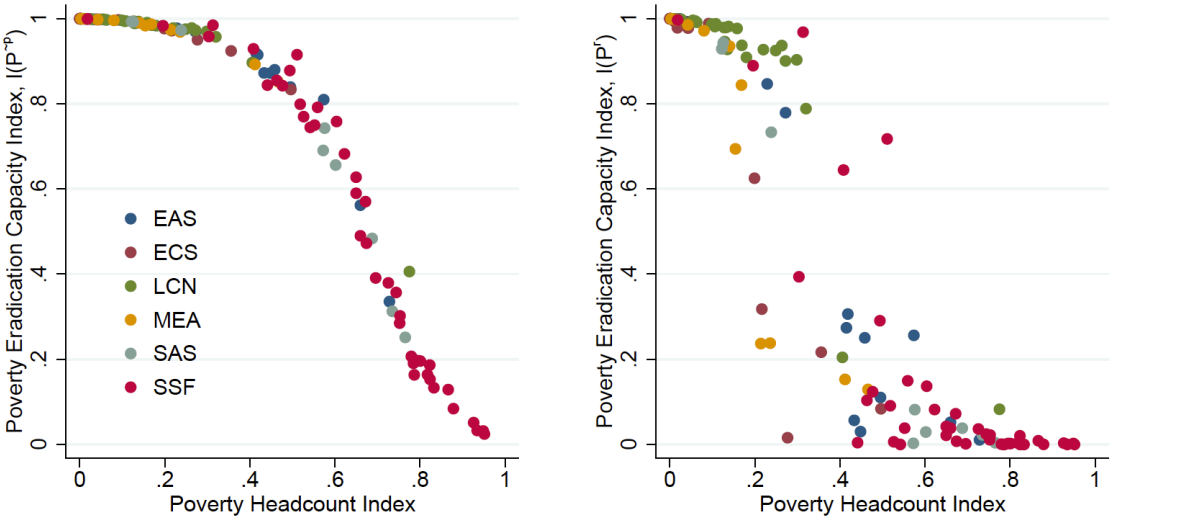


a. Tax Scenario 1 (all non-poor individuals are taxed) *b. Tax Scenario 2 (only rich individuals are taxed)*

Figure 4: A Comparison of Poverty Eradication Capacity Curves for Similar Levels of Poverty Incidence

(Example: Namibia 2004 and Senegal 2011)

Figure 5 shows the relationship between countries' Poverty Eradication Capacity Index and their incidence of poverty under both tax scenarios. Recall that the index equals zero when there is no capacity to eradicate any poverty by transferring resources from non-poor (or rich) individuals to poor individuals and it tends to one when poverty is solved with a marginal tax rate on responsible individuals which tends to zero. At the extreme, it is equal to one when poverty is zero.



a. Tax Scenario 1 (all non-poor individuals are taxed)

b. Tax Scenario 2 (only rich individuals are taxed)

Figure 5: Comparing the Poverty Eradication Capacity Index and the Poverty Headcount

In the case of Tax Scenario 1 (Figure 5, panel a), we see a clear non-linear negative relationship between the index and the poverty headcount. Our results show that for poverty levels lower than 30%, the index is very close to one, indicating that countries could easily collect enough resources to eradicate poverty by levying a small marginal tax rate on non-poor individuals. When poverty levels range from 40% to 60%, the relationship with the index appears convex. At higher poverty levels, the relationship begins to become more concave. Note that the tipping point at a poverty headcount of around 60% corresponds to an index value of approximately 0.5. Recall that countries with an index value below 0.5 are not able to fully eradicate poverty by taxing away the excess-poverty gaps of non-

poor individuals, and transfers would cover an ever-smaller share of the poverty gaps as the index approaches zero. Out of all the countries in the sample, 27 of them (approximately one-fifth) have an index value below 0.5 under the first tax scenario. Of these 27 countries, 22 of them are in Sub-Saharan Africa.

In the case of Tax Scenario 2 (Figure 5, panel b), the relationship between the index and the incidence of poverty is fuzzier. Our results show that for poverty levels higher than 30% (62 countries in our sample), only four countries (Cape Verde, Namibia, Nicaragua and South Africa) have an index value greater than 0.5 (respectively, 0.64, 0.72, 0.78 and 0.96) and thus would be able to fully eradicate poverty. This means that in the other 58 countries with poverty incidence over 30%, no marginal tax rate levied on the excess-affluence gaps of the rich would generate enough revenue to close all the poverty gaps. Out of the full sample of countries in the dataset (considering all levels of poverty incidence), this is the case for 62 countries (approximately one-half).

Figure 6 shows the relationship between the two different Poverty Eradication Capacity Indices obtained under the different tax scenarios. The index for Tax Scenario 1 (taxing all non-poor individuals) is plotted on the x-axis and the index for Tax Scenario 2 (taxing only the rich) is plotted on the y-axis. Given the sample of countries, it seems that countries with an index value ≥ 0.9 under Tax Scenario 1 also have an index value ≥ 0.2 under Tax Scenario 2. This would imply that those countries which would be able to eradicate almost all poverty by taxing all non-poor individuals would also be able to eradicate at least some poverty by taxing only the rich. Contrarily, countries with an index value ≤ 0.7 under Tax Scenario 1 have very low indices under Tax Scenario 2. This would suggest that among these countries, hardly any of them would be able to reduce the depth of poverty very much by taxing only the rich.

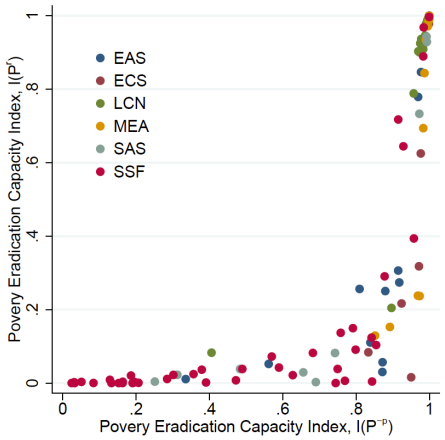


Figure 6: Poverty Eradication Capacity Indices: Tax Scenario 1 vs Tax Scenario 2

5.2 The politics

As previously described, even if a country has the arithmetic capacity to eradicate poverty using domestic resources, it may not be possible to implement redistributive policies because political power is concentrated in the hands of a few rich individuals whose interests conflict with those of the poor. Political Influence Concentration curves were also traced out for all countries in the dataset. Appendix 5 shows these curves for each country. The key finding that emerges is that there is vast heterogeneity between countries in terms of their arithmetic constraints and their political constraints for mobilizing domestic resources for poverty eradication.

This is the case even for those facing a similar incidence of poverty. For example, if we return to the case of Namibia and Senegal discussed above. As we showed, while the two countries have similar poverty rates, the optimal marginal tax rate on the non-poor is about 16% in Namibia and 50% in Senegal. From the point of view of the arithmetics of domestic resource mobilization, therefore, Namibia seems better off than Senegal since the tax effort on the non-poor is smaller. Nevertheless, as Figure 7 shows, the Political Influence Concentration Curve of Namibia always lies above that of Senegal: to counterweigh each rich individual in their own countries, poor individuals in Namibia

would need to coordinate larger coalitions than poor individuals in Senegal. Therefore, although mobilizing resources to eradicate poverty in Namibia is hypothetically "easier" than in Senegal (from a perspective of accounting), it is exactly the opposite when considering the political equilibrium of the two countries (from a perspective of political influence concentration). Of course, the actual political economy that would shape revenue collection and redistribution in each of these countries is far more nuanced than either of these metrics is able to show. This example merely serves as a means to illustrate the ways in which these indices can differ even in countries with similar poverty rates.

