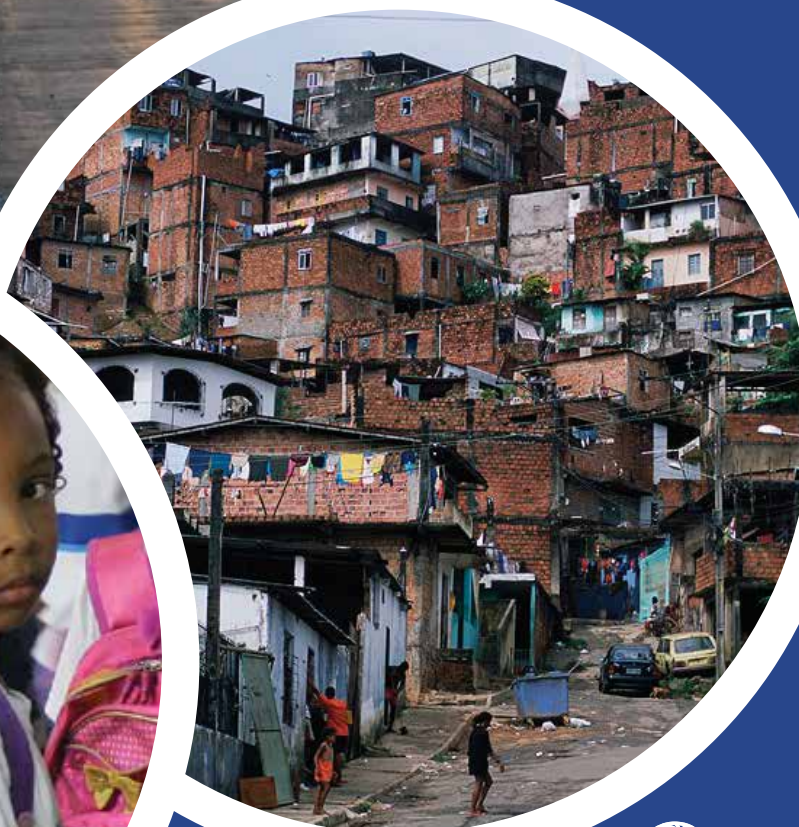
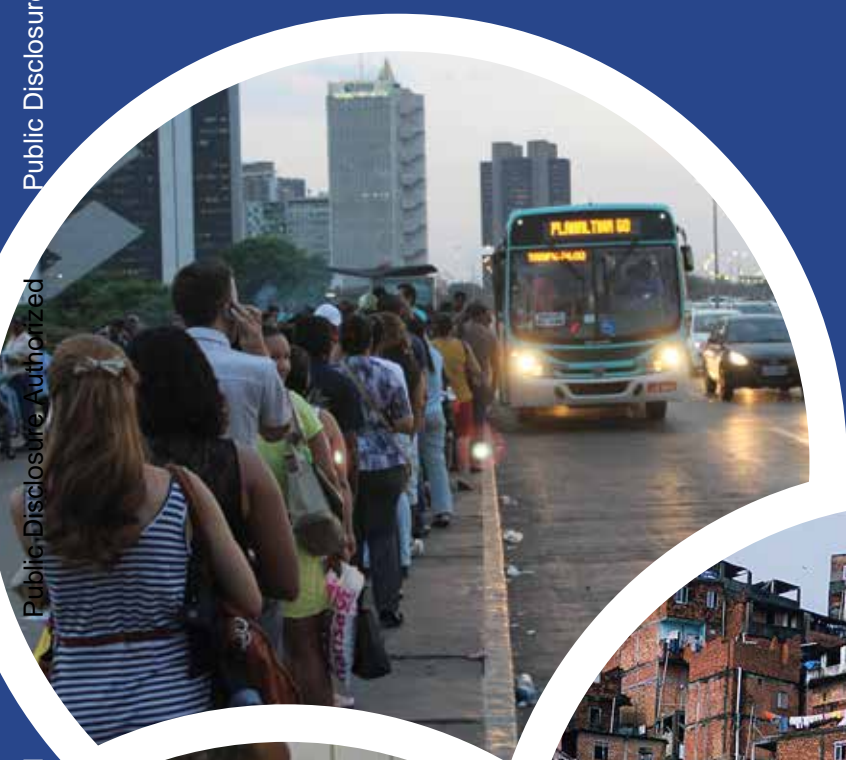


Poverty and Shared Prosperity in Brazil's Metropolitan Regions: Taking Stock and Identifying Priorities



*"The catalogue of forms is endless:
until every shape has found its city,
new cities will continue to be born.*

*When the forms exhaust their variety
and come apart, the end of cities begins."*

Italo Calvino, *Invisible Cities* (1972)

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The team included: Ali Sharman (JPA, GP Poverty), Renan Pieri (Consultant, GP Poverty), Martha Viveros (Consultant, GP Poverty), Ana Luiza Machado (Consultant, GP Poverty), Adam Ratzlaff (Consultant, GP Poverty), Yevgeniya Svachenko (Consultant, SARCE) and John Burgess (Consultant, GP Poverty).

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List of acronyms

ALMP	Active Labor Market Policies
AUs	<i>Aglomeraciones Urbanas</i> (Urban Agglomerations)
BF/BFP	<i>Bolsa Família</i> Program
BPC	<i>Benefício de Prestação Continuada</i> (Brazil's non-contributory pensions program)
CadÚnico	<i>Cadastro Único</i> (Bolsa Família Single Registry)
CEDLAS	Center for Distributive, Labor and Social Studies—University of La Plata, Arg.
CPF	<i>Cadastro de Pessoas Físicas</i> (Personal Identification)
FGV	Foundation Getulio Vargas
FPIC	<i>Funções Públicas de Interesse Comum</i> (Public Actions of Common Interest)
GFTS	General Transit Feed Specification
GIC	Growth Incidence Curve
GDP	Gross Domestic Product
HOI	Human Opportunity Index
IBEU	Urban Well-Being Index
IBGE	Brazilian Institute of Geographic and Statistical Research
IMF	International Monetary Fund
IPEA	Institution of Applied Economic Research
Ipeadata	IPEA's demographic, macroeconomic, regional, and social databases
LAC	Latin America and the Caribbean
MDS	Ministry of Social Development
MPI	Multidimensional Poverty Index
NE	Northeast
PNAD	<i>Pesquisa Nacional de Amostra por Domicílios</i> (National Household Sample Survey)
PND	<i>Plano Nacional de Desenvolvimento</i> (National Development Plan)
OB	Oaxaca-Blinder
REGIC	<i>Regiões de Influência das Cidades</i> (Regions Influenced by Cities)
RIDE	<i>Região Integrada de Desenvolvimento</i> (Development Integrated Region)
RM	<i>Região Metropolitana</i> , Metropolitan Region
RMBH	Metropolitan Region of Belo Horizonte
RMRJ	Metropolitan Region of Rio de Janeiro
RMSP	Metropolitan Region of São Paulo
SAE	<i>Secretaria de Assuntos Estratégicos</i> (Secretary of Strategical Matters)
SAGI	Secretary of Evaluation and Information Management
SEDLAC	Socioeconomic Database for Latin America and the Caribbean



Executive Summary

In the 20th Century, Brazil rapidly urbanized and is now not only an urban nation but a metropolitan one. Brazil's sprawling *regiões metropolitanas* (metropolitan regions, or RMs, which are municipal clusters) are now home to almost 50 million people and much of the country's economic vitality. The RM spatial level and its supporting governmental institutions have thus become critical to Brazil's future development. While challenges remain for tackling deprivation in rural areas, poverty in Brazil is now predominantly urban. More than six in 10 Brazilians in extreme poverty were living in urban settings as of 2012. Of these, over a fourth was concentrated in the 10 largest RMs.

Brazil 10 largest metropolitan regions (RMs)



Brazil's largest RMs achieved laudable progress both in poverty reduction and shared prosperity between 2004 and 2012.

Whether measured by income or multi-dimensional indicators, poverty in metropolitan regions plummeted during the eight-year study period. Progress was primarily driven by increases in labor incomes, but also the expansion of public services and transfers. Extreme poverty reached an unprecedented low in metropolitan regions of 2.3% compared to 3.6% at the national level, and poverty dropped to 4.6%, just over half of the national level of 9%. Behind poverty reduction was both redistribution and economic growth, which resulted in high income growth among the bottom 40% and a falling income inequality. Those dynamics were accompanied by an expansion of access to services reaching almost the entire metropolitan population for a number of key services.

However, those remaining poor are hard to reach through growth alone and the moderate poor, in particular, may face constraints on two sides: access to labor markets to support their upward mobility and the same attention from social programs as the extreme poor to meet their basic necessities, particularly in terms of education and sanitation.

There are also issues of equity in terms of those remaining behind, with households headed by afro-descendants, females, and young adults all over-represented among the poor. In general, the poor and vulnerable have limited participation in labor markets, particularly the extreme poor. However, the moderate poor suffer more than the extreme poor in access to basic services which may reflect Brazil's focus to date on eliminating extreme poverty. This study highlights some of these remaining gaps in

service delivery and safety nets (including the *Bolsa Família* cash transfer program).

Vulnerability remains stubbornly large and pervasive in Brazil's metropolitan regions and will be a key challenge to sustaining and deepening shared prosperity gains achieved over the past decade.

Close to 6.5 million people, or 11.3% of the metropolitan population, are not poor but have incomes insufficient to make them middle class. The vulnerable face a high risk of falling into poverty in the event of economic shocks, given the predominant role of labor income in their household finances. Additionally challenges include the high share of the vulnerable working informally or unable to find employment at all. Furthermore, the vulnerable group in RM settings in Brazil is likely to be even larger than what is captured by the national vulnerability line of R\$291. Using regional vulnerability lines defined by the World Bank to compare countries of the region (US\$10) enlarges this group to 21.8 million, a full 38% of the population.

Poverty and shared prosperity are converging across the RMs—with the historically lagging North and Northeast RMs having improved greatly but still facing pronounced challenges.

While the North and Northeast RMs have historically been the poorest, and remain so, the rate at which these RMs have reduced poverty and grown incomes of the bottom 40 percent is causing them to converge towards the richer RMs of the South. In particular, two RMs of the Northeast—Fortaleza and Recife—consistently stand out as lead performers, with the highest rates of GDP growth, income growth of the bottom 40%, poverty reduction, and income inequality reduction.

Table 1. Poverty reduction and shared prosperity have both advanced in Brazil's RMs since 2004

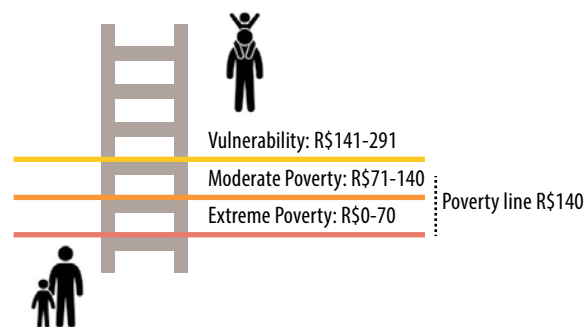
	Extreme poverty HC 2004 (%)	Extreme poverty HC 2012 (%)	Poverty HC 2004 (%)	Poverty HC 2012 (%)	Bottom 40 income growth (%)	Mean income change (%)
Brazil All	7.6	3.6	22.4	9.0	7.4	5.0
Brazil RMs	4.7	2.3	14.7	4.6	7.7	4.7
Brazil Rural	18.4	9.4	45.4	24.6	6.8	5.9
Brazil Non RM- Urban	5.9	2.8	19.7	7.2	7.3	4.9

Source: World Bank calculations using PNAD 2004, 2012. Note: Rural, urban, and metropolitan are exclusive groups. Poverty lines correspond to real values of R\$70 (extreme) and R\$140 (moderate) based on June 2011 Reais. The bottom 40 refers to the bottom 40 percent of the national income distribution living in the area. Growth refers to growth in the real value of income.

Poverty and equity outcomes vary significantly between the cores of RMs and their peripheries. The core municipalities (i.e. the capitals of the given states) offer better access to services and formal job markets than their peripheries (the surrounding municipalities). However, inequality remains higher in the core, reflecting the more diverse income structure in the center of metropolitan areas. Concentric dynamics can be observed: the further a municipality is located from the core, the worse its indicators. This underlines the importance of better integrating the outer peripheries into the RMs so as to make labor and economic opportunities offered by RMs more inclusive. A key goal will be improving mobility across the metropolitan sphere to enhance citizens' access to services and jobs.

In a less favorable economic context, the health of metropolitan regions, which comprise over 70% of Brazil's GDP, will help determine growth and shared prosperity across Brazil. History has shaped a complex institutional structure in urban Brazil that has strong bearing on the design and implementation of policies, programs, and projects requiring coordination (Melo and Pereira 2013). This is particularly visible in the RMs, where acute challenges exist in getting municipalities, RM agencies, states and the federal government to work together toward common social and economic goals. While metropolitan governance is beyond the scope of this study, this level of governance directly impacts service delivery efficiencies and therefore strongly relates to policies regarding poverty, vulnerability, and shared prosperity in urban settings.

Poverty and Vulnerability lines in Brazil



** lines based on monthly per capita income.*



Introduction

Reflecting deep-rooted historical dynamics, Brazil's population is not only heavily urban¹ but is also increasingly metropolitan. Between 1940 and 2010, Brazil's population increased almost five-fold. In 1970, Brazilian census takers found for the first time that their country's urban population surpassed its rural counterpart. Today, Brazil is among the most urbanized countries in the Latin America and Caribbean

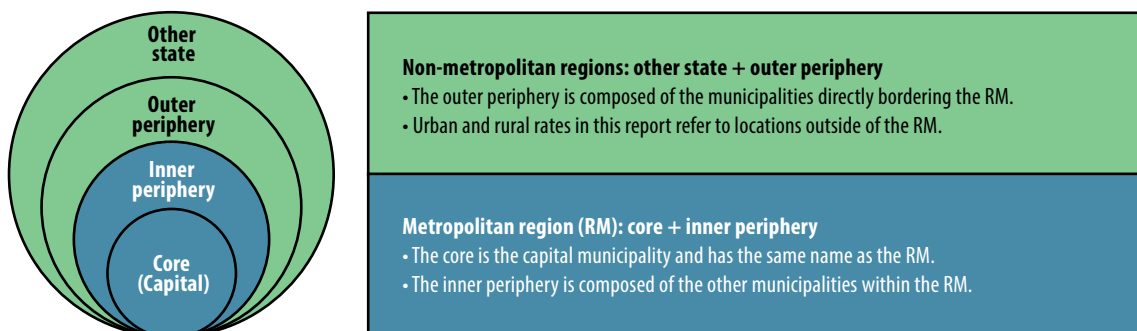
region, with more than 84% of its population living in urban areas, primarily along the coastline and in the south. The change happened very quickly, as noted by Ricardo Neves, "no other country of comparable size managed, in only two generations, to go from a rural to an urban one" (Perlman, 2008).² However, given its speed, the urban centers developed often in an ad hoc manner with limited planning, bringing together the haves and have-nots, creating an "enduring framework of inequality," in the words of urban analysts George Martine and Gordon McGranahan (2010). Despite some efforts at urban planning, the absence of vigorous implementation had consequences on the development of those areas.³ The result was often concentrated poverty, health hazards, environmental blight and a negative perception of further urbanization. Consequently, instead of using urban planning to

1 This research uses the classification developed by *Instituto Brasileiro de Geografia e Estatística* (IBGE), the Brazilian Statistical Office. The criteria that subdivide territory into urban and rural areas are based on the laws of each Brazilian municipality and updated with each census. Urban households are those located inside the urban perimeter of a city or village. Urban areas are classified as "urbanized areas" (characterized by buildings, streets and intense human occupation), "not urbanized areas" (legally defined as urban but characterized by rural occupation) and "urban isolated areas" (also legally defined as urban but separated from a municipality by rural area or by another legal limit). On the other hand, rural households are those located in rural areas external to urban perimeters and in rural agglomerations (legally defined rural areas formed by adjacent buildings separated by no more than 50m). Rural agglomerations are classified as "of urban extensions" (located outside the legal urban perimeter but developed as a result of urban expansion), "villages" (rural agglomerations of no business or private character, characterized by minimum number of services and equipment), "nuclei" (rural agglomerations linked to a single owner or company) and "other agglomerations". This research primarily refers to metropolitan, non-metropolitan urban, and rural.

2 While the spatial distribution of the urban population in the Southeast and South regions has remained relatively stable, the Northeast has declined from 35% to just under 28% of the total. The Center-West and the North have increased their shares although each now accounts for only 7-8% of the national urban population ("Urbanization Review for Brazil" – draft, September 2013, LCSUDU).

3 As noted by Martine and MacGranahan (2010), while "master plans" have been part of urban planners' discourses for a long time, the reality is that urban growth has outstripped land use planning.

Figure 1. Inside and outside the metropolitan region



improve the evolution of the city, policy makers sought to limit the permanent settlement of new rural migrants and the poor, which often led to the creation of informal urban settlements known as “favelas.” Migration to metropolitan regions did eventually slowdown, due mostly to economic growth in traditionally lagging regions and the country’s transition to a more advanced stage of urbanization. However, urban poverty accounts for 61% of the extreme poor and 59% of the moderate poor and urban areas contain large concentrations of households which are highly exposed to risks.