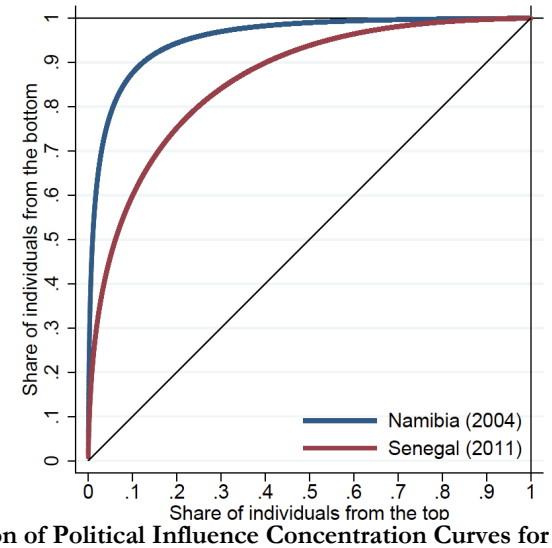


Figure 7: A Comparison of Political Influence Concentration Curves for Similar levels of Poverty (Example: Namibia 2004 and Senegal 2011)

Zooming out to the full sample of countries, there is no clear relationship between countries' political influence concentration index and their poverty headcount (Figure 8). The concentration of political influence may be very high or very low for each level of poverty. Nevertheless, we do see some regional patterns emerge. Almost all countries in Europe and Central Asia (ECS in the figure) and Middle East and North Africa (MEA in the figure) are found in the Southwest quadrant. This quadrant reflects those countries where both poverty levels and the concentration of political influence are relatively low with respect to their averages (represented, respectively, by the vertical line at about 0.35 and the horizontal line right above 0.7). In contrast, the majority of countries in Sub-Saharan Africa (SSF in

the figure) are mostly positioned in the Northeast quadrant, reflecting higher than average levels of both poverty incidence and concentration of political influence. Furthermore, almost all countries in Latin America and the Caribbean (LCN in the figure) are in the Northwest quadrant, reflecting lower than average poverty rates, but higher than average concentrations of political influence. It is also worth noting that although theory defines the lower bound for the index of political influence concentration to be zero when the political power is equally shared among all individuals in society, the data show that almost all countries have an index value higher than 0.5 (the only two exceptions are the Czech Republic with an index value of 0.498 and Ukraine with an index value of 0.493).

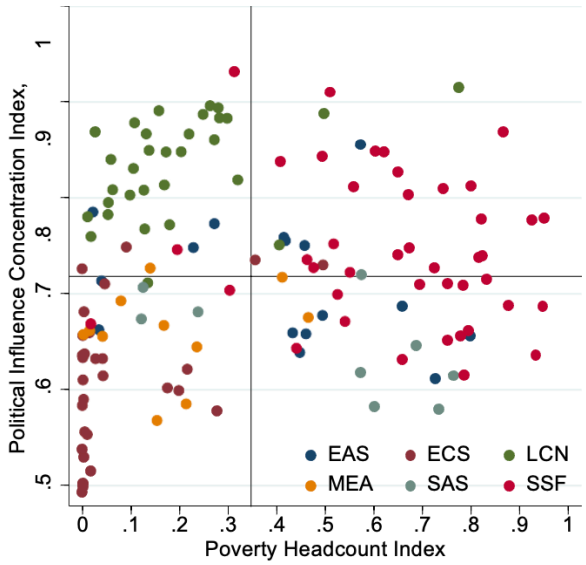
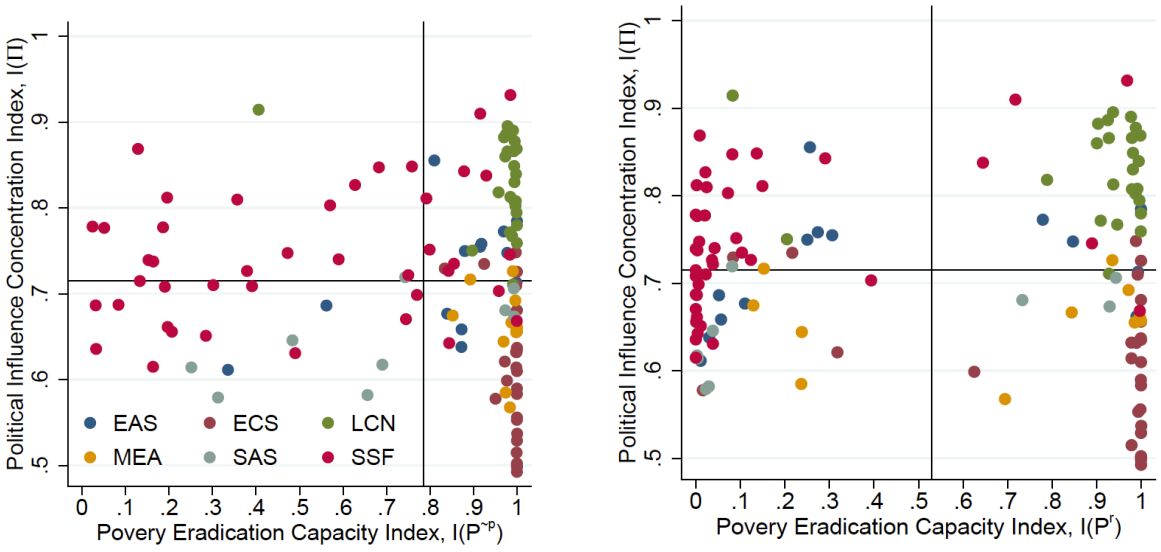


Figure 8: Comparing the Political Influence Concentration Index and the Poverty Headcount

5.3 Linking arithmetics with politics

Figure 9 brings together the indices of poverty eradication capacity and political influence concentration to show the relationship between the arithmetics of DRM and the politics of DRM. Panel a shows the relationship under Tax Scenario 1 and panel b shows the relationship under Tax Scenario 2. The vertical dispersion of data points in both panels shows clearly that even for the same levels of poverty eradiation capacity, countries have face very different degrees of political influence concentration. The vertical and horizontal lines correspond to the average value of the indices among

the sample countries, dividing the space into four quadrants. The Western quadrants thus contain the set of countries where there is a lower-than-average capacity to mobilize resources for poverty eradication (those less able reduce poverty through taxation) and the Northern quadrants contain the set of countries with a higher-than-average concentration of political influence (those more likely to face strong policy opposition). Among those countries in the Northwest quadrant (those facing both a lower capacity to mobilize resources and higher political constraints), the vast majority are in Sub-Saharan Africa under both tax scenarios.



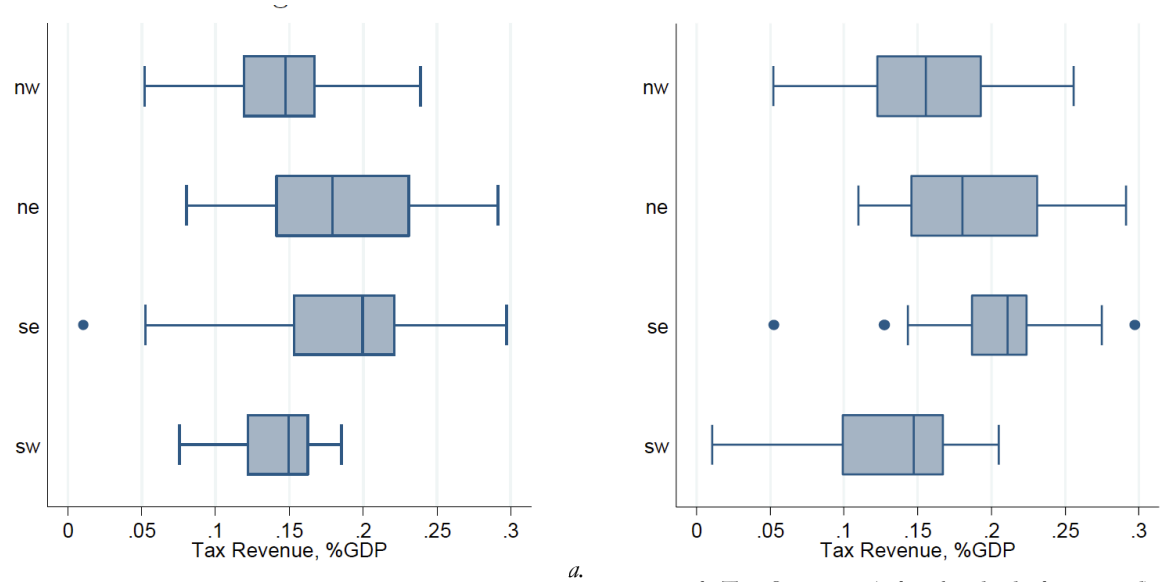
a. Tax Scenario 1 (all non-poor individuals are taxed)

b. Tax Scenario 2 (only rich individuals are taxed)

Figure 9: Bringing together the Poverty Eradication Capacity Index and the Political Influence Concentration Index

Among those countries in the Eastern most area of the plot (those with a poverty eradication capacity close to one, where a small transfer from the non-poor or the rich would be enough to fully eradicate poverty) we would expect those in the Northeast quadrant to have more difficulties in actually mobilizing resources than those in the Southeast quadrant, due to the higher concentration of political influence. This should be even more striking when, under Tax Scenario 2, only the rich are responsible for eradicating poverty since the optimal marginal tax rate would be higher and would likely foment

stronger opposition. When we check the actual fiscal effort of countries in our sample, we indeed find an association between the concentration of political influence and tax revenue as a share of GDP. Figure 10 shows tax revenue (as a share of GDP) for the countries in our sample, which we group according to the quadrant they belong to in Figure 9. The figures show that countries with a higher poverty eradication capacity index (Northeast and Southeast quadrants) are also those where tax revenue tends to comprise a larger share of GDP. Moreover, among these countries, those with a lower concentration of political influence (Southeast quadrant), tend to actually collect more taxes than countries with a higher concentration of political power (Northeast quadrant). This difference is even larger under Tax Scenario 2 (Figure 10, panel b), in which only the rich would be responsible for the transfer of resources to the poor.



a. Tax Scenario 1 (all non-poor individuals are taxed)

b. Tax Scenario 2 (only rich individuals are taxed)

Figure 10: Comparing the Arithmetics and Politics of DRM with Observed Fiscal Effort

Note: NW, NE, SE, SW refer to the quadrants defined above in Figure 9 based on whether a country's index of political influence concentration and their index of poverty eradication capacity is above or below the sample average. As such NW reflects high political concentration/ low poverty eradication capacity; NE reflects high political concentration/ high poverty eradication capacity; SE reflects low political concentration/ high poverty eradication capacity; and SW reflects low political concentration/ low poverty eradication capacity. The figure shows a box and whiskers plot. The box ranges from the 25th percentile to the 75th percentile. The line in the middle of the box shows the median. The two lines on either side of the box extend to minimum and maximum values, excluding outliers. The dots indicate outliers.