The objective of this study is to provide an overview of the evolution and status of poverty and shared prosperity in Brazil’s metropolitan regions (*regiões metropolitanas*—RMs). To the authors’ knowledge, this is the first study of poverty and shared prosperity diagnostics at the metropolitan region level. It aims to inform the World Bank’s engagements in metropolitan areas and large municipalities to address the twin goals of poverty reduction and shared prosperity in Brazil. The RMs considered in this study consist of the nine formed between 1972 and 1974 under the Complementary Law 14 of June 8, 1973 which allowed for multiple municipalities to incorporate into one *região metropolitana* (RM). These include: Belo Horizonte, Belém, Curitiba, Fortaleza, Porto Alegre, Recife, Rio de Janeiro, Salvador, and São Paulo.⁴ While additional RMs have formed since, these nine RMs and the Federal Dis-

trict, Brasília, remain Brazil’s primary metropolitan regions. As of 2012, these ten RMs accounted for approximately 31% of the Brazilian population.

The study consists of eight papers. The present paper provides an overview of the evolution of poverty, inequality and shared prosperity across Brazil’s large metropolitan regions from 2004 to 2012. Seven separate notes focus analysis on individual metropolitan regions of the less-developed North (Belém) and Northeast (Recife, Salvador, and Fortaleza) and the wealthier and largest RMs, which are located in the Southeast (Rio de Janeiro, São Paulo, and Belo Horizonte).⁵ Across key poverty and shared prosperity indicators, the RMs are benchmarked to each other and compared to other RMs in Brazil as well as to the nation and the respective state. Within each RM, the analysis distinguishes between the core of the RM (capitals of the given states) and other municipalities within the RM (the inner periphery) and in the municipalities directly bordering the RM (the outer periphery) (Figure 1). This spatial lens is important to understand the highly interrelated economic, social and governance challenges facing RMs and their peripheries.

While the ten metropolitan regions analyzed in this study are all large urban agglomerations, there are important differences in their population sizes and socio-economic compositions. The RMs vary substantially in their population size. As of the 2010 Census, 19.7 mil-

4 IBGE representatively samples nine metropolitan regions plus the federal district for the PNAD. This sampling allows for an in-depth analysis of the evolution of poverty and equity at the metropolitan level. Thus, while there are other RMs, for the purpose of this note, “RMs” only refers to the PNAD’s nine RMs of Belo Horizonte, Belém, Curitiba, Fortaleza, Porto Alegre, Recife, Rio de Janeiro, Salvador, and São Paulo, plus Brasília (Distrito Federal).

5 The RM of Curitiba, Porto Alegre and Brasília (DF) are integrated into the overall analysis but only the seven RMs of Belém, Recife, Salvador, Fortaleza, Rio de Janeiro, São Paulo and Belo Horizonte are further investigated into separate notes, reflecting the World Bank more specific engagement with these municipalities and states.

Box 1. States, municipalities and metropolitan regions in federal Brazil

Article 25 of Brazil's constitution, enacted in 1988, gives states the right to create metropolitan structures. This was a shift from the 1967 constitution, which had placed metropolitan regions under federal authority. While giving states the authority to create such bodies, the current constitution does not set any further requirements regarding their structure or funding.

Further complicating the situation is that the 1988 constitution also established municipalities as full federation members. That is to say, the more than 5,000 municipalities that are scattered across Brazil today are not subordinated to states or to any structure created by states. They enjoy the same autonomy and sovereignty.

While municipalities within an RM have a vested interest in working together given their proximity, any action undertaken by a metropolitan agency must be specifically agreed to by all municipalities involved. Incentives to coordinate vary considerably. The political economies of municipalities and metropolitan regions and their capacity to coordinate are thus determinant factors of success.

Adapted from *Metropolitan Governance and Finance in São Paulo*, in "Financing Metropolitan Governments in Developing Countries," edited by Bahl, R., Linn, J. and Wetzel, D. (2013).

lion people lived in the RM São Paulo, more than the entire population of Chile and over twice that of New York City. In contrast, only 2.1 million people lived in the RM Belém. The portion of the respective state population living in each RM also varies, ranging from 25% in Belo Horizonte to 74% in Rio de Janeiro. Furthermore, there are large differences in the racial composition of the RMs. While the citizens of the RMs in the North and Northeast of Brazil predominantly self-identify as *pardos* (mixed origin), the RMs located in the South and Southeast have larger populations that call themselves *brancos* (white). Across RMs, the share of the population that self-identifies as *pretos* (black) is relatively low, ranging from 3% to 12%, with the exception of Salvador, where the figure is 27%.

Addressing challenges will require coordinated actions at the federal, state, metropolitan, and municipal levels. Due to the federal nature of the country, Brazilian states and municipalities have strong autonomy and sovereignty. This in turn has major bearing on the implementation of policies that require all levels of government to work together. In spite of the complexity of coordination, metropolitan regions offer potential for poverty reduction and shared prosperity in Brazil. Indeed, most of the challenges, particularly those related to services and urban mobility and sustaining the substantial gains in pov-

erty reduction, access to services, and shared prosperity achieved so far, will require assertive joint action by multiple levels of government (See. Box 1). Including poverty and vulnerability in the larger agenda of metropolitan regions could provide a much-needed integrated focus.



Economic growth and redistribution have generated significant poverty reduction in Brazil's RMs

A. GDP has consistently grown in RMs since 2004 but slightly slower than at the national level

Large shares of Brazil's GDP are concentrated in metropolitan regions, making their inclusive growth vital to the country's overall economic health. As countries develop, economic activity generally becomes more concentrated in certain areas, with agglomeration effects increasing returns in those areas (Duranton, 2013; WDR, 2009). Brazil is no exception, with a large share of its GDP concentrated in its metropolitan regions. For instance, in the Northeast the three largest metropolitan regions: of Salvador (Bahia), Recife (Pernambuco), and Fortaleza (Ceará) concentrate 20% of the region's population, and contribute one half to two thirds of all economic activity in their respective states (2010). RMs function as centers of growth for Brazil, in terms of GDP and other measures captured by the REGIC survey,⁶ with

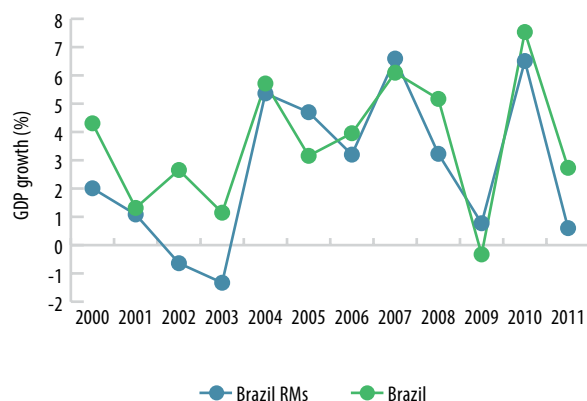
the top 10 RMs in Brazil representing 44% of the national GDP in 2011.

Economic growth in the RMs has been slightly slower than the national rate over the last decade, over all, and in the last two years of the data (2010 and 2011). From 2004 to 2011, annual GDP growth was just under the national 4 percent average in the RMs, mainly reflecting the greater susceptibility to the 2002-03 crisis and lower growth in 2011. While the RMs were slightly less affected by the 2009 global crisis than the rest of Brazil, their growth rates have been trending lower than the national average since then (Figure 2). Still, there was considerable variation in growth rates across RMs over the 2004-2011 period, with two of the poorest RMs in 2004, Fortaleza and Recife, growing the fastest while the other two poorest RMs in 2004, Belem and Salvador, grew at a pace in the bottom half of RMs and in the latter case, the slowest of all.

6 The REGIC 2007 survey identified the core municipalities of the 10 RMs as the top poles of attraction among areas that the National

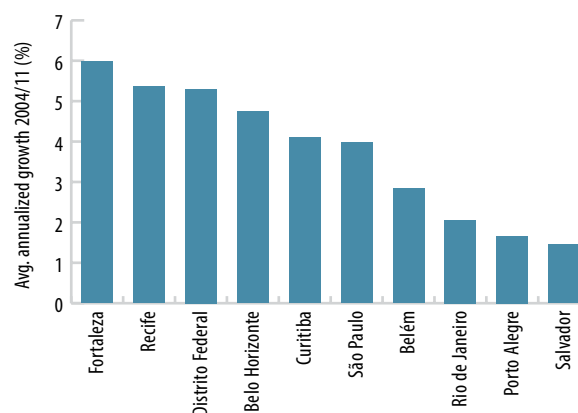
Statistical Office classifies as important for trade, banking, services, federal public management, and corporations.

Figure 2. In recent years real GDP growth in the RMs has been slowing down relative to Brazil as a whole⁷



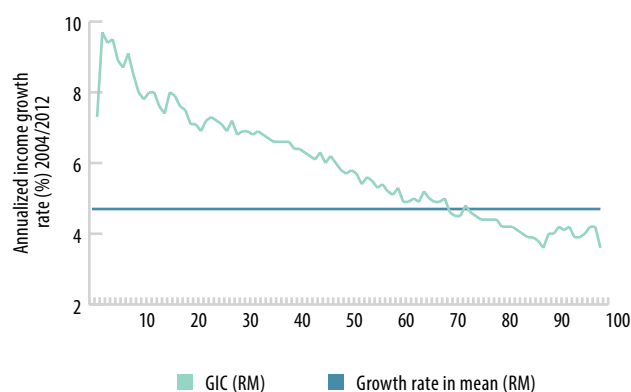
Source: World Bank calculations using Ipeadata/IBGE.

Figure 3. GDP growth grew the most in the traditionally poorer Fortaleza and Recife



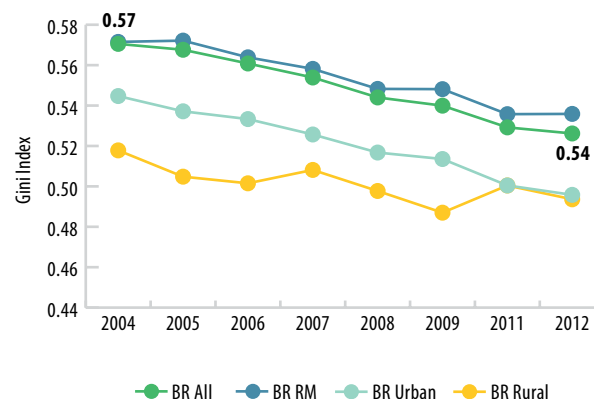
Source: World Bank calculations using Ipeadata/IBGE.

Figure 4. Income growth from 2004 to 2012 in RMs was highest for the poorest deciles



Source: World Bank calculations using PNAD 2004/2012.

Figure 5. Inequality remains higher in RMs than in urban and rural areas



Source: World Bank calculations using PNAD 2004, 2012.

B. Economic growth has most benefitted the poor, resulting in declining inequality across and within RMs

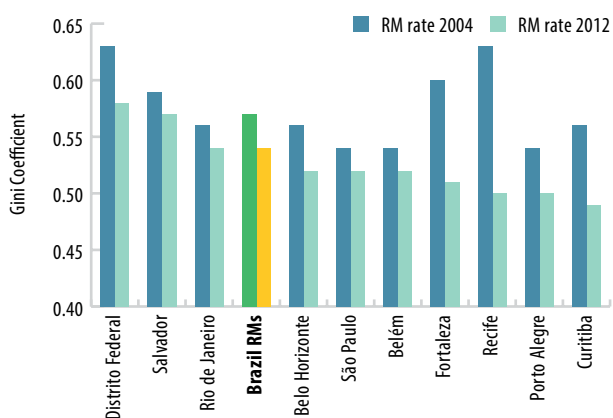
The growth incidence curve (Figure 4) indicates that growth in urban and metropolitan areas was positive for the entire income distribution, but disproportionately benefited the lower deciles underscoring an inclusive growth pattern. **Not surprisingly then, income inequality steadily declined between 2004 and 2011 before it started to flatten in 2012.** The sharpest declines were in urban areas, followed by metropolitan regions, with rural

areas experiencing the smallest declines (Figure 5). Moreover, inequality remained highest in metropolitan settings than in the rest of Brazil. This speaks to the particular profile of people who live in RMs—namely, the 10 RMs encompass large and diverse populations, with high variation among incomes. When viewed across RMs (Figure 6), inequality declined in all RMs, with the greatest declines in Recife and Fortaleza, the two RMs that initially had the highest levels of inequality.

On average, growth played a larger role than income redistribution in reducing poverty in Brazil's RMs from 2004 to 2012—with the notable exception of the RMs Recife and Fortaleza, which were the two of the poorest RMs

⁷ Graph to be updated to 2012.

Figure 6. Inequality has fallen in all RMs but remains high and heterogeneous across RMs



Source: World Bank calculations using PNAD 2004, 2012.

in 2004, and Curitiba (where growth and inequality each contributed half of the gains in poverty). The Datt-Ravallion decomposition⁸ shows that growth contributed two thirds of the poverty reduction with income redistribution providing the remaining one third during the study period (Figure 7). Looking at growth elasticity of poverty in the respective RMs also confirms the critical role played by growth in RMs, with metropolitan poverty more elastic than at the national level. RMs presenting high incidence of inequality, such as the RM Salvador, display the expected lower elasticities. The decrease in inequality seen in the RM Recife also translates into greater elasticity of poverty reduction to mean income growth. Whereas a one percent increase in mean income growth over the 2004-11 period resulted in a reduction in poverty of -2.27 percent in the case of the RM Recife, a corresponding increase only translated in reduction of -1.06 percent for the RM Salvador, the lowest of all RMs.

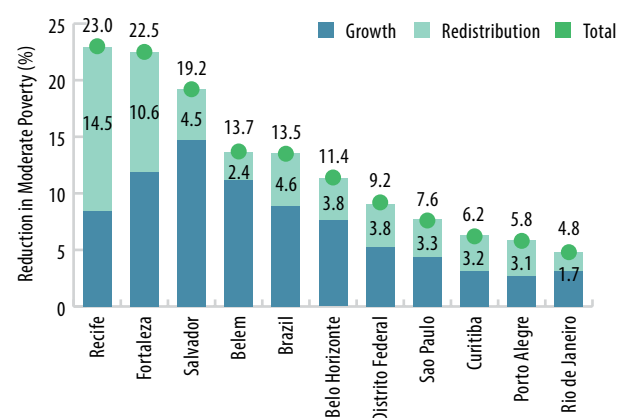
C. Monetary poverty has decreased considerably, especially in the North and Northeast, but vulnerability remains a challenge

The majority of the poor in Brazil live in urban areas.

In 2012, poverty was more common in rural areas with an

⁸ The Datt-Ravallion methodology decomposes the evolution of poverty changes into two components: (1) the income growth component, i.e., the change in poverty due to a change in the mean income in the absence of changes in income distribution, and (2) the redistribution component, i.e., the change in poverty due to changes in the Lorenz curve while keeping the mean income constant.

Figure 7. Growth reduced poverty more than redistribution, on average, in Brazil's RMs



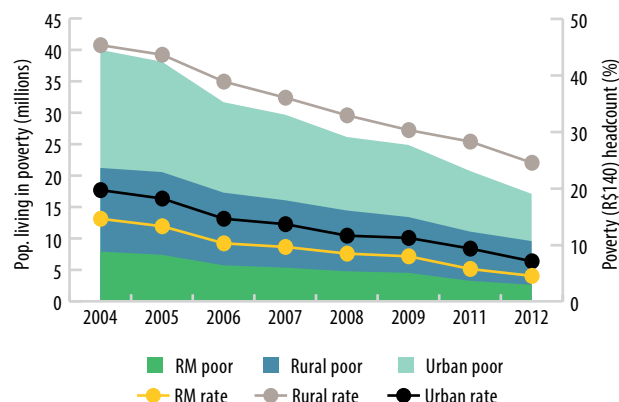
Source: World Bank calculations using PNAD 2004/2012.

incidence of 25% of the population, compared to only 7% in non-metropolitan urban areas and nearly 5% in metropolitan areas. However, given that the majority of Brazilians live in urban or metropolitan areas, the majority of the poor live in urban and metropolitan areas. In particular, the 10 largest RMs concentrate 15% of Brazil's poor and nearly 20% of the extreme poor.

While poverty rates are low in metropolitan settings, the sheer size of the RMs means that they still have very large numbers of poor people. Since 2004, the 10 largest RMs in Brazil had reduced poverty by close to 70% and extreme poverty by over 50%. **As of 2012, 4.6% of the metropolitan population lives in poverty and 2.3% live in extreme poverty.** By comparison, Brazil's overall poverty rate in 2012 was 9% and the extreme poverty rate was 3.6%. Though lower than the national rate, given that over 2.6 million people living RMs are still poor, it is important to continue providing support to ensure that these people can rise out of deprivation and that the vulnerable do not fall back into poverty (See Figure 8).

Poverty rates vary across RMs but have fallen considerably since 2004 in all of them, especially in those located in the poorest states. In 2012, all RMs had lower poverty rates than the national average of 9%, as those in the traditionally poorer Northeast and North had rates closer to 8%, while those in the South and Southeast had rates closer to 3%. In the last decade, the states with the strongest poverty reduction have been in the North and Northeast, though their states continue to exhibit signifi-

Figure 8. Most people living in poverty in Brazil are located in non-metropolitan urban areas



Source: World Bank calculations using PNAD 2001/2012. Note: Rural, urban, and metropolitan are exclusive groups.

cantly higher rates of poverty and may need to look to the strategies deployed in the RMs to spur poverty reduction.