6. Conclusion

Using two newly proposed metrics, this paper explored the arithmetics and politics of DRM in over 120 developing countries. The results showed that around 1 in 5 developing countries still face binding arithmetic constraints in terms of their potential capacity to eradicate poverty through redistribution from the non-poor to the poor. When redistribution is only from the rich to the poor—as many as 1 in 2 developing countries still face such constraints. We also see that even among those countries with the resources to feasibly eradicate poverty, there is vast heterogeneity in terms of political constraints. Among the countries that face both high arithmetic constraints and high political constraints to eradicating poverty through domestic resource mobilization, the majority are in Sub-Saharan Africa. When comparing these results with actual observed fiscal effort, we see that those countries with lower arithmetic and political constraints tend to also be those that collect more taxes. These results suggest that domestic resource mobilization very much remains an issue of resource scarcity in many developing countries. However, even when resource constraints are solved, effectively mobilizing resources for poverty reduction implies overcoming the difficult challenge arising from the concentration of resources among powerful groups and their ability to influence policy decisions.

While the exercises in this paper focused solely on the goal of poverty reduction (solved through the hypothetical exercise of redistribution), DRM is of course relevant for a broad range of development goals—and depending on the development goal in mind, the types of constraints explored here may be more or less binding for a country. Moreover, it is important to explicitly acknowledge that while the exercise in the paper used the hypothetical policy tool of redistributive monetary transfers as the means to close poverty gaps in order to conduct its accounting exercises—of course, any real-world policy to sustainably eradicate poverty would require a much more nuanced and multidimensional approach tailored to the country-context. Also, the normative decision determining which groups

should be responsible for providing the resources to be transferred (i.e. all non-poor individuals or only the rich) would similarly depend on local beliefs of what is viewed as fair and the political process for reaching agreements. Finally, there are of course many historical factors beyond the concentration of political power in the hands of the rich that would matter for shaping the political economy in a given country. Country-specific studies looking at the micro-politics of resource-bargaining over taxation can provide a much more detailed narrative on these types of issues (see for example, Hassan and Prichard's (2016) explanation of the political economy of tax reform in Bangladesh). Accordingly, the exercises presented in this paper are not meant to tell the story of any one country, but rather to offer a broader cross-country view of the way in which these specific constraints and combinations of constraints may potentially be holding countries back.

So, if the answer is that it is *not* feasible for some countries to rely solely on DRM for financing development given their current arithmetic and/or political constraints—this begs the question of how to improve the financing relationship between countries and foreign donors. If countries need to rely on foreign development assistance in the short-term to fill existing financing gaps, it is essential that this revenue is channeled in such a way that it does not undermine countries' future ability to overcome these constraints. Arguably, this financing should be provided in a way that actually expands the future national tax base and reduces the future concentration of political influence. In this way, such revenue would not only serve as a temporary means of financing for development but also as an investment in promoting positive development-governance dynamics in the long-term. This could be a way to combat what some have referred to as the "curse of aid" (Djankov et al., 2008)—a parallel to the "natural resource curse" in which aid flows are seen to hinder sustainable development progress through disincentivizing DRM and its associated processes of state-building.

Thus, while complementary sources of development financing may be necessary in the short-term given existing arithmetic and political constraints, donors and country governments should carefully consider long-term effects when designing these financing arrangements. In 1963, Nicholas Kaldor argued that "foreign aid is likely to be fruitful only when it is a complement to domestic effort, not when it is treated as a substitute for it" (Kaldor, 1963, p. 410). This paper would add that it is likely to be fruitful only when it is a complement to current domestic effort *and a catalyst for future domestic effort*, in the sense of working to reduce the existing arithmetic and political constraints that make countries dependent on aid in the first place.

Endnotes

[1] We acknowledge that while there are many other potential sources of taxation, potential development targets on which to allocate revenues, and potential constraints to effectively doing these – this paper limits its focus specifically to personal income taxation, the goal of poverty eradiation, and the arithmetic & political constraints involved. In narrowing its focus in this way, this paper seeks to answer a very specific question through the development of the two new analytical tools it proposes. In this way, it hopes to contribute in its own way to a much broader theoretical and empirical literature on domestic resource mobilization for development.

[2] The assumption of no growth is justified because the paper does not look at efficiency implications of taxation, which is not necessary for our argument.

[3] Ceriani and Verme (2014) refer to the first approach as the *Proportional Income Lever* and the second as the *Progressive Income Lever*. Ravallion (2010a) refers to the first approach as the *marginal tax rate on incomes above the poverty* line and to the second as the *marginal tax rate on the rich*.

[4] The tool is accessible online, where the user selects the country, the year for the analysis (among the available years for each country) and a poverty line. PovcalNet then returns the headcount index for the selected poverty line.

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Appendix 1. Technical description of the empirical approach

Consider a population N made of $i = 1, 2, \ldots, n$ individuals, $n \in \mathbb{N}$. Each individual is endowed with a level of welfare $y_i \in \mathbb{R}_+$, which is the monetary value according to which poverty is measured (it can either be income or consumption according to the prevailing methodology in the country). Without loss of generality, let us assume that incomes are ordered, such that $y_1 \leq y_2 \leq y_3 \leq \ldots y_n$. Population N can be divided into two subgroups: poor and non-poor individuals. The set of poor individuals in the population Q^p is defined as the set of individuals whose welfare level is smaller than the poverty line z: $Q^p = \{i : y_i < z\}$. The set of non-poor individuals in the population, $Q^{\sim p}$ is defined as the set of individuals whose welfare is greater or equal to the poverty line: $Q^{\sim p} = \{i : y_i \geq z\}$. Non-poor individuals, in turn, may belong to two distinct welfare groups: the middle class and the rich, defined as follows. The set of middle-class individuals, Q^m is defined as the set of non-poor individuals whose welfare level is below the affluence line z^r : $Q^m = \{i : z \leq y_i < z\}$. Finally, the set of rich individuals, Q^r is the set of those non-poor individuals whose welfare is above the affluence line: Q^r: $\{i : y_i \geq z^r\}$. Summarizing: $N = Q^p \cup Q^{\sim p} = Q^p \cup Q^m \cup Q^r$. The poverty line z and the affluence line z^r are considered as given.

Defining the Poverty Eradication Capacity Curve and Index

The poverty eradication policy is defined by a marginal tax rate $\tau \in [0, 1]$ and by the normative statement on whether the middle class should be accountable or not for redistribution. In the first case, under Tax Scenario 1, the marginal tax rate will be levied on the sum of the welfare levels in excess of the poverty line, $G^{\sim p}$, defined as $G^{\sim p} = \sum_{i \in Q^{\sim p}} (y_i - z)$. In the second case, under the Tax Scenario 2, the marginal tax rate will be levied on the sum of the welfare levels in excess of the affluence line, G^r, defined as $G^r = \sum_{i \in Q^r} (y_i - z^r)$. The set (τ, G^δ) defines therefore the poverty eradication policy and the total transfer amount T^δ: T^δ (τ, G^δ), where $\delta = \sim p$ under Tax Scenario 1 and $\delta = r$ under Tax Scenario 2. By construction, for a given marginal tax rate $\tau, T^{\sim p} \geq T^r$, since the tax base Q^r is a subset of $Q^{\sim p}$.

The *optimal* poverty eradication policy, $(\hat{\tau}, G^\delta)$, is defined by the marginal tax rate $\hat{\tau}$ such that, according to the redistribution rule followed by the policy maker ($\delta = \sim$p or $\delta = r$), the total transfer equals the sum of the poverty gaps of all poor individuals (G^p): $\hat{\tau} G^\delta = G^p$, where $G^p = \sum_{i \in Q^p} (z - y_i)$ and $\delta = (\sim p, r)$. More generally, each marginal tax rate τ , given the tax scenario, corresponds to a transfer level T^δ which is some share of the sum of the poverty gaps in the society. This information can be summarized in a *Poverty Eradication Capacity Curve*, defined as follows.

Definition A1.1 Poverty Eradication Capacity Curve. *The Poverty Eradication Capacity Curve*, P^δ: $[0,1] \rightarrow [0,1]$, *plots the share of poverty gap the country is able to compensate,* $\min\left\{1, \frac{T^\delta}{G^p}\right\}$, *for each level of the marginal tax rate* τ, *given the tax scenario* $\delta = (\sim p, r)$ *elected by the society.*

We can summarize the information of the Poverty Eradication Capacity Curve in a single index, the *Poverty Eradication Capacity Index*, defined below in equation (1).

Definition A1.2 Poverty Eradication Capacity Index. *For each* $\delta \in \sim p, r$:

$$I(P^{\delta}) = \int_0^1 P^{\delta}(x)\,dx \tag{1}$$

The index will tend to one when the sum of poverty gaps in the country is zero (indicating maximum poverty eradication capacity) and will equal zero when the sum of excess poverty (or affluence) gaps is zero (indicating minimum poverty eradication capacity)

Defining the Political Influence Concentration Curve and Index

Let us define $Q(q^u)$ as the set of individuals belonging to the upper q-th quantile of more affluent individuals in the society, and $Q(q^b)$ as the set of individuals belonging to the bottom q-th quantile of poorer individuals in the society, where $q^u, q^b \in [0,1]$. Moreover, let $Y(q^u)$ be the sum of incomes belonging to the top q-th quantile of more affluent individuals in the society:

$$Y(q^u) = \sum_{i \in Q(q^u)} y_i \tag{2}$$

Symmetrically, let $Y(q^b)$ be the sum of incomes belonging to the q-th quantile of poorer individuals in the society:

$$Y(q^b) = \sum_{i \in Q(q^b)} y_i \tag{3}$$

For each rich individual at the top, the coalition of individuals at the bottom needs to be at least large enough for the sum of poor individuals' incomes to equalize the income of the rich individual. Therefore, we approximate the concentration of political influence in the society as defined in the following *Political Influence Concentration Curve.*

Definition A1.3 Political Influence Concentration Curve. *The Political Influence Concentration Curve,* $\Pi : [0,1] \rightarrow [0,1]$*, plots the share of individuals at the bottom of the distribution needed to equalize the income levels of each* q^u *quantile of individuals at the top of the welfare distribution in the society, with* $q^u = [0,1]$.

In other words, for each share of individuals at the top of the distribution ($q^u \in [0,1]$), with sum of incomes $Y(q^u)$, Π plots the share of population from the bottom (q^b) such that $Y(q^b) = Y(q^u)$. Note that, although the definition is similar to the Lorenz curve, using our notation, the Lorenz curve plots instead for each $q^b \in (0,1]$, the corresponding $Y(q^b)$ as a share of $Y(1)$. We can summarize the information embedded in Π in a single index, the *Political Influence Concentration Index,* as defined in equation (4).

Definition A1.4 Political Influence Concentration Index.

$$I(\Pi) = \left(2\int_0^1 \Pi(x)\,dx\right) - 1 \tag{4}$$

Appendix 2. Summary of validation exercise comparing results using PovcalNet data with those using the original underlying microdata

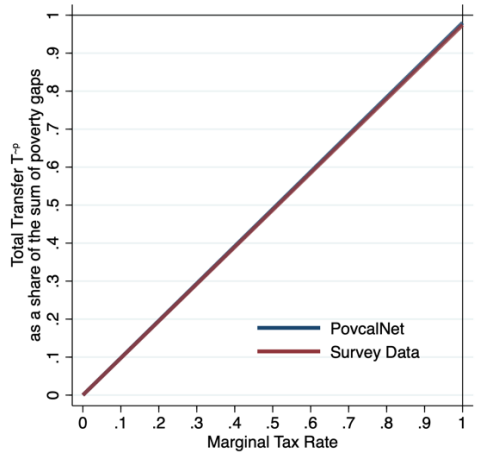
Table A2.1 List of Country Index Values and Corresponding Survey Years

Country	Survey year	Data Source	Poverty Headcount Index P0	Poverty Eradication Capacity Index, Tax Scenario 1 $I(P^{\sim p})$	Poverty Eradication Capacity Index, Tax Scenario 2 $I(P^{r})$	Political Influence Concentration Index $I(\Pi)$
Ethiopia	2011	PovcalNet	0.66	0.49	0.04	0.63
		Survey Data	0.67	0.49	0.06	0.61
Nigeria	2011	PovcalNet	0.78	0.19	0.00	0.71
		Survey Data	0.76	0.23	0.00	0.75
Peru	2010	PovcalNet	0.13	0.99	0.98	0.81
		Survey Data	0.13	0.99	0.93	0.71
South Africa	2009	PovcalNet	0.31	0.98	0.97	0.93
		Survey Data	0.29	0.99	0.97	0.91

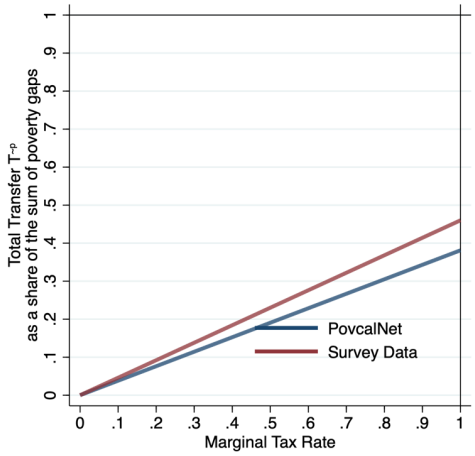
Source: Authors' elaboration on data from Dykstra et al. (2014a); ERSS 2011-2012 (Ethiopia); GHSP Panel 2010-2011 (Nigeria); ENAHO 2010 (Peru); GHS 2009 South Africa.

Figure A2.1 Poverty Eradication Capacity Curves, Tax Scenario 1

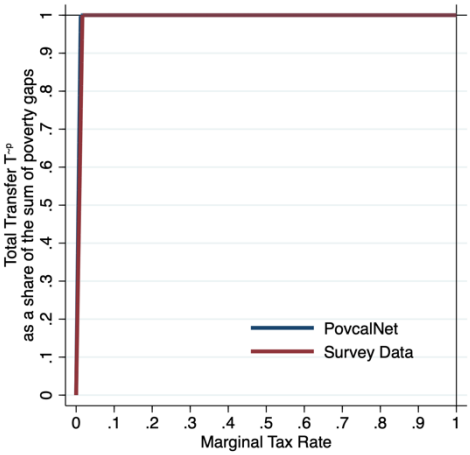
a. Ethiopia (2011)



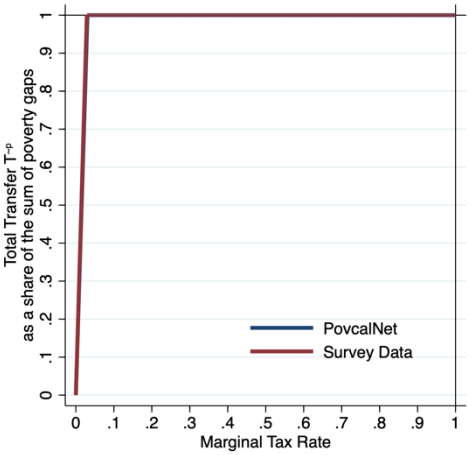
b. Nigeria (2011)



c. Peru (2010)



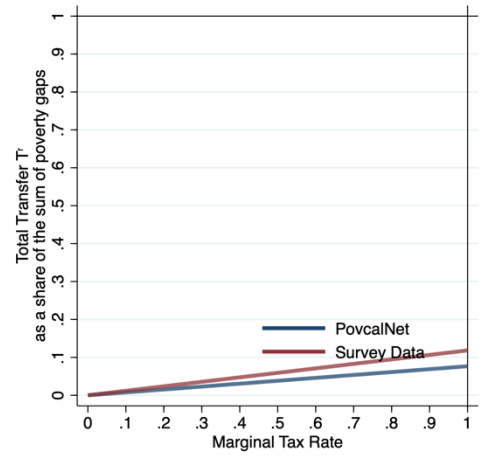
d. South Africa (2009)



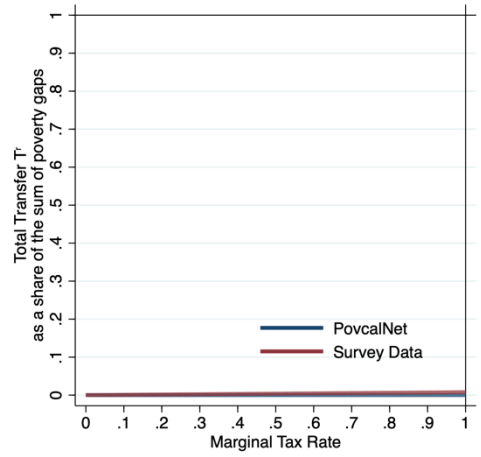
Source: Authors' elaboration on data from Dykstra et al. (2014a); ERSS 2011-2012 (Ethiopia); GHSP Panel 2010-2011 (Nigeria); ENAHO 2010 (Peru); GHS 2009 South Africa.