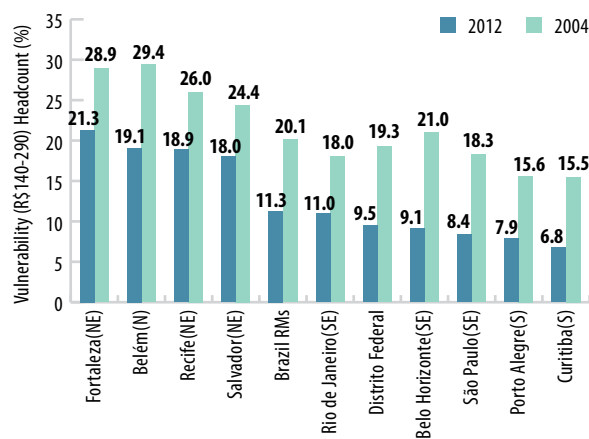
Vulnerability is an important challenge for Brazil's RMs, particularly in the Northeast. Along with strong poverty reduction, vulnerability rates have also fallen across RMs and in 2012 stood at 11% on average (See Figure 9.) However, while RMs in the South and Southeast cut vulnerability rates by half, RMs in the Northeast reduced vulnerability by closer to one quarter. Given the large reduction in poverty rates in the North and Northeast, a relatively decline in vulnerability not surprising, because a large portion of the people graduating out of poverty are likely to have joined the ranks of the vulnerable, rather than making it through to the middle class. When using international lines, rates of vulnerability are even higher and significantly so, indicating that the problem is likely even larger than that shown here (see Box 2).

D. Upward economic mobility has been strong in Brazil's RMs

The RMs grew incomes of the bottom 40% by more than the average for their respective states between 2004 and 2012. Close to a fourth of the Brazilians in the bottom 40% of the income distribution live in the ten largest metropolitan regions. The growth of their income was robust at close to 8%, on average.⁹ Furthermore, in every

9 As one of the twin goals of the World Bank, shared prosperity is measured by the growth of the income per capita of the bottom 40% of the income distribution; pro-poor growth is measured by the

Figure 9. Vulnerability levels have declined but remain significant



Source: World Bank calculations using PNAD 2004, 2012.

RM, bottom 40 income growth exceeded that of the mean population income growth, showing that growth has not only benefitted the bottom 40 but benefitted them more than the top six quintiles. The Northeast RMs performed particularly well in terms of shared prosperity, with its RMs occupying three out of the four top positions. Notably, while the RM Salvador had the lowest GDP growth rate over the period, average income growth was among the highest for the bottom 40. At the other end of the spectrum, the RMs Belém and Rio de Janeiro performed the worst in terms of shared prosperity (See Figure 11.) Due to poverty reduction, many of the bottom 40% are vulnerable and close to half are middle class. Thus, promoting the income growth of the non-poor has become key to sustaining and deepening shared prosperity (See Figure 12.)

The expansion of shared prosperity has contributed to a large portion of the population of Brazil's RMs climbing the socio-economic ladder over the past decade.

By 2012, more than three in four Brazilians had middle class incomes while five in six metropolitan Brazilians did. In the absence of panel data, assessing intra-generational mobility in the metropolitan setting is complicated. However, using synthetic panels (Annex 7) to drill down on

growth of the bottom 40% compared to the mean. We present here this measure at the national level (bottom 40% of Brazil residing in the given RM) and at the state level (bottom 40% of the state residing in the corresponding RM) to provide a finer lens on the reading of shared prosperity in a large federal country such as Brazil. The benchmark for shared prosperity in Brazil remains at the national level. See Annex 16 on the measurement of shared prosperity at the sub-national level.

Box 2. Poverty and Vulnerability through an international measurement lens

Using international lines to measure poverty in Brazil's RMs shows significant poverty reduction but rescale poverty and vulnerability to more salient challenges. Since

2004, extreme poverty using the global line (\$1.25 PPP per day) fell by over half, to reach 2.5% in 2012. Similarly strong results are seen with regional lines but with incidence levels classifying a larger share of the metropolitan population as poor. Indeed, using the regional lines

for extreme (\$2.5 PPP) and moderate (\$4 PPP) poverty, poverty is seen falling by two thirds and half, respectively, to reach 6.3% and 15.6% in 2012. While a similar reduction is seen with vulnerability, close to 40% of metropolitan Brazilians continue to live in a state of vulnerability to poverty as measured with the \$4-\$10 PPP lines.



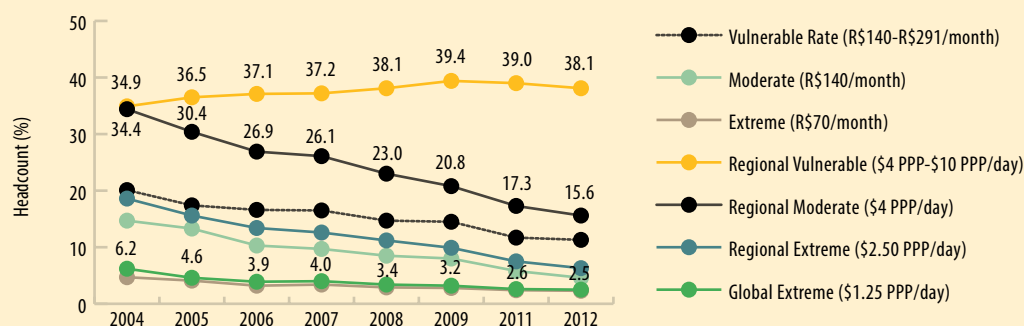
50% metropolitan residents are either poor or vulnerable in 2012



**15.6% are poor
38% are vulnerable**

In recent years, R\$70 and R\$140 per capita per month, administrative poverty lines defined for the *Bolsa Familia* and *Brasil Sem Miséria* programs, have been increasingly used in place of official poverty lines. Thus, the monetary poverty measures considered in the rest of this study refer to individuals, unless noted otherwise, with per capita household incomes between the following thresholds: poverty—below R\$140, extreme poverty and the extreme poor—below R\$70, the moderate poor—between R\$70 and R\$140, vulnerable—between R\$140 and R\$291, and middle-class—R\$291+. ¹⁰ Cost of living is not taken into account in order to be consistent with national methodologies of measuring poverty in Brazil. As such, poverty comparisons between Brazil RMs and Brazil are likely more favorable for the former given that the cost of living in metropolitan areas is generally higher than average. The same applies for regional differences, particularly the South/Southeast and North/Northeast divide. See Annex 6 for more information about poverty lines in Brazil and see Annex 5 for a comparison of results adjusting and not-adjusting for cost of living.

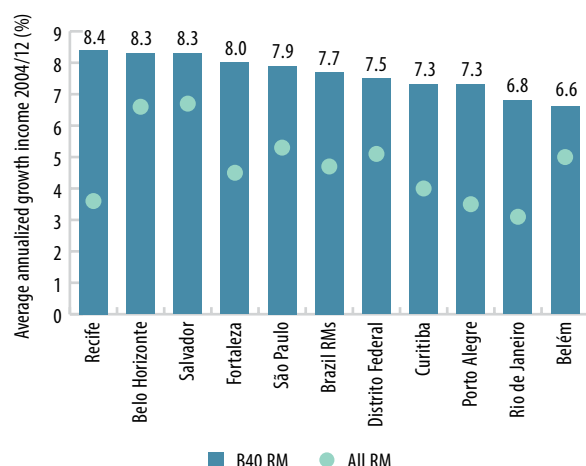
Figure 10. National, regional and international lines show a consistent reduction in poverty and vulnerability but levels vary substantially across thresholds.



Source: WB calculations using PNAD 2004 to 2012, R\$ lines refer to the real value based on June 2011.

¹⁰ SAE recently updated its definition of the middle class in Brazil, raising the threshold income to R\$291 per capita. It also defined three types of "middle class": lower-middle class, R\$291-441; "middle" middle class, R\$441-R\$641; and higher middle class, R\$641-\$1,019 (SAE, 2013). Vulnerability is defined as income per capita between R\$140 and R\$291. <http://www.sae.gov.br/site/?p=17351#ixzz2h0ho0ALf>.

Figure 11. Average annualized real growth rate of income is high for the national bottom 40 living in RMs



Source: World Bank calculations using PNAD 2004, 2012.

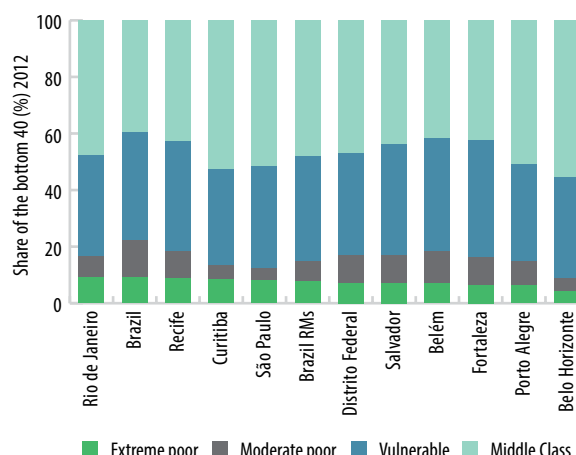
economic mobility between 2004 and 2012 indicates that approximately 20% of the people living in RMs saw an improvement in their socio-economic class.¹¹ These results are similar to those found at the national level.¹²

But gender and race continue to influence socio-economic mobility in the RMs. Analysis of the transition between income groups shows that females across all income groups are less likely than males to move up

11 In the absence of panel data, analysis of the evolution of income over the period is complemented by a zoom-in on income mobility using synthetic panels, based on the approach recently developed by Dang, Lanjouw, Luoto and McKenzie (2011). The analysis identifies people who left and people who stayed in poverty, and the potential hypotheses that lie behind the trends. The main advantage of this approach is that it does not need to impose much structure on the individual income-generating process. Instead, it allows us to calculate lower and upper bounds on the movements in and out of poverty, depending on the assumption regarding the individual-specific error term. Synthetic panels are built using two cross-section datasets, 2004 and 2012. The methodology and results are further detailed in Annex 7. Caution should be applied in the interpretation of those results. Indeed, in zooming in on metropolitan regions, the significant reduction of the sample size presents a first limitation—the RMs are pooled to overcome this limitation, extracting the respective RMs from this pooled sample. This solution only partially remedies the sampling limitation. In addition, the very nature of a metropolitan setting signifies that a higher degree of migration is to be expected. This weakens some of the assumptions used when building synthetic panels—namely that there are good reasons to believe that the composition of the group observed with the first cross-section dataset will be similar if not identical to the composition of the group captured by the second cross-section dataset. For those reasons, the results are presented in Annex 7 and are not further expanded upon in the main analysis.

12 According to Fruttero, Castaneda, Lopez-Calva & Lugo (2012), over the period 2003 to 2011 and using a vulnerability line of R\$250, 19.8% of the Brazilian population rose in socio-economic status.

Figure 12. The middle class makes up almost half bottom 40 living in Brazil's RMs



Source: World Bank calculations using PNAD 2004, 2012.

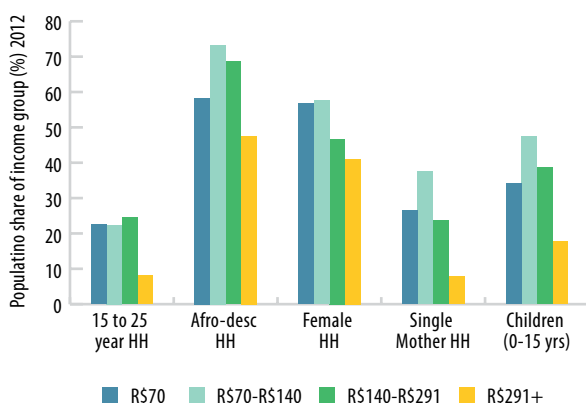
the economic ladder.¹³ While gender differences in the probability of moving from extreme to moderate poverty decreased between 2004 and 2012, being a woman still meant having a lower likelihood of moving out of vulnerability and into the middle class. White households were more likely than afro-descendant households to move from extreme to moderate poverty, but afro-descendants were more likely than whites to move from moderate poverty to the vulnerable group.

E. The poor and vulnerable face specific challenges to their upward mobility

As of 2012, over 9 million people living in the 10 largest RMs in Brazil were either poor or vulnerable to poverty, with households headed by young adults, afro-descendants and females over-represented among these groups. About a third of the metropolitan poor and vulnerable live in the Northeast, a half in the Southeast, while the North, South, and Distrito Federal each have less than a tenth. Comparatively, less than a fifth of the entire metropolitan population lives in the Northeast and more than three fifths lives in the Southeast. Children and households headed by young adults, afro-descendants, and single mothers are significantly over-represented among both the poor and vulnerable (See Figure 13).

13 The analysis was done using a simple logit model to capture factors at play for income groups to transition into the next upper group (e.g., from extreme to moderate poverty, from moderate poverty to vulnerability). Results are presented in Annex 8.

Figure 13. Certain demographic groups are over-represented among the poor



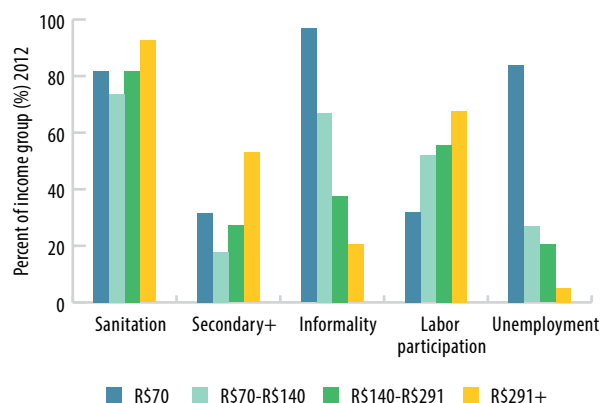
Source: World Bank calculations using PNAD 2012.

This is especially true for young-adult and single-mother households, which account for more than twice as many households in poverty or vulnerability as in the general population. Female-headed households are also over-represented among the moderate and extreme poor but have similar shares of the vulnerable group as they do in the general population.

The poor and vulnerable continue to have lower education and to lack access to some basic services such as sanitation. While access to services is approaching complete coverage in RMs, there are still households that lack adequate sanitation and whose children who are not enrolled in school. Both of these services impact the entire life cycle of a person due to the long-term effects of sanitation on health and education on characteristics ranging from labor earnings as an adult, smoking, drinking and relationships.¹⁴ In RM settings, this situation is, surprisingly, most commonly found among the moderate poor (See Figure 14). For example, 18% of the RM moderate poor live in households with school-age children who do not attend school compared to 12-13% of both the extreme poor and vulnerable. Adult educational attainment follows the same pattern, with the extreme poor and vulnerable having higher rates than the moderate poor. Likewise, 26% of moderate poor individuals live in households lacking sanitation, compared to 18% for extreme and vulnerable households.

14 See Becker and Tomes (1979), Feinstein et al. (2006), Heckman et al. (2006), and World Bank (2010b).

Figure 14. More extreme poor have access to services than the moderate poor but worse labor outcomes



Source: World Bank calculations using PNAD 2012.

Labor market indicators such as hourly wage, informality rates, labor force participation, and unemployment strongly differentiate the moderate poor from the extreme poor. This hints at the key role played by labor markets in the incidence and depth of poverty. While the unemployment rate among the extreme poor in RMs is 84%, it falls to 27% and 21% for the moderate poor and vulnerable, respectively, and to around 5% for the middle class (See Figure 14). If they do work, the extreme poor are more likely to be self-employed, informal, or work part-time compared to the moderate poor. On the other hand, the moderate poor resemble the vulnerable in terms of labor force participation and unemployment rates, though they have higher levels of informality.¹⁵

15 While informality offers an opportunity for firms to operate under lower regulatory and wage costs, it often means low insurance for workers, under-saving for retirement, unfair competition, and noncompliance with tax collection and the rule of law. It ultimately creates a drag on productivity and growth (World Bank, 2007).



Labor markets, demographic changes, and transfers have been key to poverty and inequality reduction

A. Labor income drove poverty and inequality reduction in Brazil's RMs

Increased labor income contributed the most to poverty reduction in each of the RMs. Using a Shapley decomposition to separate the factors behind poverty changes shows that labor income contributed close to 80% of the change in poverty and over 95% of the change in extreme poverty between 2004 and 2012 across Brazil's RMs. (See Figure 15). This surpassed the national rate by close to 20 and 50 percentage points, respectively, indicating that labor markets are especially critical in those settings, including when compared to non-metropolitan urban settings (see Figure 16). Within RMs, labor income consistently played the leading role in poverty and extreme poverty reduction, contributing over 60% in each one. The smallest contribution of labor income to poverty reduction occurred in the three Northeastern metropolitan regions, whereas the largest was seen in the RM Rio de Janeiro. Across RMs, changes in transfers and the share of adults in households (falling

dependency ratio) reduced poverty. Transfers played a positive role in every RM and, after labor income, were the second- or third-biggest factors most commonly found to have reduced poverty.

Transfers and falling dependency ratio also contributed to poverty and extreme poverty reduction. Changes in transfers¹⁶ and demographics¹⁷ contributed to poverty and extreme poverty reduction while changes in contrib-

¹⁶ The PNAD defines income from capital and social programs using the same variable. In order to separate these two sources of income, potential income from *Bolsa Família* and *Benefício da Prestação Continuada* is imputed based on the number of eligible children in the family for *Bolsa Família* and the value of the variable (i.e., if it is the same as the minimum wage, the variable is assumed to be income from BPC). The potential income from social programs is then added to the income from *abono de permanência* and remittances to define "transfers," while the remaining income is defined as "capital gains." See Firpo, Pieri, Pedroso, and Souza (2013) and Barros et al. (2006).

¹⁷ The share of adults means the number of adults in a household. It is a demographic measure particularly useful in appreciating the evolution of dependency ratios and/or the effect of "youth bulges"—notably in combination with the share of occupied, i.e., the number of adults per household in the workforce. (See Azevedo, Inchauste and Sanfelice, 2012.)