Figure A2.2 Poverty Eradication Capacity Curves, Tax Scenario 2

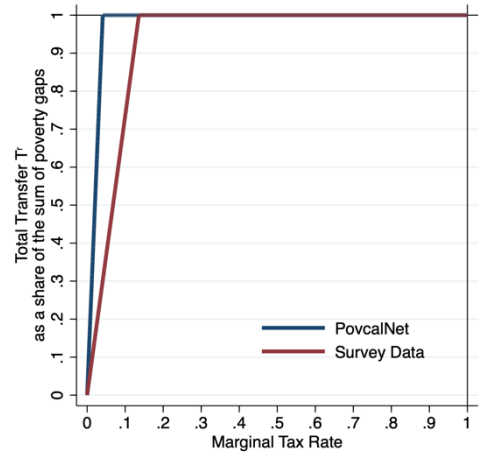
a. Ethiopia (2011)



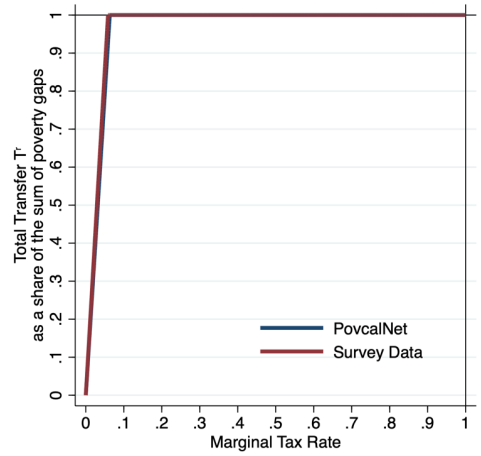
b. Nigeria (2011)



c. Peru (2010)



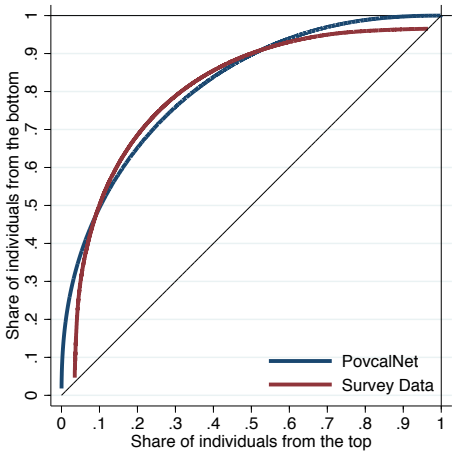
d. South Africa (2009)



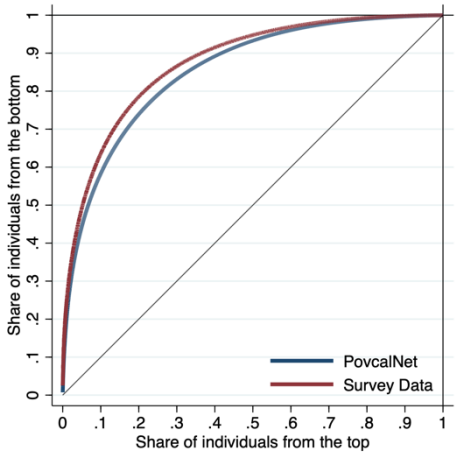
Source: Authors' elaboration on data from Dykstra et al. (2014a); ERSS 2011-2012 (Ethiopia); GHSP Panel 2010-2011 (Nigeria); ENAHO 2010 (Peru); GHS 2009 South Africa.

Figure A2.2 Political Influence Concentration Curves

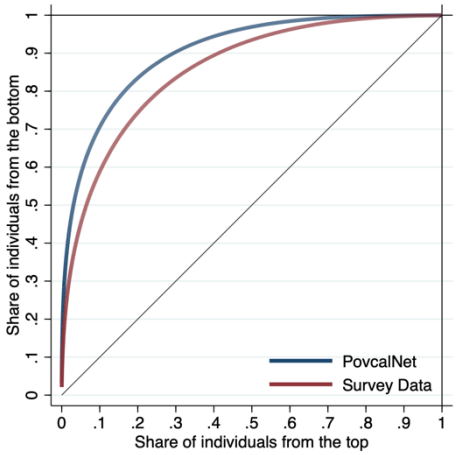
a. Ethiopia (2011)



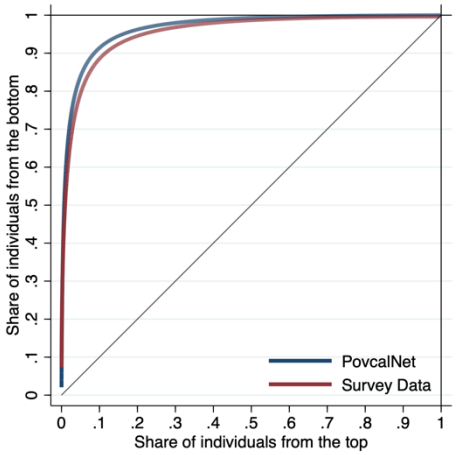
b. Nigeria (2011)



c. Peru (2010)



d. South Africa (2009)



Source: Authors' elaboration on data from Dykstra et al. (2014a); ERSS 2011-2012 (Ethiopia); GHSP Panel 2010-2011 (Nigeria); ENAHO 2010 (Peru); GHS 2009 South Africa.

Appendix 3.

Table A3.1 List of Country Index Values and Corresponding Survey Years

Country	Survey year	Poverty Headcount Index P0	Poverty Eradication Capacity Index, Tax Scenario 1 $I(P^{\sim p})$	Poverty Eradication Capacity Index, Tax Scenario 2 $I(P^{r})$	Political Influence Concentration Index $I(\Pi)$
Albania	2008	0.04	1.00	0.98	0.63
Algeria	1995	0.24	0.97	0.24	0.64
Angola	2009	0.67	0.47	0.01	0.75
Argentina–Urban	2010	0.02	1.00	1.00	0.76
Armenia	2010	0.20	0.98	0.63	0.60
Azerbaijan	2008	0.03	1.00	0.99	0.63
Bangladesh	2010	0.77	0.25	0.00	0.61
Belarus	2011	0.00	1.00	1.00	0.50
Belize	1999	0.22	0.98	0.93	0.87
Benin	2003	0.75	0.30	0.02	0.71
Bhutan	2012	0.13	0.99	0.94	0.71
Bolivia	2008	0.25	0.98	0.92	0.89
Bosnia and Herzegovina	2007	0.00	1.00	1.00	0.66
Botswana	1994	0.49	0.88	0.29	0.84
Brazil	2009	0.11	0.99	0.99	0.88
Bulgaria	2007	0.00	1.00	1.00	0.53
Burkina Faso	2009	0.73	0.38	0.04	0.73
Burundi	2006	0.93	0.03	0.00	0.64
Cambodia	2009	0.50	0.84	0.11	0.68
Cameroon	2007	0.30	0.96	0.39	0.70
Cape Verde	2002	0.41	0.93	0.64	0.84
Central African Republic	2008	0.80	0.20	0.00	0.81
Chad	2003	0.83	0.13	0.00	0.71
Chile	2009	0.03	1.00	1.00	0.87
China	2009	0.27	0.97	0.78	0.77
China–Rural	2009	0.46	0.88	0.25	0.75
China–Urban	2009	0.03	1.00	0.99	0.66
Colombia	2010	0.16	0.99	0.98	0.89
Comoros	2004	0.65	0.63	0.02	0.83
Congo, Dem. Rep	2006	0.95	0.02	0.00	0.78
Congo, Rep	2005	0.74	0.36	0.02	0.81
Costa Rica	2009	0.06	1.00	0.99	0.84
Croatia	2008	0.00	1.00	1.00	0.64
Czech Republic	1996	0.00	1.00	1.00	0.50
Cote d'Ivoire	2008	0.46	0.85	0.10	0.73
Djibouti	2002	0.41	0.89	0.15	0.72
Dominican Republic	2010	0.10	1.00	0.99	0.80
Ecuador	2010	0.11	0.99	0.98	0.83
Egypt, Arab Rep	2008	0.15	0.98	0.69	0.57
El Salvador	2009	0.17	0.98	0.94	0.81
Estonia	2004	0.02	1.00	1.00	0.66
Ethiopia	2011	0.66	0.49	0.04	0.63
Fiji	2009	0.23	0.98	0.85	0.75
Gabon	2005	0.20	0.98	0.89	0.75
Gambia, The	2003	0.56	0.79	0.15	0.81
Georgia	2010	0.36	0.92	0.22	0.73
Ghana	2006	0.52	0.80	0.09	0.75
Guatemala	2006	0.26	0.98	0.94	0.90
Guinea	2007	0.70	0.39	0.00	0.71
Guinea-Bissau	2002	0.78	0.21	0.00	0.66

Guyana	1998	0.18	0.98	0.91	0.77
Haiti	2001	0.78	0.41	0.08	0.91
Honduras	2009	0.30	0.97	0.90	0.88
Hungary	2007	0.00	1.00	1.00	0.59
India	2010	0.69	0.48	0.04	0.65
India–Rural	2010	0.74	0.31	0.02	0.58
India–Urban	2010	0.58	0.74	0.08	0.72
Indonesia–Rural	2011	0.45	0.87	0.03	0.64
Indonesia–Urban	2011	0.42	0.91	0.31	0.75
Iran, Islamic Rep	2005	0.08	1.00	0.97	0.69
Iraq	2007	0.21	0.97	0.24	0.58
Jamaica	2004	0.05	1.00	1.00	0.79
Jordan	2010	0.02	1.00	1.00	0.66
Kazakhstan	2009	0.01	1.00	0.99	0.55
Kenya	2005	0.67	0.57	0.07	0.80
Kyrgyz Republic	2011	0.22	0.97	0.32	0.62
Lao PDR	2008	0.66	0.56	0.05	0.69
Latvia	2009	0.01	1.00	1.00	0.64
Lesotho	2003	0.62	0.68	0.08	0.85
Liberia	2007	0.95	0.03	0.00	0.69
Lithuania	2008	0.00	1.00	1.00	0.68
Macedonia, FYR	2010	0.09	1.00	0.99	0.75
Madagascar	2010	0.93	0.05	0.00	0.78
Malawi	2010	0.82	0.19	0.02	0.78
Malaysia	2009	0.02	1.00	1.00	0.78
Maldives	2004	0.12	0.99	0.93	0.67
Mali	2010	0.79	0.16	0.00	0.61
Mauritania	2008	0.48	0.84	0.12	0.73
Mexico	2010	0.06	1.00	0.99	0.81
Moldova, Rep	2010	0.04	1.00	0.98	0.61
Montenegro	2010	0.00	1.00	1.00	0.54
Morocco	2007	0.14	0.99	0.94	0.73
Mozambique	2008	0.82	0.16	0.00	0.74
Namibia	2004	0.51	0.92	0.72	0.91
Nepal	2010	0.57	0.69	0.00	0.62
Nicaragua	2005	0.32	0.96	0.79	0.82
Niger	2008	0.75	0.28	0.01	0.65
Nigeria	2011	0.78	0.19	0.00	0.71
Pakistan	2008	0.60	0.66	0.03	0.58
Panama	2010	0.14	0.99	0.98	0.85
Papua New Guinea	1996	0.57	0.81	0.26	0.86
Paraguay	2010	0.13	0.99	0.98	0.87
Peru	2010	0.13	0.99	0.98	0.81
Philippines	2009	0.42	0.92	0.27	0.76
Poland	2011	0.00	1.00	1.00	0.61
Romania	2011	0.02	1.00	0.98	0.51
Russian Federation	2009	0.00	1.00	1.00	0.73
Rwanda	2011	0.82	0.15	0.00	0.74
Senegal	2011	0.55	0.75	0.04	0.72
Serbia	2010	0.01	1.00	1.00	0.56
Seychelles	2007	0.02	1.00	1.00	0.67
Sierra Leone	2011	0.80	0.20	0.00	0.66
Slovak Republic	2009	0.00	1.00	1.00	0.50
Slovenia	2004	0.00	1.00	1.00	0.58
South Africa	2009	0.31	0.98	0.97	0.93
Sri Lanka	2010	0.24	0.97	0.73	0.68
St. Lucia	1995	0.41	0.90	0.20	0.75
Sudan	2009	0.44	0.84	0.00	0.64
Suriname	1999	0.27	0.97	0.90	0.86

Swaziland	2010	0.60	0.76	0.14	0.85
Syrian Arab Republic	2004	0.17	0.99	0.84	0.67
São Tomé and Príncipe	2001	0.54	0.74	0.00	0.67
Tajikistan	2009	0.28	0.95	0.02	0.58
Tanzania	2007	0.88	0.08	0.00	0.69
Thailand	2010	0.04	1.00	0.99	0.71
Timor-Leste	2007	0.73	0.34	0.01	0.61
Togo	2011	0.53	0.77	0.01	0.70
Trinidad and Tobago	1992	0.14	0.99	0.93	0.71
Tunisia	2010	0.04	1.00	0.99	0.66
Turkey	2010	0.05	1.00	0.99	0.71
Turkmenistan	1998	0.50	0.83	0.08	0.73
Uganda	2009	0.65	0.59	0.04	0.74
Ukraine	2010	0.00	1.00	1.00	0.49
Uruguay	2010	0.01	1.00	1.00	0.78
Venezuela, RB	2006	0.13	0.99	0.95	0.77
Vietnam	2008	0.43	0.87	0.06	0.66
West Bank and Gaza	2009	0.00	1.00	1.00	0.66
Yemen, Rep	2005	0.47	0.85	0.13	0.67
Zambia	2010	0.87	0.13	0.01	0.87

Source: Authors' elaboration using data from Dykstra et al. (2014a).

Appendix 4.

Figure A4.1 Poverty Eradication Capacity Curves, All Countries (Tax Scenario 1 is shown in blue and Tax Scenario 2 in red)