Figure 15. Labor income contributed most to decreasing poverty and inequality in RMs

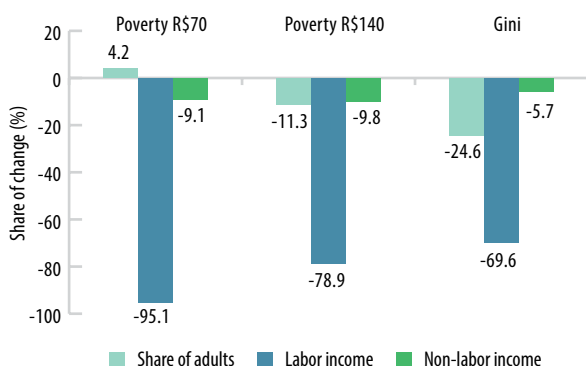
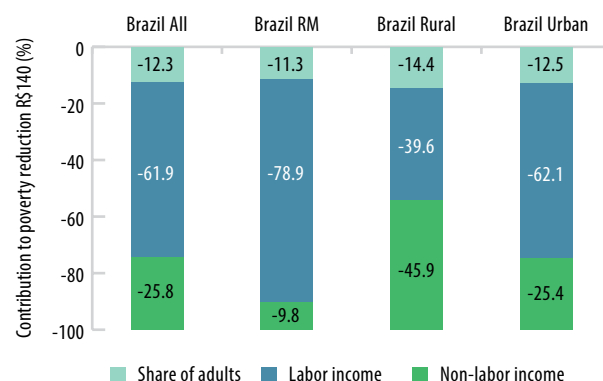


Figure 16. The contribution of labor income to poverty reduction was the largest in metropolitan setting



Source: World Bank calculations using PNAD 2004/2012; Note: The share of adults (occupied) corresponds to the number of adults (occupied adults) in the household. Non-Labor income includes transfers, pensions, capital and other non-labor incomes. Poverty lines used are R\$70 (extreme poverty) and R\$140 (poverty).

utory pensions and changes in employment had negative effects on extreme poverty reduction. Across RMs, changes in transfers and the share of adults in households (falling dependency ratio) reduced poverty, with the latter particularly influential in Porto Alegre and Curitiba. Transfers played a positive role in every RM and, after labor income, were generally the second- or third-biggest factor in reducing poverty (trading off with the share of adults in the household). However, transfers played a smaller role than at the national level, likely due to the overpowering aspect of labor income in RMs. With a small, negative influence on poverty, an increasing share of adults occupied in the work force actually acted to raise extreme poverty, highlighting some of the employment challenges of the extreme poor. This is consistent with the national trend, though the magnitude is doubled in RMs and every RM except for Distrito Federal displayed this trend. Changes in contributory pensions also contributed to higher extreme poverty in every RM (and more negligibly, also to higher poverty), suggesting that a smaller number of extremely poor RM households received contributory pensions. This may indicate a shift towards working aged households in metropolitan areas.

Changes in labor incomes contributed most (69%) to income inequality reduction across RMs but was not the dominant factor within every RM. For example, changes in the share of employed adults in the household (labor participation) in the RM São Paulo and share of adults (dependency ratio) in São Paulo and Porto Alegre contributed more to reduction in the Gini than la-

bor income. In Recife and Fortaleza, the RMs with the two largest reductions in Gini over the period, labor incomes dominated, with the second-highest factor contributing less than 12% in each. In the RM Salvador, labor income accounted for over 50% of the reduction in Gini, but transfers were close behind and mattered more in the RM Salvador than in any other RM. Across RMs, transfers, demographics, and employment (apart from Rio de Janeiro and Belém) contributed to income inequality reduction, while capital generally had the opposite effect, especially in São Paulo. In the case of the RMs Salvador and Belém, contributory pensions also exerted a drag on inequality reduction exceeding 25%.

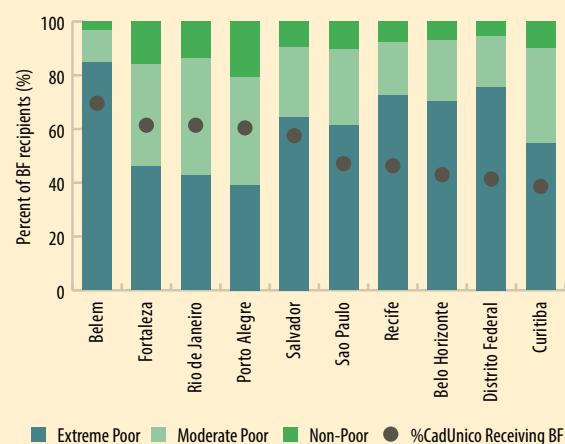
In RMs, changes in household demographics and labor market participation accounted for more of the change in income inequality than at the national level, while transfers accounted for less. Labor income had a relatively similar influence at both levels. But other factors had differing impacts. The effect of share of changes in the household share of adults was almost 25% in the RMs while it was 13% at the national level. The impact of the share of employed differs similarly, with a contribution towards the reduction in the Gini of almost 20% in RMs compared with only 3% at the national level. Capital had a much larger negative impact on income inequality reduction in the RMs, while transfers and contributory pensions accounted for half of the importance in RMs as at the national level. The marked contribution of demographics is particularly important for a country in the advanced stages of its demographic transition. A sizeable share of

Box 3. Social Programs in Brazil's RMs

The Brazilian Government is implementing multiple programs to fight multidimensional poverty. These programs include *Bolsa Família* and *Segurança Alimentar*. Many are run by the Ministry of Social Development (MDS, *Ministério do Desenvolvimento Social e Combate à Fome*) as part of the *Brasil Sem Miséria* plan, which began in 2010. The flagship program against poverty, the conditional cash transfer (CCT) scheme *Bolsa Família*, dates to 2004. It provides R\$70/month money to households in extreme poverty (based on an extreme poverty line of R\$70 per month), with an additional R\$30-32 for each child in the family. This can be higher based on conditions fulfilled by the family. The purpose of *Bolsa Família* and other CCT programs is to provide additional income to families that are below a given income threshold, provided that they fulfil certain conditions that help future human capital accumulation and overall development. In the case of *Bolsa Família*, these conditions include school attendance for children between the ages of 6 and 17, participation in maternal and child health courses provided by the Health Ministry, and remaining up to date on vaccinations. Furthermore, households must have a child under the age of 17 or be expecting a child.

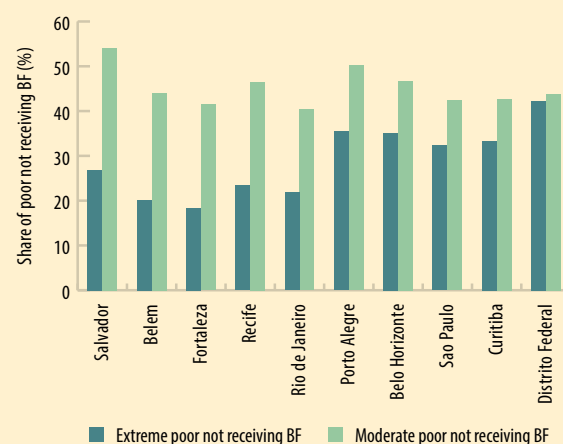
A major portion of the extreme poor in Brazil's RMs receive benefits from *Bolsa Família*, but the moderate poor are largely left out in some RMs. Percentages of RM populations receiving benefits from *Bolsa Família* range from 10% (Curitiba) to 31% (Fortaleza). This represents over 40% of registrants in the CadÚnico in each RM. In seven out of the 10 RMs, the extreme poor are the majority of recipients of BF. This means that a large portion of the neediest is receiving social support. However, in RMs in the North and Northeast, which have some of the highest poverty rates, there may be little room left for the moderate poor to also benefit from social assistance. In these RMs, the share of the extreme poor registered in CadÚnico but not receiving *Bolsa Família* benefits is lowest, but the gap between the moderate poor and extreme poor not receiving benefits is largest. In greater or lesser form, this pattern exists across RMs. This may be what is reflected in the reduced access to services and educational attainment of the moderate poor, discussed in section C.D of this report.¹⁸

Figure 17. Recipients of *Bolsa Família* are primarily the extreme poor



Source: World Bank calculations using Cadastro Único (MDS SAGI online database).

Figure 18. Many of the moderate poor do not receive benefits



Source: World Bank calculations using Cadastro Único (MDS SAGI online database).

¹⁸ The income aggregate used by the Cadastro Único program varies from that used in the computation of the poverty numbers provided at the beginning of this note.

Box 4. Tax incentives and business registration simplification for reducing informality

Micro and small enterprises (MSEs) play an important role in Brazil's economy, employing 67% of the labor force and contributing 20% to the GDP, according to IBGE.¹⁹ MSEs are also critical for RMs' development, employing about 60% of the workers in the largest RMs (RAIS and CAGED, 2013). Studies show that simplification of business registration procedures and streamlining of tax systems encourages MSEs to formalize, while formalization in turn leads to job creation and increases firm productivity, which could have positive implications for poverty reduction and shared prosperity. This pattern is especially important for RMs where informality continues to be a main issue, particularly for the poor and vulnerable.

Prior to the mid-1990s, the complexity of the Brazilian tax system presented a serious constraint to MSEs' growth and development and helped create high informality. To address this problem, the Brazilian Government implemented a new simplified tax system for micro (annual gross revenues up to R\$120,000) and small firms (up to R\$720,000) in 1996.²⁰ Known as the SIMPLES, its goal was to reduce cost of doing business, facilitate tax payments and broaden the tax base. This hope was that this would facilitate growth of small, labor-intensive firms and enable them to compete with large firms. For that reason, SIMPLES explicitly excluded from program eligibility all activities that by law require the employment of professionals from regulated occupations.

SIMPLES established a new progressive tax rate system that combined federal, state and municipal taxes into one. Businesses using SIMPLES were able to substitute up to eight taxes and social security contributions for a single tax rate on their annual gross revenues, with rates varying from 3% to 5% for micro-enterprises, and from 5.4% to 7% for small firms (Fan et al. 2008).²¹ Moreover, while the state and municipal taxes—the *Imposto Sobre Circulação de Mercadorias e Prestação de Serviços* (ICMS) and the *Imposto Sobre Serviços* (ISS)—were initially not included in SIMPLES, states and municipalities could enter into agreements with the Federal Government to transfer to it the collection of the corresponding taxes through an increase in the SIMPLES rates (Fajnzylber et al. 2011).

Several evaluations of this reform showed a significant positive impact on firm formalization leading to job creation and increased firm productivity (Monteiro and Assuncao, 2006; Fajnzylber et al. 2011). Monteiro and Assuncao used the 1997 Urban and Informal Economy Survey (ECINF) which covered 40,000 firms in the Brazilian state capitals and metropolitan areas and applied difference-in-difference estimation method. They found that the SIMPLES reform increased formality by 13 percentage points, which in turn stimulated investment and switching of the firms from short-term to long-term projects. Fajnzylber et al., using the 1997 and 2003 ECINF and implementing a regression discontinuity analysis, also found that SIMPLES led to significant increase in formalization of enterprises. Moreover, formalization was associated with job creation, increase in capital intensity, and productivity.

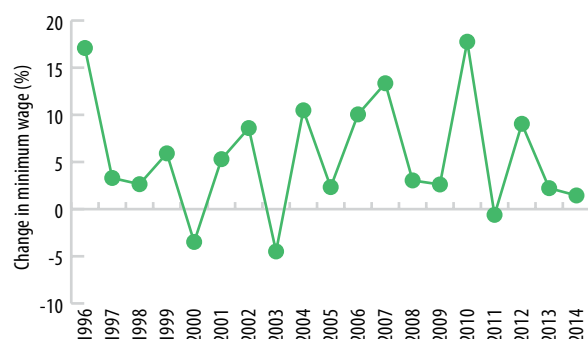
Other countries in LAC have implemented innovative reforms to encourage formalization of businesses. For example, Mexico in 2002 enacted the Rapid Business Opening (SARE) reform, which reduced the average number of days, procedures and office visits required to register a business. Evaluation of that reform using discriminatory analysis showed that it significantly increased the number of formal businesses and generated wage employment (Bruhn, 2013).

19 <http://thebrazilbusiness.com/article/brazilian-tax-simples-nacional>.

20 The definition of micro and small enterprises was amended in 2006: a firm was considered micro if its annual gross revenues were equal or less than R\$240,000, and it was considered small if its annual gross revenues were between R\$240,001 and R\$2,400,000. In 2011, the president of Brazil proposed to increase the ceiling from R\$240,000 to R\$360,000 for micro firms, and from R\$2.4 million to R\$3.6 million for small firms. <http://riotimesonline.com/brazil-news/rio-business/tax-changes-for-small-businesses-in-brazil/#>

21 The taxes and contributions covered by SIMPLES included (1) corporate income tax (*Imposto de Renda das Pessoas Jurídicas*—IRPJ); (2) tax on industrialized products (*Imposto sobre Produtos Industrializados*—IPI); (3) social security contribution to fund unemployment insurance and other social programs (*Contribuição para o PIS/PASEP*); (4) social security contribution on net profits (*Contribuição Social sobre o Lucro Líquido*—CSLL); (5) social security contribution (*Contribuição para o Financiamento da Seguridade Social*—COFINS); and (6) employers' social security contributions (*Contribuição para a Seguridade Social a cargo de Pessoa Jurídica*).

Figure 19. The real minimum wage increased substantially between 2004 and 2011



Source: World Bank calculations using Ipeadata. Note: Change is the percentage change in real terms from January of each year.

its population is entering retirement. Yet there remains a young population (particular in the North and Northeast) whose productive participation in labor markets will define how shared prosperity is sustained, especially in metropolitan settings which attract young migrant workers.

B. Improved labor market outcomes and policies increased labor incomes

Labor incomes increased by more than one third overall between 2004 and 2012 and increased the most in the lowest deciles. While the average level of labor income across RMs in Brazil increased by 36%, workers in the lowest deciles of the household per capita income distribution saw their labor incomes increased by much more—73% for the first decile and 93% for the second. This was not unique to RMs, as labor income also grew fastest for the lower deciles at the national level.

A number of factors contributed to raising labor incomes in the RMs since 2004, chief among them: lower unemployment and informality rates as well as higher hourly wages. Efforts to increase access to education translated into an increased availability of skilled workers in 2012 compared to 2004, as evidenced by an increase of almost one third in the rate of adults with a secondary or higher level of education. While labor force participation remained relatively stagnant over this period, unemployment in the RMs dropped by almost half to 7%. Echoing this improving labor market environment was the decrease in informality from 31% in 2004 to 22% in 2012. Implementation of special tax and registration regimes

have supported the transition to formality by lowering bureaucracy and the tax burden for small enterprises to declare formal employees. (See Box 4.) Still, while all RMs improved in labor market indicators, large variations between RMs persist. As with other dimensions of the analysis, the Northeast RMs continue to lag behind the Southeast. In 2012, the highest performer in the Northeast was still below the lowest performer in the Southeast in terms of hourly wage, informality, unemployment, and average labor income.

Brazil increased the minimum wage, raising it in real terms by more than 70% from 2002 to 2013, directly benefiting workers in the formal sectors in RMs but also those working in the informal sectors. Not only did this directly benefit the more than 10 million workers paid at minimum wage levels, it also helped workers across the labor income distribution by raising the wage floor.²² Even though the minimum wage primarily concerns workers of the formal sector, in dynamic labor markets, it also serves as a reference point for informal work and for many of the self-employed. According to IBGE, the change in minimum wage raised the share of wages in the GDP from 46% to 58% between 2003 and 2012.²³

C. Gender differences persist in labor outcomes across RMs

Female labor market income contributed significantly poverty and inequality reduction in RMs. (See Figure 20). Though less than the contribution of male labor income, female labor income still contributed almost one third of the decline in extreme poverty and over 15% of the decline in both inequality and poverty. Similarly, increased female labor force participation helped drive down poverty, extreme poverty and inequality, while declining participation rates for men drove up extreme poverty.

22 The substantial increase of the minimum wage in Brazil also has had direct impact on pensioners, a growing portion of Brazil's population, because there is an automatic link between the minimum pension and the minimum wage. At present all pension recipients—which include all people aged 65 and above—receive at least the minimum wage, which is almost 10 times the extreme poverty line (R\$70).

23 SAE, (2013), *Vozes da Nova Classe Média - Caderno #4 : Classe Média e Emprego Assalariado*, Brasília: Secretaria deAssuntosEstratégicos(SAE).

Box 5. Minimum wages in Brazil and its RMs

Brazil's first minimum wage was enacted in 1936 by President Getúlio Vargas. Following Courseuil and Servo (2002), Brazilian research on the topic can be divided into three groups: (1) papers that estimate the effect of minimum wage on wage distribution, (2) papers that investigate the relation with income distribution, and (3) papers that analyze other effects on the labor market.

One possible challenge for empirically studying the effects of changes in the minimum wage is to determine a counterfactual or a control group that was not affected due to the simultaneous nature of changes for all individuals. For this, the literature has tended to concentrate on wage distribution analysis focusing on employed workers or, when analyzing issues related to poverty, doing these using aggregated measures. Barros et al. (2001) use PME data to identify who is affected by the minimum wage. Following individuals from 1995 to 1998, they decompose variation in poverty level and show that components of the minimum wage not related to labor markets significantly reduced poverty.

Firpo and Reis (2007) show that a continuous increase of the minimum wage above inflation between 2001 and 2005 caused a reduction in wage inequality from 30% to 60%, depending on the inequality measure used. Such effect on inequality is also found in Jales (2012) for the period between 2001 and 2009. In this paper, the author proposes a methodology for estimating the latent distribution of wages in the absence of the minimum wage policy. Using this framework, the author finds that the reduction in wage inequality was accompanied by an increase in unemployment and a reduction of the formal sector of the economy that consequently reduced labor tax revenues.