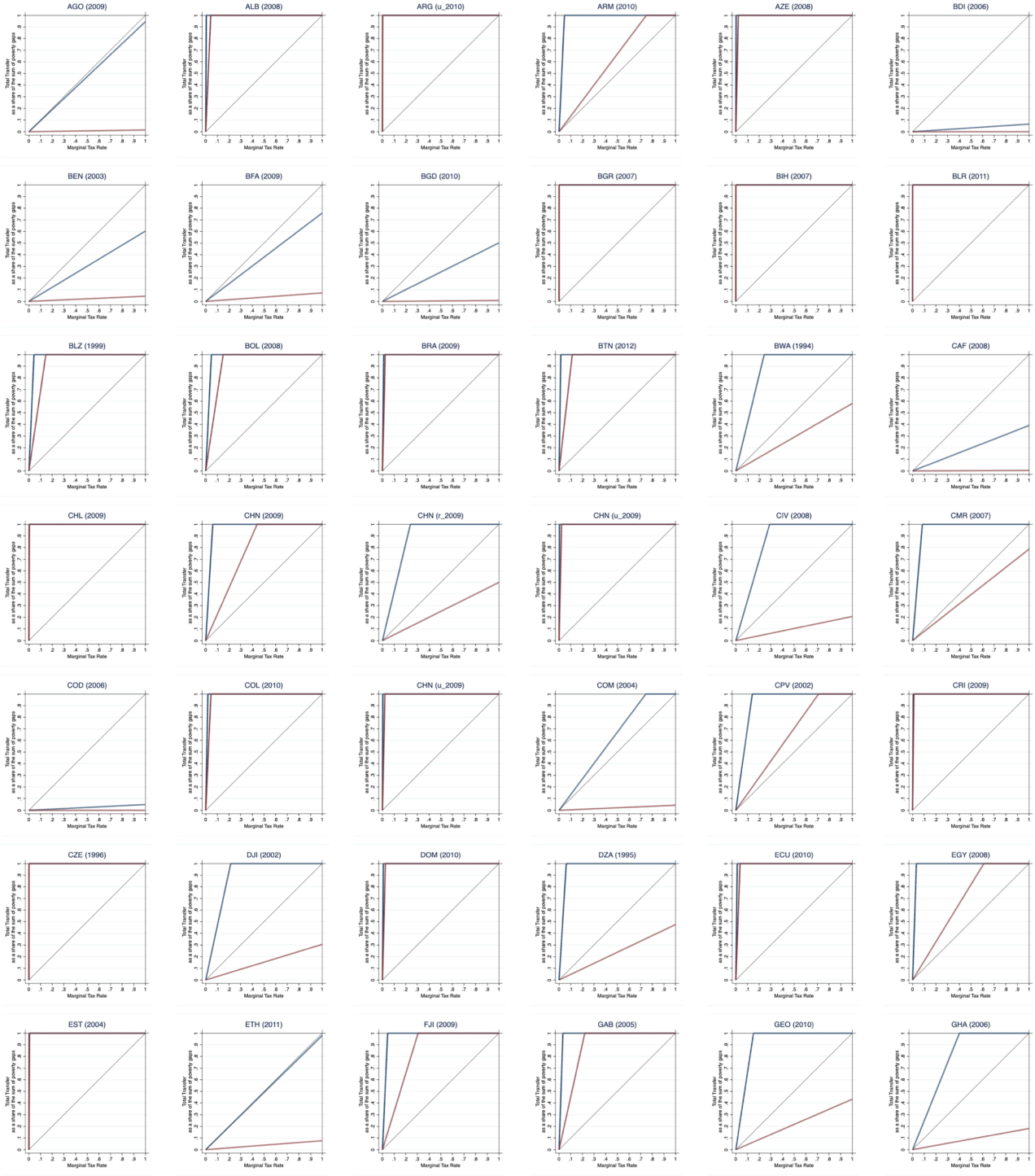


Figure A4.1 (cont.) Poverty Eradication Capacity Curves, All Countries (Tax Scenario 1 is shown in blue and Tax Scenario 2 in red)

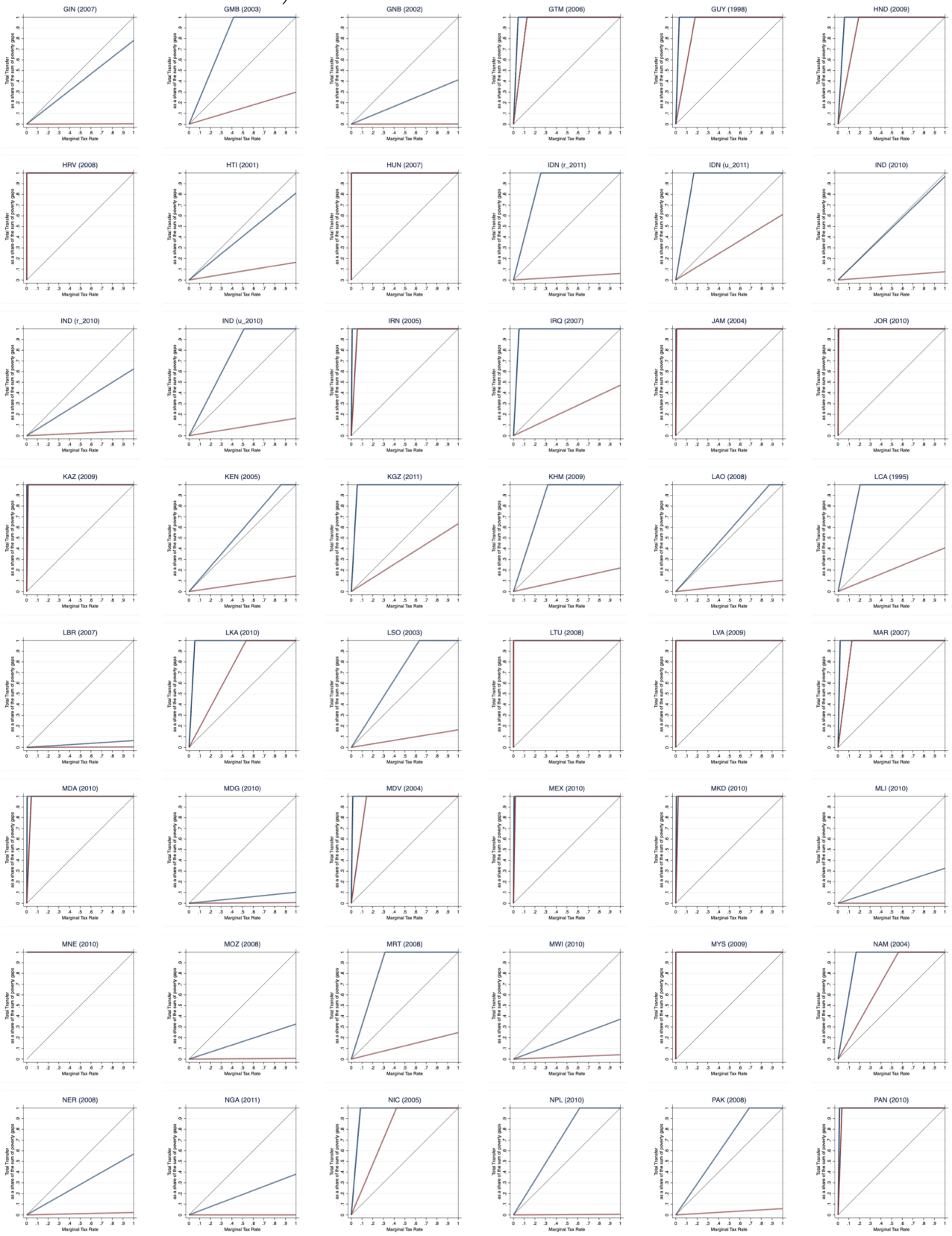
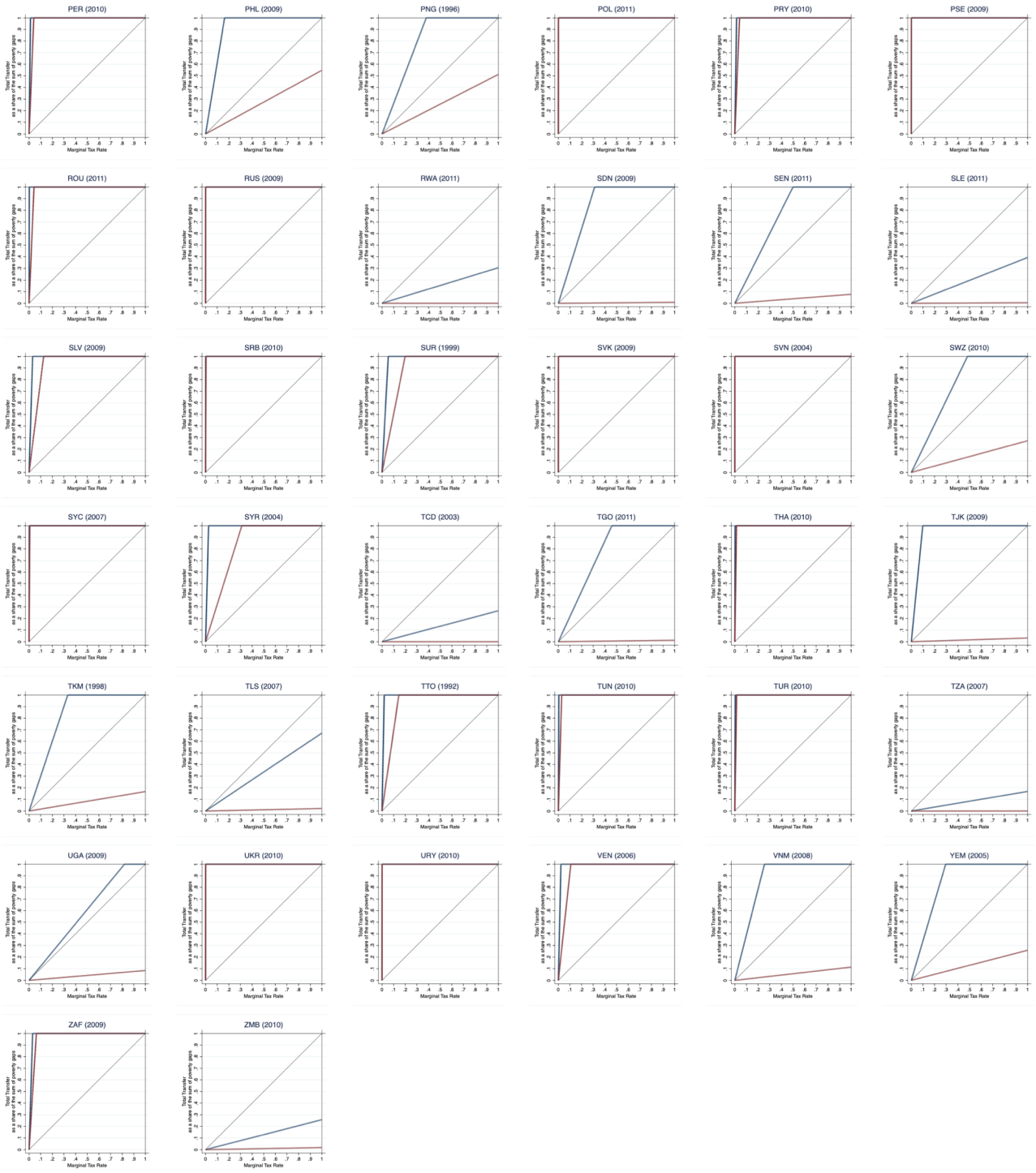


Figure A4.1 (cont.) Poverty Eradication Capacity Curves, All Countries (Tax Scenario 1 is shown in blue and Tax Scenario 2 in red)



Appendix 5.

Table A5.1 Political Influence Concentration Curves, All Countries

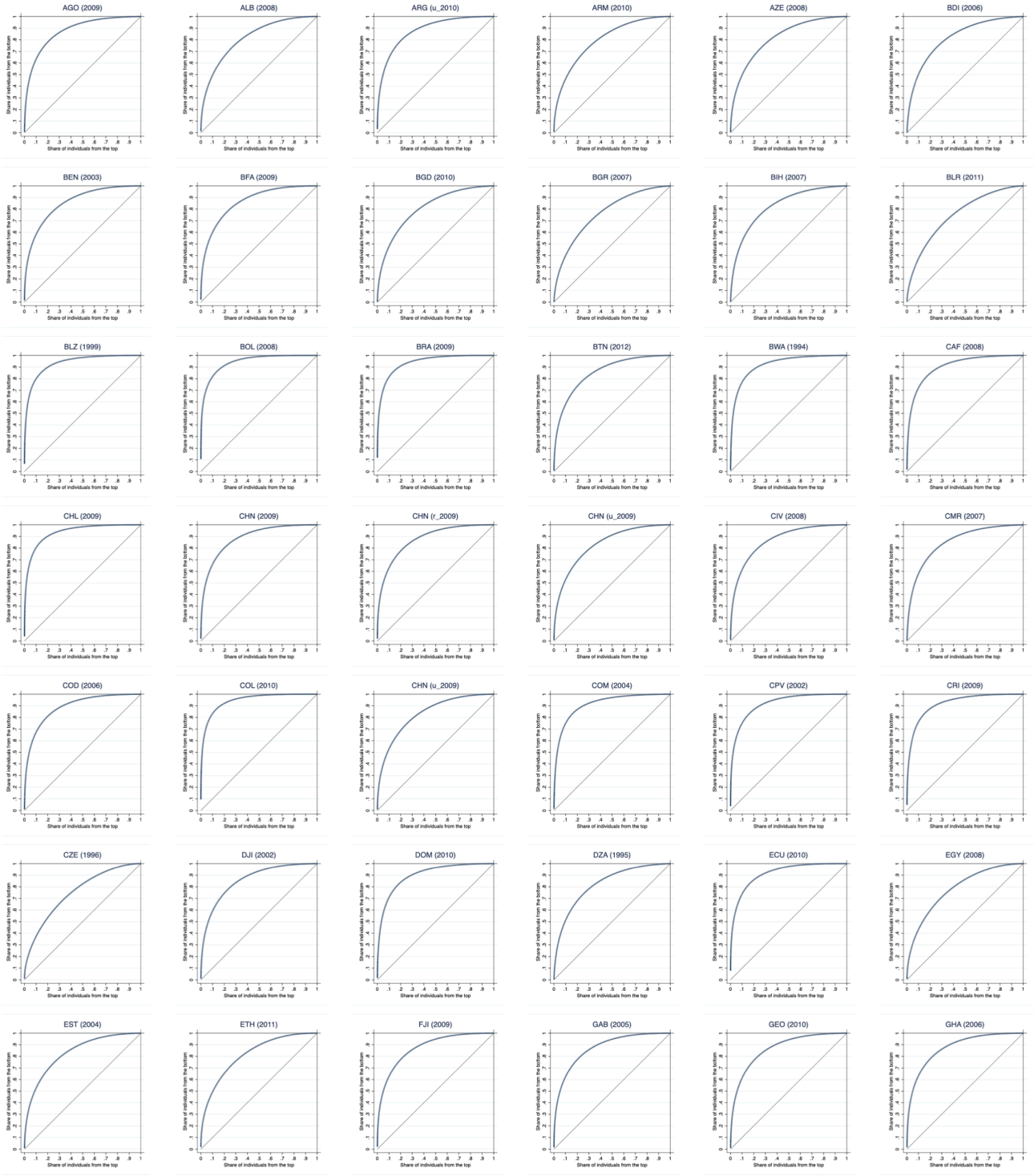


Table A5.1 (cont.) Political Influence Concentration Curves, All Countries

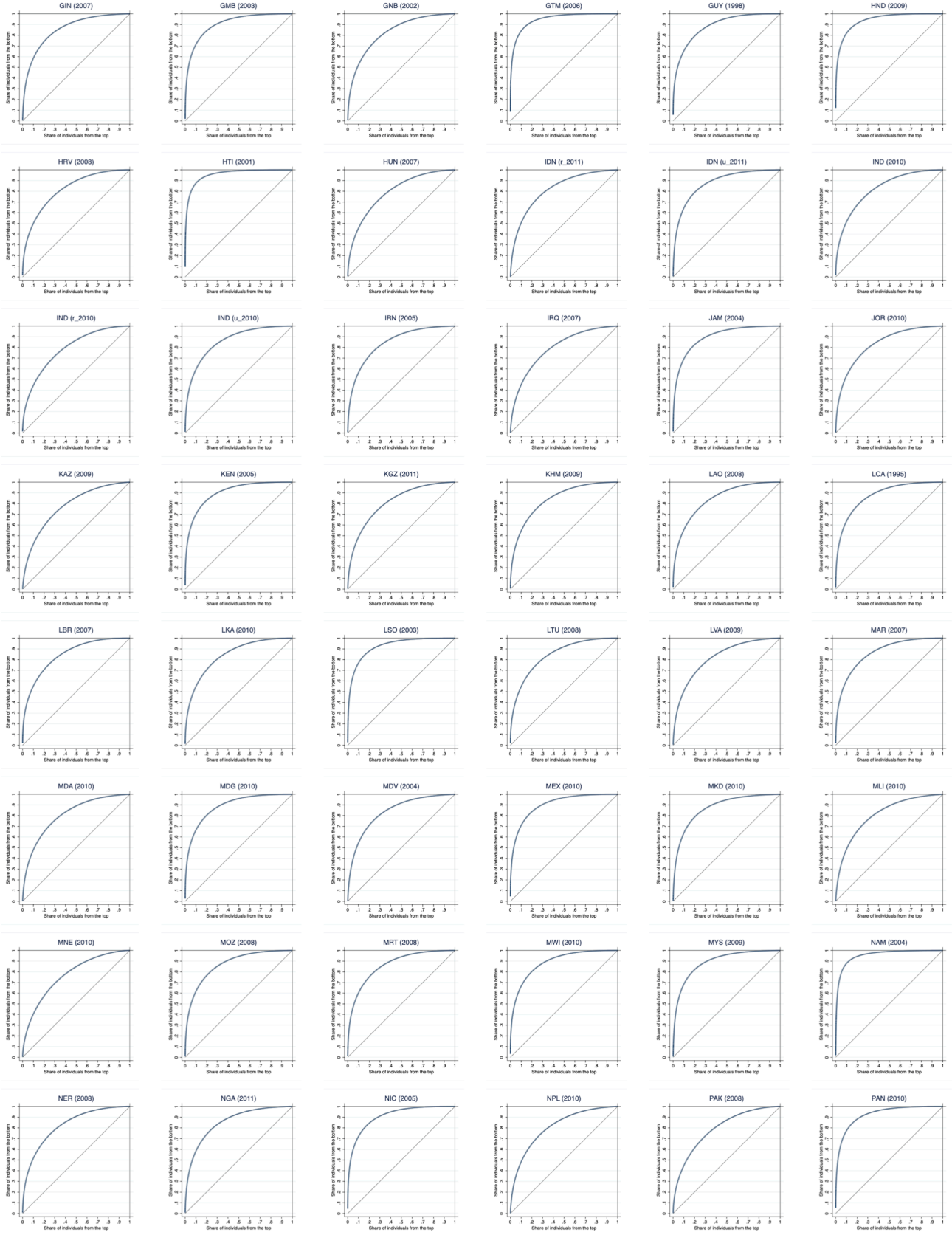


Table A5.1 (cont.) Political Influence Concentration Curves, All Countries