Another topic in the literature begins with the creation of regional wage floors in 2000.²⁴ Five states enacted this policy: Rio de Janeiro, São Paulo, Santa Catarina, Rio Grande do Sul, and Paraná. Moura and Neri (2008) present evidence of the impact for the first years of regional wage floors in Rio de Janeiro and Rio Grande do Sul, finding that the floor is not binding for most of the firms paying lower salaries. Courseuil, Foguel and Hecksher (2012b) estimate the impact of wage floors on Paraná and São Paulo using PNAD data and the methodology developed by Abadie, Diamond and Hainmueller (2010) known as synthetic control. They find positive effects on income and employment but only for some occupations. The establishment of regional floors also presents opportunity to use additional econometric tools to study poverty and unemployment. It further underlines the necessity of bringing a geographical lens to the analysis, because regional floors can change wage distribution distinctly by state and occupation.

Looking at RMs to assess how changing the minimum wage could affect wage distribution for the present analysis, the authors implement a regression discontinuity design (RD) for each of the RMs using the PNAD and following Lee (2008) and Lee and Lemieux (2010). The results show that for all except Rio and São Paulo, there is a peak around the minimum wage value. This shows that a large share of workers have their incomes concentrated at the minimum wage level and therefore changes in its level can substantially affect the labor market for the employed.

Given the bunching of workers around the minimum wage line across RMs, a second step in the analysis involves looking at the possible effects this policy could have around the cut-off of wages distribution. The inference is that a worker receiving the minimum wage would expect his or her own wage to be exactly or barely above the minimum wage value. Thus, the authors of the present report look at the cut-off generated by the minimum wage value (wage demeaned equals wage less minimum wage values) to estimate the effect of the minimum wage on formality, schooling years, the probability of the head of household being a man, and access to assets. The results show a strong discontinuity when formality is used as a dependent variable, echoing the results of Jales (2012). This means that the implementation of a minimum wage policy against low wages has the adverse effect of reducing the proportion of formal contract vacancies in the labor market, particularly in RMs where wages are concentrated around the minimum wage or below it. However, no impact is found on other outputs when restricting the analysis to the occupied population.

24 Regional floors vary but can't be lower than the federal mandatory statutory minimum wage. Moura and Neri (2008) document how some firms do not pay the wage floor in spite of the law.

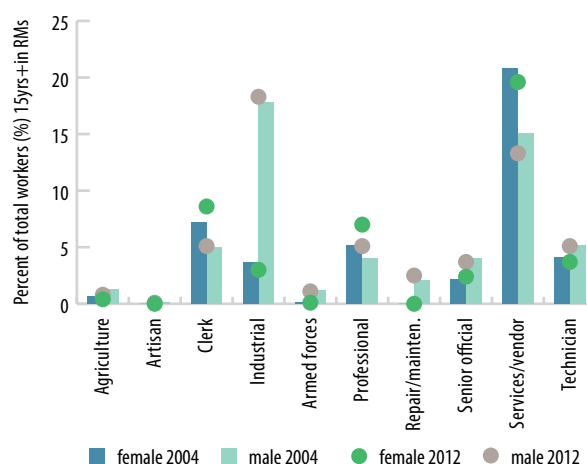
Figure 20. Women's labor income is an important contributor to reduction of poverty and inequality in Brazil RMs



Source: World Bank calculations using PNAD 2004, 2012. Note: "Transfers" are based on imputed values of social program payments. Poverty lines used are R\$70 (extreme) and R\$140 (moderate). See for details on poverty lines in Brazil. Brazil RMs only.

Females continue to have worse labor outcomes than males across indicators such as hourly wage, informality, labor force participation, unemployment, and part-time employment. But, since 2004, the differences in rates between males and females of all of these indicators except for hourly wage have lessened. However, the fact that the difference in wages slightly increased over the same time period indicates that progress towards gender equity in the labor market is not extending to financial outcomes. When controlling for factors that may affect wages, such as migration status, union affiliation, weekly hours worked, informality, age, and education, the wages that women living in RMs earned was significantly less than men's. In fact, being a woman was the largest determinate of the variables considered, and, alarmingly, this negative effect increased, especially for poor women, from 2004 to 2012. (See Annex 15.) Continued gender segmentation in labor markets may also contribute to these differential outcomes, which show a higher share of women in services and a significantly larger share of men in industrial employment (Figure 21).

Figure 21. The share of female and male workers by occupational category has remained relatively stable since 2004



Source: World Bank calculations using PNAD 2004, 2012. Note: workers 15 years and older. Brazil RMs only.



Increased access to a range of services has almost eliminated multi-dimensional poverty

Access to basic goods and services is approaching universal coverage in RMs

Compared to the national rates, access to basic goods and services in the RMs is higher, but the gap between the nation and the RMs is closing.²⁵ Rates of child school enrollment, access to electricity, and possession of basic assets are similarly high at the RM and the national levels, but RMs are performing slightly better than the nation in terms of safe water, shelter, and educational attainment (See Figure 22). RMs have markedly greater sanitation coverage than national figures, with rates close to 15 percentage points above the national level. Compared to 2004, the access gap between RMs and Brazil has narrowed across indicators, shrinking the most in terms of assets and safe water.

As of 2012, over 90% of the population in RMs had access to basic goods or services. Over 97% of individuals lived in households that had quality shelter, safe water, electricity, and possessed two out three of the following three goods: refrigerator, telephone, and clean cooking

stove. Over 90% of individuals lived in households that had basic sanitation, children enrolled in school, and at least one household member with eight years of education. While those coverage rates are encouraging, they also signal the complexity of reducing the remaining gaps. More targeted and integrated approaches will be required for this task.

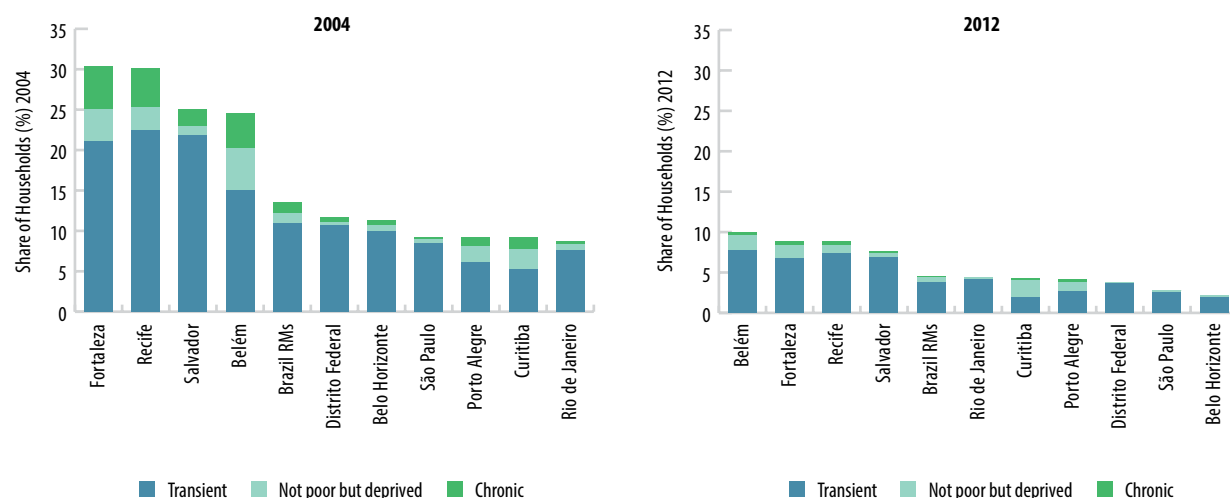
Figure 22. Access to services is higher in the RMs but Brazil as a whole is catching up



Source: World Bank calculations using PNAD 2004, 2012.

25 See Annex 9 on the calculation of the MPI.

Figure 23. The Northeast remains the poorest region, but rates have fallen significantly



Source: World Bank calculations using Cadastro Único (MDS SAGI online database).

Source: World Bank calculations using Cadastro Único (MDS SAGI online database).

While monetary poverty has fallen significantly in Brazil RMs, the reduction is more striking in multi-dimensional poverty. Chronic poverty—which combines these two forms of deprivation—has been virtually eliminated and the remaining monetary poverty now constitutes the main challenge, particularly in the Northeast. While monetary poverty remains the main indicator for poverty reduction, many countries, including Brazil,²⁶ recognize the importance of looking at poverty from a multi-dimensional perspective, which measures access to different types of goods and services. (See Box 6 and Annex 9 for detailed descriptions of this approach.) The indicators and deprivations criteria used in the present analysis are based on previous work done on chronic poverty in Brazil (World Bank, 2013).²⁷

MPI analysis for the RMs shows that rising incomes and a concerted effort by the Brazilian government have nearly eradicated chronic poverty within the large metropolitan regions. Its incidence fell below 0.5% in all ten of the RMs considered, and was also low at the na-

tional level. While some of the RMs have had low levels of multi-dimensional poverty since 2004, such as São Paulo, others such as Fortaleza and Belém achieved this low level of chronic poverty through more significant reductions of around 7 percentage points (See Figure 23). Since monetary poverty in RMs is also low, the largest group of people who are poor only in monetary terms, called the transient poor—makes up only 3.8% of the population. Still, not only do those percentages represent large numbers of people due to Brazil's size, but the deprivation criteria (threshold cut-offs) may need to be revised to better account for the specificities of vulnerability in a metropolitan setting.²⁸

B. Equitable access to quality education remains a problem

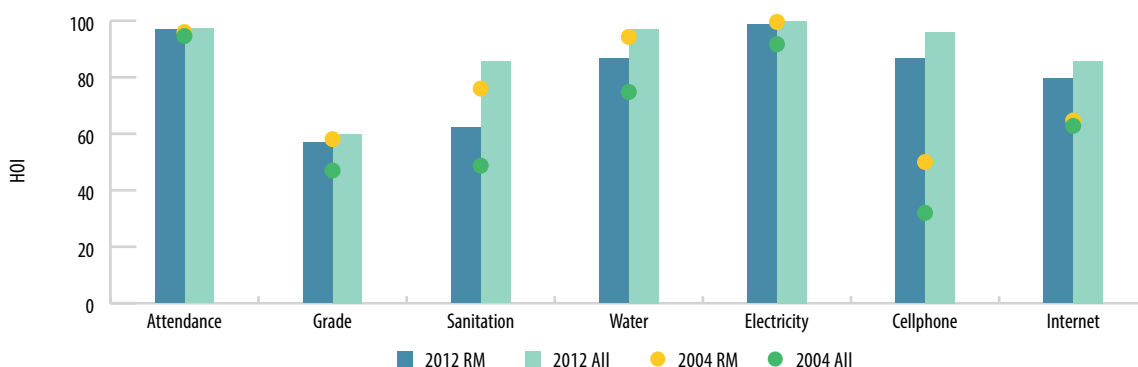
Children in Brazil's RMs have better opportunities than in other settings, but equitable access to quality education and sanitation is still not universal. Using

26 Brazil's Ministry of Social Development (MDS), which is charged with the *Brasil sem Miséria* plan and the *Bolsa Família* program, clearly states that poverty is a multi-dimensional phenomenon—even though the ministry has primarily used administrative income poverty lines (R\$70 and R\$140) to set and monitor its poverty objectives. See MDS (2013) : *Programa Bolsa Família : uma década de inclusão e cidadania*; MDS/ SAGI (2014) : *Pobreza multidimensional: subsídios para discussão à luz do MPI/OPHI*.

27 See Annex 9 on the Multi-Dimensional Poverty Index (MPI) methodology.

28 A number of Latin America countries such as Mexico and Colombia have designed their own MPI indicators to monitor poverty. This may provide Brazil with relevant experience to follow suit in the future. (Santos, M., 2013: *Measuring Multi-Dimensional Poverty in Latin America: Previous Experiences and the Way Forward*, OPHI Working Paper N.66.) The Santos paper analyzes methods most used by researchers to select poverty dimensions; existing data or convention; theory, namely the selection of dimensions based on implicit or explicit assumptions of what people value or should value; public "consensus," ongoing deliberative participatory processes, and empirical evidence regarding people's values.

Figure 24. The HOI is higher in RMs than in the nation but still low in school quality, sanitation, and home Internet



Source: World Bank calculations using PNAD 2004, 2012.

Box 6. Measuring non-income-based levels of social welfare in metropolitan Brazil

Though its philosophical roots reach back to Aristotle, non-monetary approaches to welfare only became prevalent within economic literature in the late 20th century, following Amartya Sen's seminal Tanner Lectures on basic capability equality delivered at Stanford University in 1979. Since then, various approaches to measuring well-being through non-monetary indicators have been applied to assess poverty and inequality in developing countries. One such indicator is the Multidimensional Poverty Index (MPI), developed by Sabina Alkire and James Foster. The MPI examines the intensity of deprivation across indicators that are believed to be closely linked with well-being, such as education, housing conditions, and the accumulation of assets. When a household lacks access to a certain number of these basic services or goods, it is considered to be "multi-dimensionally poor." (See Annex 9.)

Alkire et al. (2014) argue that the MPI can directly compare well-being outcomes between urban and rural locations. However, evidence suggests that for a more precise understanding of well-being, the MPI should be tailored to the location. Generally, income-based poverty lines correspond to different levels of well-being in urban and rural settings due to different market structures in those areas and generally underestimate urban levels of poverty. This makes the MPI an important component to compare settings.²⁹ However, to characterize urban poverty beyond its comparability with rural settings, the MPI should be tailored to factors relevant to life in cities. Having "access" to a particular service is not enough in an urban setting, where population density may impinge on quality of such services as sewage, water and trash, and where lapses in service are more problematic. To enhance the urban MPI, indicators of quality of life in urban settings that are not as applicable in rural settings, such as home eviction rates, lack of transportation, and exposure to crime should be considered. However, to date there is no good repository of such information.

In order to tailor the MPI to urban settings in Brazil, more and better data is needed. The national household survey (PNAD) is limited in sample size and scope of questions asked during the interview, while the Census faces a similar issue of question scope and comes out only every 10 years. Data being gathered by municipal and state governments and service providers are therefore key to better tracking and understanding basic well-being in urban Brazil. Policy makers need to adopt systems to easily share and connect these data so as to create a more comprehensive picture of well-being at a more disaggregated geographic level. Alternatively, specific surveys can be undertaken in order to directly collect this type of data. Since 2008, the state of Minas Gerais has been doing this in its *Travessia* program, which uses the MPI to target areas most in need of funding and technical assistance to provide services and access to housing.³⁰

29 See extract of DANIDA. 2002. "Improving the Urban Environment and Reducing Poverty." Workshop paper. Copenhagen, Denmark from <http://web.mit.edu/urbanupgrading/urbanenvironment/issues/how-much-poverty.html>.

30 Tribunal de Contas do Estado de Minas Gerais. 2011. "Relatório de Auditoria Operacional: Programa Travessia". Belo Horizonte. <http://www.tce.mg.gov.br/IMG/Travessia.pdf>.

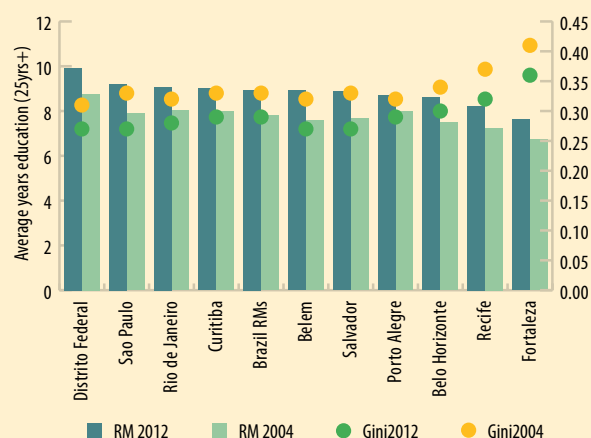
Box 7. Quality of education indicators have improved in RMs

All RMs increased average years of education and reduced educational inequality between 2004 and 2012. Across metropolitan Brazil, average years of education increased by 1.1 years. In 2012, the Distrito Federal and the largest RMs, São Paulo and Rio de Janeiro, achieved the highest average educational attainment rates (more than 9 years), while Recife (8.2 years) and Fortaleza (7.6 years) had the lowest. All RMs performed better than their respective states in both 2004 and 2012, with the rates differing most for the middle performers. In general, the RMs with higher levels of educational attainment had lower levels of educational inequality.³¹ (See Figure 25.) This indicates the importance of increasing educational attainment, particularly in lagging RMs such as Recife and Fortaleza, where the education Ginis were 0.32 and 0.36, respectively.

Grade repetition and drop-out rates have improved across RMs but there is still variation among RMs. From 2005 to 2012, every RM lowered its rates of dropouts and grade failures for elementary education. On average, RMs cut the dropout rate by half to reach just 3% and decreased the grade failure rate by 4 percentage points to 10% in 2012. (See Figure 26.) These rates are similar to those seen across all of Brazil. In 2012, RMs with the highest grade failure rate also had the highest dropout rates. This was notably true for Salvador, which had a grade failure rate more than 60% higher than the overall RM rate and, despite improving the most over the time period, retained one of the highest dropout rates across RMs. The reverse applied in the best-performing RMs. For instance, São Paulo's dropout rate was under 1% and its grade failure rate was half that of all Brazil RMs. The reason why some RMs (notably São Paulo) have lower failure rates could be related to a policy called *Progressão Continuada* (Continued Progressions) or *Aprendizagem em Ciclos* (Learning in Cycles). In São Paulo, this policy allows students to fail only at the end of a school cycle (fifth grade or ninth grade). The program has been effective in cutting drop-out rates, but its impact on learning is controversial.

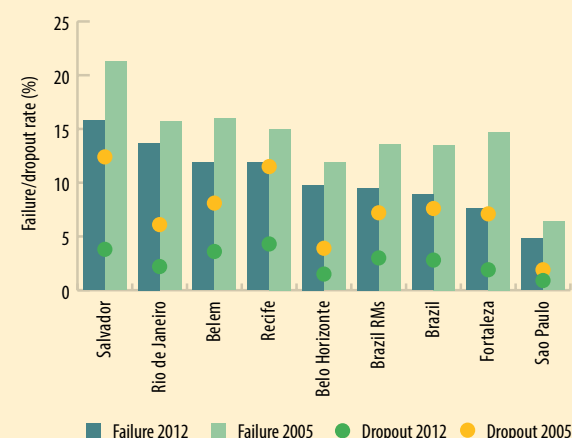
Looking at an index of school infrastructure and teacher training rates shows that, on average, schools located in RMs improved and performed slightly better than schools overall. The main reason is that the RMs' municipal schools perform better than municipal schools overall. Differences between the performances of state schools are more limited. Between 2007 and 2012, school infrastructure and teachers' training rates improved across RMs. Especially impacting training was a substantial increase in teachers' access to higher education. As of 2012, São Paulo and Belo Horizonte performed well in both infrastructure and teacher training. Rio de Janeiro performed better than the Brazil RM rate in infrastructure but below the Brazil RM rate in training. Meanwhile, RMs located in the Northeast all performed below the Brazil RM average in both.

Figure 25. Educational attainment and education inequality improved across RMs



Source: World Bank calculations using PNAD 2004, 2012.
Note: Adults age 25 years old and up used in calculations.

Figure 26. Grade repetition and dropout rates declined across RMs



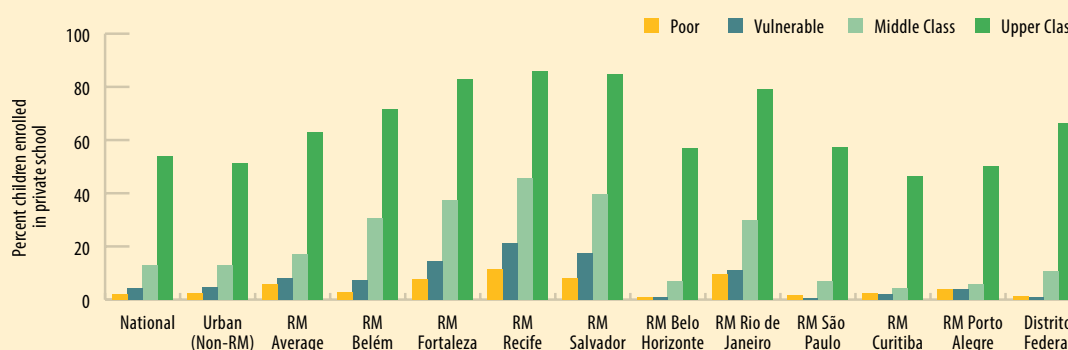
Source: Ministry of Education. Note: Elementary school rates.

31 Educational inequality is measured by the Gini index where 1 is total inequality and 0 is total equality of years of education attained by the adult (25 years+) population.

Box 7. Quality of education indicators have improved in RMs (cont.)

Still, inequity in access to quality education – a key vector of upward mobility – is particularly concerning in RM setting. More than 60 percent of the upper class and over 15 percent of the middle class children go to private schools in the largest metropolitan regions of Brazil (Figure 27). Not surprisingly, these rates are even lower for the children residing vulnerable and poor households, hovering respectively at less than 10 and 5 percent. Across metropolitan areas, opting for private school is the most prevalent in the North and Northeast RMs, where close to 90 percent of the upper class send their children to private schools and the rates even increase for the poor and vulnerable households. These results suggest that school quality is a particularly prevalent issue in the RM of Recife, Fortaleza and Salvador, although private school enrollment rates are also significant in the RM Belém and Rio.

Figure 27. More primary school children are enrolled in private school across income group in RMs (%) (2013)



Source: World Bank Calculation, PNAD 2013.

the Human Opportunity Index³² to assess coverage and equity in children's access to basic services (opportunities) shows that children in all RMs have more opportunities than at the national level, ranging from 81 (out of 100) in RM Fortaleza to 92 in RM São Paulo. These numbers compare to an index of 71 in all of Brazil. High performance on the composite HOI is largely driven by the near universal coverage rate in RMs for access to safe water, electricity, and child school enrollment (See Figure 24). The worst-performing indicator across RMs was for grade progression on time. The average rose by only about 2 points since 2004, compared to about 10 points for sanitation and 21 points for home Internet. This is particularly concerning because not only was grade progression on time the worst-performing indicator, but it has not been improving.

There are differences between the RMs both in terms of overall HOI and particular lagging dimensions.

While in RMs such as São Paulo, and Brasília (Distrito Fed-

eral) the HOIs for grade progression on time and access to sanitation are relatively high, while they are relatively low in other RMs such as Fortaleza and Belém. The RMs of Salvador and Rio de Janeiro present a mixed picture, having the two lowest HOIs for grade completion on time yet relatively good (in comparison to other RMs) HOIs on sanitation and home Internet.

Inequality in coverage captured by low HOIs for on-time grade progression and sanitation highlights a need for more targeted interventions in RMs experiencing these low HOIs. Indeed, unequal distribution of coverage based on circumstances (such as parental education or income) drives the low results for grade progression on time and sanitation in the RMs in question. The penalty for inequality of grade progression on time was the highest among opportunities for the RMs and was the same as the national average (6.4 points). The analysis shows that the education of the household head and household per-capita income continued to be strong determinants in the inequality of distribution of basic opportunities among children. It could therefore hinder intergenerational mobility in RMs as in the rest of the country.

32 The HOI is a measure ranging from 0 to 100 of the coverage rate of children's access to basic opportunities adjusted for the equity of distribution based on uncontrollable circumstances such as gender, race, and parents' income. For a comprehensive explanation of how HOI is calculated, see Annex 10.



Spatial inequities are pronounced within RMs - heightened by constrained mobility

A. Core municipalities have lower levels of poverty and higher access to services than peripheries but are also more unequal

Income inequality within core municipalities is consistently higher than within inner peripheries. Census data from 2010 shows a clear pattern of higher levels of income inequality in the core municipalities of RMs (i.e., the state capitals) than in the rest of the municipalities of the RMs. (See Figure 28.) Among the six RMs in the Northeast and Southeast, core municipalities have a Gini Index that is 10 points higher, on average, than in their inner peripheries, with the lowest (Salvador) and highest differences (Fortaleza and Recife) in the Northeast. That inequality is higher in the cores of these RMs is not surprising since density brings together people from various backgrounds, but it is this density that makes lowering inequality especially critical given the greater likelihood of physical interaction between people from varying economic levels.

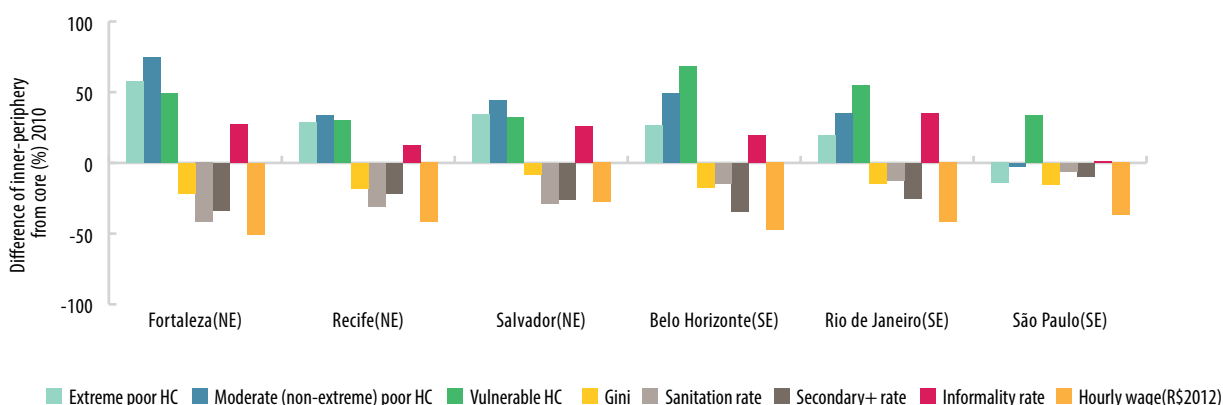
In terms of access to services and educational attainment, two measures are systemically lower outside the

core: access to sanitation and adults' rates of secondary education. But rates of school enrollment are generally similar between cores and their inner peripheries.

Access to sanitation is lower in every RM outside the core. This pattern is most marked in the Northeast, where the core-periphery difference is over 20 percentage points. Similarly, adults (15 years and older) living in the core are more likely to have higher secondary education rates, with an over 10 percentage point difference between the core and inner periphery in each RM with the exception of São Paulo, which differed by only half as much (4.5 percentage points). By contrast, school enrollment does not show large differences, and, as of 2010, was close to 90% across geographical areas and across RMs. With the inner peripheries growing their populations at a faster rate than the cores, improving these access rates will only become more important (See Figure 29).

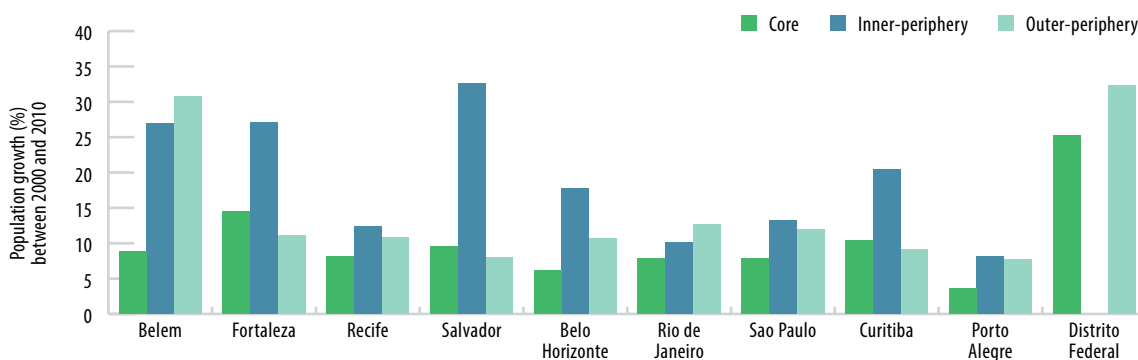
Workers earn less and are more likely to be informal outside the cores of the RMs. In the inner peripheries, hourly wages are 40% lower than in the cores, as a simple average across the Northeast and Southeast RMs. In addition, informality is always higher outside the cores,

Figure 28. Differences between cores and peripheries are notable across RMs with the exception of some indicators in São Paulo



Source: World Bank Calculation, Census 2010.

Figure 29. Inner peripheries are growing the fastest across RMs



Source: World Bank calculations using IBGE.

though in São Paulo the difference is small. The Oaxaca-Blinder re-centered regression (RIF) run for seven RMs confirms those findings (See Annex 14). Median labor income per capita in the inner peripheries of the RMs is lower than in the metropolitan core, ranging from -30% in the RM São Paulo and Salvador to close to -50% in the RM Fortaleza.³³ The gap for the bottom of the distribution (10th quantile) is particularly pronounced in the RMs Rio, Fortaleza, Salvador, and Belo Horizonte (all over 20%). When comparing an RM to its outer periphery, a stark contrast is observed between RMs experiencing small to null differences (the RMs Rio, São Paulo, and Belo Horizonte,) and the rest experiencing large differences, for both the bot-

tom and the top of the distribution. This means that both the vulnerable and better-off residents of peripheral municipalities are working in lower quality jobs and receiving lower wages, regardless of formality, than the core, so that improved mobility matters for the full spectrum of the income distribution.

B. The effect of urban mobility on these spatial differences warrants further analysis

Better urban mobility will be critical to connecting the RMs' most deprived inhabitants and to job opportunities and to overcome other spatial mismatches. As one of the key issues of the June 2013 protests, urban mobility undoubtedly constitutes a priority issue for Brazil policy makers—and one directly related to shared prosperity.

33 This measure excludes pensions and benefits received from social programs like *Bolsa Família* and *Benefício de Prestação Continuada*.

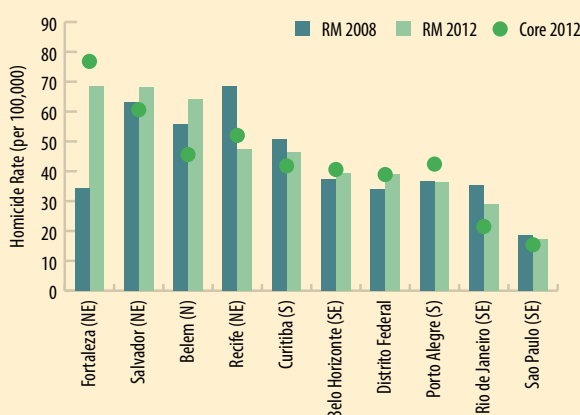
Box 8. Crime in metropolitan Brazil

RMs in the North and Northeast had the highest rates of violent crime of RMs in Brazil in 2012 (Figure 30). Crime levels rose in four out of ten RMs, remained roughly stagnant in 3 RMs, and fell in another 3, with strongest decline in Recife. The RM Fortaleza had the highest rate of all, with 69 homicides per 100,000 residents per year, while the RM São Paulo had the lowest at 17. Looking within the RMs, there is no clear pattern between center and periphery crime rates. In general, crime rates in the core of the RM were similar to the overall RM, although the core had much higher rates in Fortaleza, while in Belem and Rio de Janeiro, crime affected the core slightly less than the overall RM.

Fortaleza, once one of the safest RMs in terms of homicide, is now the most dangerous, while Recife, once the most dangerous RM in Brazil, has become the safest.

The murder rate doubled dramatically in the RM Fortaleza, while in the RM Recife, it fell by close to one third of the 2008 rate. Recife's success in reducing homicides may reflect Pernambuco state's *Pacto Pela Vida*, a public safety initiative that began in 2007 and has 138 different programs. The state's large reductions in poverty and inequality (the largest across all RMs) may also have played a role, as various studies have linked poverty and inequality to crime rates. (See Fajnzylber, Lederman, and Loayza, 2002 and Poveda 2011.) Given the changing dynamics of crime and the relatively high homicide rates across the country, more research into security programs such as the *Pacto Pela Vida* or Rio de Janeiro's *Unidade de Polícia Pacificadora* (UPP – Pacifying Police Unit) and their effect on social welfare would help policy makers tackle both issues of crime and of poverty and inequality facing Brazilians. While governments at the national and state level have started to invest in better monitoring and evaluation systems of crime and violence, more remains to be done to evaluate the cost effectiveness of the numerous citizen security programs developed over the past couple of years. To do so will require not only information pertaining to the incidence of crime and violence but also disaggregated information on the programs themselves such as geo-referenced funding amounts, police force capabilities, crime reporting, and the dates of implementation or scale-up of any actions to account and disentangle the effects of those interventions.

Figure 30. Homicide rates have soared in Fortaleza and declined in Recife in recent years



Source: World Bank calculations using CEBELA, 2014. "Mapa da Violência"; Ipeadata/IBGE.

The fact that educational levels and returns to education are lower outside the core and lower still outside the RM, as shown in the OB analysis conducted for the stand-alone notes, suggests that people are constrained in their ability to commute to better labor opportunities in the centers of the RMs. A growing consensus exists that poor job accessibility contributes to poor labor outcomes for lower-skilled ethnic minorities (Kain 1992, 2004; Ihlanfeldt and Sjoquist, 1998; Gobillon et al, 2007). On the other hand, no consensus exists on the magnitude of the spatial mismatch and on which groups most are affected (Ihlanfeldt, 2006). More

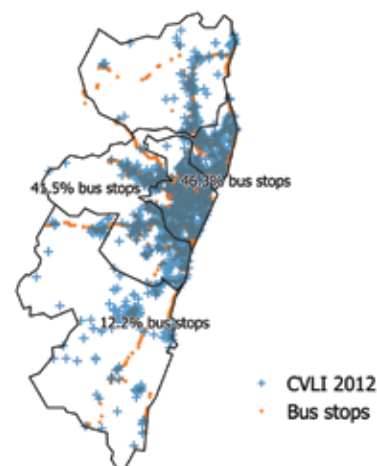
recent analysis on jobs displacement and joblessness duration in the United States (Andersson et al. 2014) gives further credence to spatial mismatch. It found that better job access significantly decreases the duration of joblessness among lower-paid workers, particularly traditionally more challenged groups (non-Hispanic blacks, women and older workers). The example of the RM Recife (Figure 14) where the localization of homicides closely matches that of bus stops also suggests that non-physical barriers can constitute additional bottlenecks to the mobility of vulnerable groups (Figure 31). Analysts looking at pover-

ty, social protection, and labor market in Brazil stand to gain a more refined strategic policy lens if they integrate this dimension into their work. The expansion of big data analysis in the country could help in this task.³⁴

While urban mobility is undeniably critical to well-functioning labor markets in metropolitan settings, constraints on commuting time variables limit the analysis. This report highlights spatial features of poverty and shared prosperity in metropolitan and peri-metropolitan settings. But commuting time variables captured by both the PNAD and the census (long-form) do not provide significant results, either in differences in commuting time between residents of different areas of the metropolitan regions or across time. (See Annex 13.) Still, previous studies have shown that improved transportation – notably through better integration of different transportation modes (ex. train and buses) can increase access to job opportunities (Pereira and Schwanen, 2009). Taking the case of the metropolitan region of Rio de Janeiro, in 2010 a resident of Rio’s periphery spent an average of 86 minutes commuting every day (close to a ¼ of its workday) and the RM Rio de Janeiro has the lowest proportion of workers taking less than half an hour to get to work (around 40 percent in 2009). This situation curtails the access of poor and vulnerable to better labor opportunity – 55 percent of the region’s jobs are located in the Municipality of Rio de Janeiro – notably by reducing the opportunity cost to commute. Incidentally, the lack of significant results does

not necessarily mean that commuting time has no relation to poverty or economic growth. Rather, concerning the differences between the core of the RM and its inner periphery, this could indicate that lack of reliable transportation may keep people working closer to home at the cost of lost earnings from higher wages in the core. On the other hand, the categorical construction of the commuting variables in both the census and the PNAD may also not adequately capture household commuting patterns and ways in which mobility could be a bottleneck to access to services and labor market opportunities (Anderson et al. 2014).

Figure 31. Public transportation in Recife appears plagued by crime and is limited outside the core



Source: Pernambuco Open Data—Grande Recife; PPV; IBGE.

Box 9. Towards more inclusive urban transport: The RMs São Paulo and Rio

Transport infrastructure figures prominently in Brazil’s development strategy. In 2013 the State of São Paulo allocated almost two thirds of its fiscal budget to the sector, with over 22% alone earmarked for the expansion and operation of the Metro in the São Paulo Metropolitan Region (RMSP). Road and rail investments in urban mobility rank among the top investment priorities in Brazil’s large cities. These programs have traditionally focused on improving efficiency, reducing emissions, and promoting the competitiveness of cities. But more recently, policies aimed at addressing the needs of the urban poor and other underprivileged groups are increasingly gaining a salient role in the transport agenda. Corseuil and Pereira (2012a) shows that the monthly transport costs of the lowest decile represented over 20% of their income v. 15% on average, and 13% for the highest decile in 2009.

34 In particular, the use of administrative registries such as the RAIS or the CadÚnico in connection with the census and commuting data (using GTFS data of public transportation) offers much potential to refine the analysis in metropolitan and peri-metropolitan settings. Exploratory cross-sectoral discussions confirm the possibility of such analysis and its relevance for Brazil. (TBC)

Box 9. Towards more inclusive urban transport: The RMs São Paulo and Rio (cont.)

Over the last 20 years, state and metropolitan governments have combined policy and infrastructure initiatives to provide the more disadvantaged with improved access to opportunities. On the policy side, municipal and state authorities subsidized peripheral residents' using the integrated fare scheme known as "*Bilhete Unico Integrado*" (BIU). As a result, the share of household income in RMSP dedicated to transport fell by half for the moderate and extreme poor to 9% and 13%, respectively. The BUI policy and associated investments in public transportation have enabled low-income people to travel more often and access previously unreachable districts in the search for higher-paying and better-quality jobs and opportunities. The impact evaluation for the inter-municipal BUI in the Metropolitan Region of Rio de Janeiro (RMRJ) shows, for instance, that the policy increased the number of formally employed people in the municipalities with BUI, particularly in peripheral areas.

On the infrastructure side, significant investments in the suburban rail/metro network increased physical accessibility to formal jobs, particularly in peripheral areas. In the RMSP, 150,000 low-income families gained access, on average, to an additional 2.5 potential jobs within a 45-minute radius as a direct effect of Metro Line 4 implementation. In addition to large-scale transport projects, Brazilian cities have in the last few years experimented with models of mobility consisting of medium- and low-capacity systems aimed exclusively at integrating low-income no-go areas into the fabric of the city. Examples of such "pro-poor" transport infrastructure can be found in the RM Rio, such as the aerial cable car system (*teleferico*) in the informal settlements of *Complexo do Alemão and Providência*, and the *Rubem Braga* elevator connecting the Metro with a favela in a central district. On a daily basis, each of these modes serves between 8,000 and 10,000 people residing in low-income neighborhoods. While more nuanced analysis is needed to assess the impact on job creation³⁵, land value and uses, and other welfare outcomes, these systems have undoubtedly enhanced citywide accessibility and transport mode choices in formerly underserved communities. Perhaps more importantly, the new integration and connectivity have increased a sense of belonging among residents of the *favelas*.

Table 2: Households' monthly expenses on public and private transportation per income decile (POF 2009)

Household income per capita	Urban transport expenses (R\$)			Household Income (R\$)	Share of income (%)		
	Public transport	Private transport	Total		Public transport	Private transport	Total
1st decile	54.82	61.34	116.16	532.03	10.30	11.53	21.83
2nd decile	64.75	97.14	161.90	917.20	7.06	10.59	17.65
3rd decile	71.03	118.74	189.77	1,165.42	6.10	10.19	16.28
4th decile	83.82	164.72	248.54	1,490.95	5.62	11.05	16.67
5th decile	82.69	213.93	296.63	1,730.79	4.78	12.36	17.14
6th decile	88.07	262.23	350.30	2,102.56	4.19	12.47	16.66
7th decile	89.47	350.45	439.92	2,573.93	3.48	13.62	17.09
8th decile	86.57	454.56	541.14	3,257.67	2.67	14.04	16.71
9th decile	83.07	727.52	810.59	4,669.59	1.78	15.58	17.36
10th decile	76.66	1,426.78	1,503.45	10,872.28	0.71	13.12	13.83
Average	76.89	427.44	506.33	3,211.25	2.46	13.31	15.77

Source: IBGE (2010), IPEA (2012).

35 On urban transport expansion and employment see the case of the United States in Baum-Snow (2014).



Conclusion

The last decade brought significant welfare gains to metropolitan Brazil. Solid growth in these economic powerhouses helped drive extreme poverty down from 4.7% in 2004 to 2.3% in 2012 and poverty from 14.7% to 4.7%. The incomes of the bottom 40 grew by 7.7% a year, compared to 4.7% for the RM mean. Moreover, there were signs of income convergence, as the traditionally poorer Northeastern RMs experienced faster gains in both poverty reduction and shared prosperity than the other seven RMs. Overall, growth and higher labor incomes were the catalyzing force behind these gains, accounting for 95% of the fall in extreme poverty. However, in the three RMs in the Northeast (Fortaleza, Salvador and Recife), redistribution also played an important role.

Still, while poverty has fallen to just 4.7% in metropolitan Brazil, a significant number of people (2.6 million) remain poor and an even larger number of people (6.5 million) are vulnerable to sliding back into poverty. Furthermore, despite their impressive gains, the three northeastern RMs and northern RM Belém remain the poorest, with poverty rates exceeding 8%, almost double the average for metropolitan areas. These four RMs also have the lowest levels of access to sanitation and secondary education, and the highest levels of private school enrollment for middle and upper class children—suggesting significant quality problems in their schools. While these RMs made important progress in reducing income inequality, there are important spatial differences within them. Poverty remains higher in their inner peripheral municipalities compared to their core capital cities and labor market opportunities less attractive (lower wages and higher informality). The socioeconomic gaps between

these four RMs and nearby urban and rural areas are likely to continue acting as a strong pull factor, attracting more poor and vulnerable households from the interior of the state and the periphery, thus spurring further RM population growth. This is in contrast to the southern RMs, where there remain few significant welfare disparities between each RM and the rest of its state.

The first area relates to better understanding the challenges that the poor face in accessing quality employment even though they live in economic powerhouses.

The extreme poor are virtually excluded from the labor market and hence the benefits of growth. In RMs, over 80% of them are unemployed, with the rates in the RMs São Paulo and Rio de Janeiro exceeding 90%. Given Brazil's unprecedented increase in formal sector employment and historically low unemployment, this disconnect of the poor from labor markets and stubbornly high levels of informality among the vulnerable are of deep concern. In a context of possible slower growth for Brazil in the future, it will be crucial to create better performing and more inclusive labor markets to sustain the gains achieved so far.

The second area pertains to better understanding what caused the differences in inequality reduction rates observed across RMs—particularly in the Northeast. While two of the Northeastern RMs, Recife and Fortaleza, achieved the highest reductions in inequality over the time period (from 0.63 Gini points to 0.50 and from 0.60 to 0.51 respectively), the third (Salvador) is falling behind in this dimension. Further investigation behind those differences could help shed light on how to sustain and deepen inequality reduction all over Brazil.

The third area concerns the persisting gaps in service delivery and quality—between the middle and up-

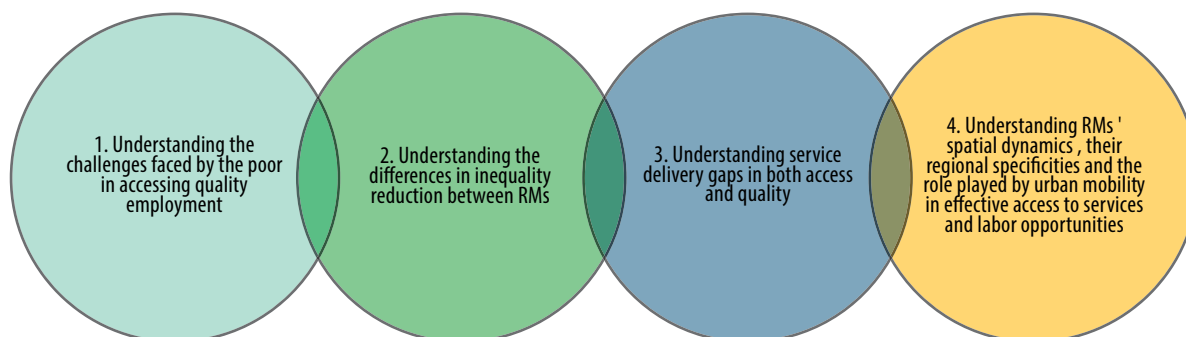
per classes on one side and the poor and vulnerable on the other, especially the moderate poor.

While access to basic services has greatly improved, the analysis confirms that challenges remain in key sectors such as sanitation and education, both in coverage and quality. Understanding those challenges and the bottlenecks that cause them is critical to sustaining the gains achieved and avoiding a permanent disconnect between those that can afford to opt out or compensate for quality shortcomings in public systems and those who can't. In addition, the gaps between the extreme and moderate poor warrant further investigation and could have important policy implications. As noted, those gaps may indicate that the moderate poor face specific challenges in access to services due to a prioritized policy focus on extreme poverty and may also include some transient poor that have lost their employment.

The fourth area refers to the need for further exploration of the spatial dynamics of RMs—and their regional specificities, and the role played by mobility in effective access to services and labor opportunities for all metropolitan residents.

This is especially true given that the inner-periphery municipalities are growing in population faster than the cores across RMs, requiring increased coordination between metropolitan municipalities. Indeed, inner periphery municipalities are symbiotic with their core municipalities and efficient urban mobility is key to development. The center of the RM consistently displays better outcomes—with the exception of inequality—suggesting a need for better connectivity to allow different municipalities to contribute and share their growth potential. Constrained mobility of the metropolitan poor and vulnerable lowers their capacity to leverage the economic opportunities potentially offered by metropolitan regions.

The diagnostic highlights four areas where more research is warranted to help further refine policies aimed at reducing poverty and vulnerability and enhancing shared prosperity



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Annex 1. What is a Metropolitan Region?

It is first and foremost an instrument for planning and management for municipalities that have public functions of common interest (*Funções Públicas de Interesse Comum*—FPIC). The functions are services and structures and activities that, shared across municipal boundaries,

together make up an integrated socio-spatial process. Included are territorial planning; soil and land use; environment and water resources; transport and commuting; sanitation (water, sewage, draining); and health and education.

Metropolitan governance in Brazil—a timeline	Today there are:
<p>→ Creation of the Metropolitan Regions (RMs) in the 1970s</p> <ul style="list-style-type: none"> - They become “anchors” in the regional and national development of the country (linked the second PND—<i>Plano Nacional de Desenvolvimento</i> II- PND 1975-1979) - Existing metropolitan areas prioritized for institutionalization. - Creation of the initial management model - Creation of different metropolitan institutions <p>→ Federal Constitution of 1988:</p> <ul style="list-style-type: none"> - Metropolitan question is brought to the state level (<i>Estadualização</i>) - Conflicts are initiated at the federal level that are not yet resolved more than 25 years later - Lack of national criteria and references - Institutional process of <i>metropolização</i> - Metropolitan management is fragmented and made more vulnerable 	<ul style="list-style-type: none"> • 55 Metropolitan Regions (<i>Regiões Metropolitanas</i> – RMs) established by the states using different criteria. • 3 Integrated Regions of Development (<i>Regiões Integradas de Desenvolvimento—RIDEs</i>) established by the Federal government (Teresina, Petrolina/Juazeiro and Brasília). • 12 Metropolises (<i>Regiões de Influência das Cidades—REGICs</i>) : <ul style="list-style-type: none"> - 1 Large National Metropolis: São Paulo - 2 National Metropolises: Rio de Janeiro and Brasília - 9 Regional Metropolises: Belo Horizonte, Porto Alegre, Curitiba, Fortaleza, Salvador, Recife, Belém, Manaus and Goiânia. - The new PNAD-Continua will be representative for 20 metropolitan regions (Manaus, Belém, Macapá, São Luís, Fortaleza, Natal, João Pessoa, Recife, Maceió, Aracaju, Salvador, Belo Horizonte, Vitória, Rio de Janeiro, São Paulo, Curitiba, Florianópolis, Porto Alegre, Vale do Rio Cuiabá, and Goiânia) as well as the RIDE of Teresine (Grande Teresina).

Typology of the management of public functions of common interest
(Funções Públicas de Interesse Comum—FPIC)

Public Functions Types		Main Public Functions	Main Characteristics	Cooperation Difficulties
Cooperative Public Functions	Less structured sector in terms of Federal Government but more structured sector in local and state level (National Agencies)	Transport Sanitation	-Federal laws and programs guiding States and municipalities -Main financing by Union -State protagonist on RM, especially in transport system -Experiences on consortiums involving municipalities and states; -Facilities to access federal resources for infrastructure in the RM considered by IBGE	-Different institutional development levels in states and municipalities
	Strong/ Highly structured sector- shared competence and/ or national system	Health Education	-Strong national system that guides, controls and finances the policies in states and municipalities; -Facilities to access federal resources for infrastructure in the RM considered by IBGE	-Different territorial bases for management of these functions -Different institutional levels in states and municipalities
"Non (?) Cooperative" Public Functions		Housing Land Use Control	-Sectors controlled by municipalities using different criteria; -Federal financing directly to municipalities; -State financing directly to municipalities	-Difficulties in controlling land market -Plan limited to municipalities territories -Interest conflicts in municipalities' border areas

Source: IPEA (2013).

Figure 32. 58 RMs and RIDEs



Total population: 93.8 million (IBGE, 2010)
PIB 2010: R\$ 3.2 trillion (IBGE, 2010)
PIB per capita: R\$34.246 (IBGE, 2010)

Figure 33. 12 Metropoles according to criteria of spatial/economic integration (REGIC/IBGE, 2007)



Total population: 63.2 million (IBGE, 2010)
PIB 2010: R\$2.0 trillion (IBGE, 2010)
PIB per capita: R\$32.966 (IBGE, 2010)

Annex 2. Economic growth in Brazil's RMs and Brazil as a whole

Table 3. GDP (in 2000 R\$ millions) and real annual GDP growth (%)

Area	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brazil	11,308	11,795	11,950	12,267	12,408	13,117	13,531	14,066	14,924	15,695	15,643	16,822	17,282
		4.3	1.3	2.7	1.1	5.7	3.2	4.0	6.1	5.2	-0.3	7.5	2.7
Brazil RMs	5,550	5,644	5,709	5,662	5,582	5,867	6,149	6,335	6,761	6,982	7,038	7,487	7,536
		1.7	1.1	-0.8	-1.4	5.1	4.8	3.0	6.7	3.3	0.8	6.4	0.7
Belém	69	77	78	80	80	87	89	94	100	102	102	104	106
		10.9	2.0	1.8	0.1	9.1	2.7	5.3	6.2	1.8	0.7	1.5	1.9
Fortaleza	144	148	146	157	153	160	168	177	184	202	207	228	241
		2.3	-1.2	7.9	-2.6	4.6	4.8	5.4	3.7	9.9	2.7	10.0	5.7
Recife	173	177	179	192	187	194	206	214	229	237	245	273	280
		2.3	1.5	7.2	-2.8	4.1	6.0	4.1	7.0	3.2	3.4	11.7	2.6
Salvador	240	250	250	258	250	272	299	295	305	308	328	336	301
		4.1	0.2	3.2	-3.1	8.8	9.8	-1.4	3.3	1.1	6.4	2.6	-10.4
Belo Horizonte	340	364	382	390	392	433	441	479	522	560	533	603	599
		7.2	4.9	2.2	0.5	10.5	1.8	8.7	8.9	7.3	-4.7	13.0	-0.7
Rio de Janeiro	1,060	1,069	1,068	1,069	1,007	1,097	1,097	1,110	1,174	1,156	1,181	1,228	1,265
		0.8	0.0	0.0	-5.8	9.0	0.0	1.2	5.8	-1.5	2.1	4.1	2.9
São Paulo	2,383	2,432	2,462	2,365	2,356	2,412	2,591	2,676	2,874	2,962	2,960	3,131	3,170
		2.1	1.2	-3.9	-0.4	2.4	7.4	3.3	7.4	3.1	-0.1	5.8	1.2
Curitiba	265	280	282	286	304	317	320	331	368	388	388	414	419
		5.6	0.8	1.6	6.2	4.1	1.1	3.4	11.0	5.5	0.0	6.9	1.2
Porto Alegre	361	385	389	399	393	417	430	426	445	459	459	500	468
		6.6	1.0	2.7	-1.4	6.0	3.2	-0.8	4.4	3.0	0.0	8.9	-6.4
Distrito Federal	516	465	473	466	461	478	507	532	560	609	635	669	686
		-10.0	1.7	-1.4	-1.2	3.7	6.2	4.9	5.3	8.6	4.3	5.3	2.6

Source: World Bank calculations using Ipeadata/IBGE.

Table 4. GDP per capita (in 2000 R\$) and real GDP per capita growth (%)

Area	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Brazil	6,897	6,946	6,932	7,025	7,015	7,224	7,346	7,531	8,111	8,277	8,170	8,819	8,983
		0.7	-0.2	1.3	-0.1	3.0	1.7	2.5	7.7	2.0	-1.3	7.9	1.9
Brazil RMs	10,796	10,558	10,508	10,269	9,982	10,191	10,515	10,669	11,500	11,618	11,590	12,557	12,540
		-2.2	-0.5	-2.3	-2.8	2.1	3.2	1.5	7.8	1.0	-0.2	8.3	-0.1
Belém	3,983	4,173	4,147	4,142	4,061	4,239	4,272	4,402	4,768	4,770	4,739	4,944	4,988
		4.8	-0.6	-0.1	-2.0	4.4	0.8	3.0	8.3	0.0	-0.7	4.3	0.9
Fortaleza	4,891	4,831	4,677	4,946	4,732	4,771	4,904	5,069	5,226	5,605	5,671	6,305	6,585
		-1.2	-3.2	5.8	-4.3	0.8	2.8	3.4	3.1	7.3	1.2	11.2	4.4
Recife	5,396	5,294	5,294	5,610	5,386	5,474	5,725	5,881	6,270	6,345	6,496	7,407	7,542
		-1.9	0.0	6.0	-4.0	1.6	4.6	2.7	6.6	1.2	2.4	14.0	1.8
Salvador	8,151	8,002	7,864	7,990	7,619	8,024	8,653	8,390	8,216	8,103	8,474	9,403	8,345
		-1.8	-1.7	1.6	-4.6	5.3	7.8	-3.0	-2.1	-1.4	4.6	11.0	-11.3
Belo Horizonte	7,403	7,550	7,752	7,783	7,684	8,186	8,172	8,717	9,561	10,039	9,442	11,134	10,969
		2.0	2.7	0.4	-1.3	6.5	-0.2	6.7	9.7	5.0	-5.9	17.9	-1.5
Rio de Janeiro	10,172	9,834	9,733	9,631	8,987	9,605	9,505	9,516	10,170	9,815	9,951	10,379	10,619
		-3.3	-1.0	-1.1	-6.7	6.9	-1.0	0.1	6.9	-3.5	1.4	4.3	2.3
São Paulo	13,753	13,602	13,580	12,860	12,645	12,610	13,353	13,597	14,952	15,101	14,969	15,908	15,994
		-1.1	-0.2	-5.3	-1.7	-0.3	5.9	1.8	10.0	1.0	-0.9	6.3	0.5
Curitiba	9,845	10,097	9,888	9,842	10,222	10,176	10,047	10,153	11,589	11,891	11,716	13,049	13,083
		2.6	-2.1	-0.5	3.9	-0.4	-1.3	1.1	14.1	2.6	-1.5	11.4	0.3
Porto Alegre	10,066	10,345	10,285	10,428	10,147	10,464	10,637	10,398	11,244	11,370	11,289	12,619	11,762
		2.8	-0.6	1.4	-2.7	3.1	1.7	-2.2	8.1	1.1	-0.7	11.8	-6.8
Distrito Federal	26,206	22,658	22,544	21,716	21,034	20,938	21,750	22,320	22,820	23,798	24,357	26,025	26,287
		-13.5	-0.5	-3.7	-3.1	-0.5	3.9	2.6	2.2	4.3	2.3	6.8	1.0

Source: World Bank calculations using Ipeadata/IBGE.

Annex 3. Shared prosperity in Brazil's RMs and Brazil as a whole

Table 5. Mean income (R\$2012) and income growth (%) of the total population and bottom 40% of the national income distribution

Area	2004	2005	2006	2007	2008	2009	2011	2012
Brazil All (All)	584.09	620.77	678.00	695.27	729.69	748.51	796.16	860.92
		6.3	9.2	2.5	5.0	2.6	6.4	8.1
Brazil All (B40)	134.05	145.16	163.74	169.80	186.68	197.75	215.00	236.59
		8.3	12.8	3.7	9.9	5.9	8.7	10.0
Brazil RMs (All)	773.37	838.47	899.28	919.88	953.55	973.55	1,039.59	1,115.66
		8.4	7.3	2.3	3.7	2.1	6.8	7.3
Brazil RMs (B40)	141.76	154.88	176.32	182.94	200.80	214.46	235.38	256.93
		9.3	13.8	3.8	9.8	6.8	9.8	9.2
Belém (All)	484.79	502.34	551.65	644.05	623.13	592.39	689.93	717.34
		3.6	9.8	16.7	-3.2	-4.9	16.5	4.0
Belém (B40)	145.69	152.67	171.60	185.71	202.74	206.69	229.28	242.38
		4.8	12.4	8.2	9.2	1.9	10.9	5.7
Fortaleza (All)	479.15	503.27	523.87	533.61	596.71	632.53	656.84	682.89
		5.0	4.1	1.9	11.8	6.0	3.8	4.0
Fortaleza (B40)	134.25	146.64	165.57	173.78	187.01	197.64	222.19	248.48
		9.2	12.9	5.0	7.6	5.7	12.4	11.8
Recife (All)	524.60	550.02	588.08	555.15	623.91	654.47	654.67	697.18
		4.8	6.9	-5.6	12.4	4.9	0.0	6.5
Recife (B40)	128.30	139.00	160.34	163.78	178.25	194.08	212.73	245.50
		8.3	15.4	2.1	8.8	8.9	9.6	15.4
Salvador (All)	528.02	586.28	658.32	702.25	753.52	796.73	841.26	886.12
		11.0	12.3	6.7	7.3	5.7	5.6	5.3
Salvador (B40)	130.35	145.28	167.24	172.27	189.56	203.50	225.23	247.11
		11.5	15.1	3.0	10.0	7.4	10.7	9.7
Belo Horizonte (All)	710.10	768.02	869.49	881.41	922.27	975.97	1,066.26	1,181.01
		8.2	13.2	1.4	4.6	5.8	9.3	10.8
Belo Horizonte (B40)	146.65	163.41	180.68	191.21	205.78	222.93	249.45	278.41
		11.4	10.6	5.8	7.6	8.3	11.9	11.6

Table 5. Mean income (R\$2012) and income growth (%) of the total population and bottom 40% of the national income distribution (cont.)

Area	2004	2005	2006	2007	2008	2009	2011	2012
Rio de Janeiro (All)	869.38	886.57	995.24	970.95	1,030.26	1,073.22	1,055.57	1,108.19
		2.0	12.3	-2.4	6.1	4.2	-1.6	5.0
Rio de Janeiro (B40)	149.43	163.89	183.20	184.07	208.15	219.96	238.70	253.31
		9.7	11.8	0.5	13.1	5.7	8.5	6.1
São Paulo (All)	821.48	946.89	986.79	1,011.21	1,010.48	1,008.53	1,119.36	1,237.15
		15.3	4.2	2.5	-0.1	-0.2	11.0	10.5
São Paulo (B40)	145.01	158.17	181.75	190.91	211.99	222.98	243.86	266.09
		9.1	14.9	5.0	11.0	5.2	9.4	9.1
Curitiba (All)	920.04	908.70	913.46	1,079.39	1,081.77	1,105.26	1,137.93	1,260.62
		-1.2	0.5	18.2	0.2	2.2	3.0	10.8
Curitiba (B40)	151.06	162.13	193.71	203.37	201.08	221.69	254.15	265.95
		7.3	19.5	5.0	-1.1	10.3	14.6	4.6
Porto Alegre (All)	885.22	941.71	984.43	957.45	1,027.11	1,017.45	1,124.77	1,168.76
		6.4	4.5	-2.7	7.3	-0.9	10.5	3.9
Porto Alegre (B40)	150.23	161.82	182.10	188.32	208.15	225.59	245.39	263.18
		7.7	12.5	3.4	10.5	8.4	8.8	7.3
Distrito Federal (All)	1,114.78	1,214.89	1,348.12	1,488.19	1,527.06	1,570.09	1,659.77	1,655.29
		9.0	11.0	10.4	2.6	2.8	5.7	-0.3
Distrito Federal (B40)	142.42	156.50	178.25	186.05	199.58	225.53	231.67	254.48
		9.9	13.9	4.4	7.3	13.0	2.7	9.8

Source: World Bank calculations using PNAD 2004/2012

Table 6. Mean income growth (%) of the population and bottom 40% of each state living in the RM

Area	All income 2004	B40 (of UF) income 2004	All income 2012	B40 (of UF) income 2012	All annualized growth (%)	B40 (of UF) annualized growth (%)
Belém	484.79	110.36	717.34	164.83	5.0	5.1
Fortaleza	479.15	87.13	682.89	170.56	4.5	8.8
Recife	524.60	86.06	697.18	178.07	3.6	9.5
Salvador	528.02	84.64	886.12	162.32	6.7	8.5
Belo Horizonte	710.10	153.88	1,181.01	301.09	6.6	8.8
Rio de Janeiro	869.38	207.80	1,108.19	295.07	3.1	4.5
São Paulo	821.48	214.11	1,237.15	370.69	5.3	7.1
Curitiba	920.04	193.46	1,260.62	357.46	4.0	8.0
Porto Alegre	885.22	216.09	1,168.76	355.17	3.5	6.4
Distrito Federal	1,114.78	182.36	1,655.29	345.29	5.1	8.3

Source: World Bank calculations using PNAD 2004, 2012.

Annex 4. The Gini Index in Brazil's RMs and Brazil as a whole

Table 7. Gini Index across individuals using household per capita income

Area	2004	2005	2006	2007	2008	2009	2011	2012	Δ 2004/12
Brazil All	0.57	0.57	0.56	0.55	0.54	0.54	0.53	0.53	-0.04
Brazil RMs	0.57	0.57	0.56	0.56	0.55	0.55	0.54	0.54	-0.04
Belém	0.54	0.54	0.54	0.56	0.52	0.51	0.52	0.52	-0.03
Fortaleza	0.60	0.58	0.56	0.55	0.56	0.56	0.52	0.51	-0.09
Recife	0.63	0.61	0.60	0.58	0.59	0.57	0.54	0.50	-0.12
Salvador	0.59	0.59	0.58	0.59	0.58	0.58	0.56	0.57	-0.02
Belo Horizonte	0.56	0.55	0.55	0.55	0.53	0.53	0.52	0.52	-0.04
Rio de Janeiro	0.56	0.56	0.56	0.56	0.55	0.56	0.54	0.54	-0.02
São Paulo	0.54	0.55	0.54	0.52	0.51	0.51	0.51	0.52	-0.02
Curitiba	0.56	0.54	0.52	0.52	0.50	0.51	0.48	0.49	-0.07
Porto Alegre	0.54	0.54	0.54	0.52	0.53	0.51	0.51	0.50	-0.03
Distrito Federal	0.63	0.60	0.60	0.61	0.62	0.62	0.60	0.58	-0.04

Source: World Bank calculations using PNAD 2004/2012.

Table 8. Gini Index across Brazil RM households by gender, race, age and education of household head

Area	2004	2005	2006	2007	2008	2009	2011	2012	Δ 2004/12
All HH	0.58	0.58	0.57	0.57	0.56	0.56	0.55	0.55	-0.03
Gender HH									
Female	0.59	0.58	0.57	0.57	0.57	0.56	0.56	0.54	-0.05
Male	0.58	0.58	0.57	0.56	0.56	0.56	0.54	0.55	-0.03
Race HH									
Afro-descendant	0.53	0.52	0.51	0.50	0.49	0.50	0.49	0.48	-0.05
White	0.57	0.58	0.56	0.56	0.56	0.56	0.56	0.56	-0.02
Education HH									
Less than primary	0.46	0.45	0.43	0.43	0.44	0.42	0.40	0.39	-0.07
Primary complete	0.48	0.50	0.45	0.46	0.46	0.47	0.42	0.44	-0.05
Some secondary	0.48	0.48	0.46	0.47	0.46	0.45	0.44	0.51	0.03
Secondary complete	0.50	0.48	0.48	0.47	0.47	0.47	0.46	0.46	-0.04
Some tertiary	0.44	0.47	0.46	0.43	0.49	0.44	0.45	0.46	0.03
Tertiary complete	0.46	0.46	0.46	0.46	0.46	0.48	0.48	0.48	0.02
Age HH									
15 to 19	0.58	0.55	0.52	0.46	0.48	0.55	0.48	0.45	-0.13
20 to 24	0.55	0.52	0.50	0.50	0.50	0.49	0.47	0.48	-0.07
25 to 29	0.56	0.58	0.56	0.55	0.59	0.57	0.59	0.56	0.00
30 to 34	0.62	0.62	0.58	0.58	0.56	0.59	0.57	0.56	-0.06
35 to 39	0.60	0.60	0.58	0.56	0.57	0.57	0.58	0.56	-0.03
40 to 44	0.57	0.60	0.58	0.56	0.54	0.55	0.54	0.55	-0.03
45 to 49	0.57	0.58	0.57	0.56	0.55	0.55	0.53	0.53	-0.04
50 to 54	0.55	0.56	0.56	0.56	0.54	0.53	0.54	0.54	-0.01
55 to 59	0.56	0.56	0.57	0.58	0.55	0.55	0.53	0.54	-0.02
60 to 64	0.58	0.57	0.58	0.56	0.57	0.57	0.55	0.54	-0.04
65+	0.57	0.56	0.52	0.54	0.54	0.53	0.53	0.54	-0.03

Source: World Bank calculations using PNAD 2004/2012.

Annex 5. Monetary poverty in Brazil's RMs with and without adjusting for cost of living

Table 9. Poverty headcounts with and without adjusting for cost of living

Headcounts with no adjustment for cost of living								
R\$70	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	7.6	7.0	5.8	5.7	4.8	4.6	4.4	3.6
Brazil RMs	4.7	4.1	3.2	3.4	2.9	2.8	2.4	2.3
Belém	6.0	5.9	4.9	3.7	3.5	3.7	3.2	3.4
Fortaleza	8.5	8.5	5.9	6.2	5.6	5.0	3.5	3.3
Recife	10.8	10.0	7.0	8.3	6.9	6.1	6.4	4.3
Salvador	9.6	7.6	5.5	5.9	4.6	4.3	3.6	3.3
Belo Horizonte	3.8	2.7	2.3	2.4	2.2	2.0	1.5	1.1
Rio de Janeiro	3.1	2.4	2.5	3.1	2.2	2.3	2.4	2.8
São Paulo	3.7	3.3	2.5	2.5	2.1	2.4	1.7	1.9
Curitiba	2.3	2.3	1.3	1.6	2.2	1.6	1.4	1.7
Porto Alegre	2.8	2.4	2.1	2.6	1.9	2.0	1.4	1.4
Distrito Federal	4.8	3.8	2.4	2.1	2.8	1.9	2.2	1.9
R\$70-140	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	14.8	13.9	11.5	10.4	9.3	8.7	6.7	5.3
Brazil RMs	10.0	9.3	7.2	6.3	5.6	5.2	3.4	2.3
Belém	16.6	16.7	12.9	10.4	9.7	9.6	7.9	5.5
Fortaleza	22.3	18.2	15.5	14.3	12.2	10.6	8.0	5.0
Recife	21.1	18.9	16.4	13.9	14.2	10.5	7.5	4.7
Salvador	17.5	16.6	12.3	11.2	9.7	8.9	6.5	4.6
Belo Horizonte	9.9	8.5	7.3	6.3	4.9	4.1	2.2	1.2
Rio de Janeiro	6.8	7.4	5.0	5.1	4.1	4.7	3.3	2.3
São Paulo	6.7	6.1	4.4	3.7	3.5	3.5	1.9	1.0
Curitiba	6.6	6.6	4.8	2.4	3.3	2.9	1.3	1.0
Porto Alegre	6.5	6.5	5.6	4.5	3.9	3.6	2.3	2.0
Distrito Federal	8.8	8.1	6.1	5.5	4.5	4.7	2.5	2.6
R\$140-R\$291	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	22.6	20.7	19.8	19.9	18.6	18.2	15.5	15.2
Brazil RMs	20.1	17.4	16.6	16.5	14.7	14.5	11.7	11.3
Belém	29.4	26.4	25.8	24.4	22.8	25.0	18.9	19.1
Fortaleza	28.9	26.7	27.7	27.6	24.9	25.1	21.3	21.3
Recife	26.0	23.8	25.5	25.8	23.5	23.7	20.2	18.9
Salvador	24.4	23.5	23.0	23.0	21.5	20.1	16.8	18.0
Belo Horizonte	21.0	19.0	17.6	16.6	15.1	12.7	10.6	9.1
Rio de Janeiro	18.0	15.6	14.6	14.3	13.9	12.0	11.3	11.0
São Paulo	18.3	14.4	13.1	13.6	11.2	11.9	8.9	8.4
Curitiba	15.5	13.5	15.0	11.9	9.3	10.4	7.6	6.8
Porto Alegre	15.6	14.5	13.0	12.8	11.6	11.7	8.6	7.9
Distrito Federal	19.3	15.6	13.8	14.0	13.5	12.6	10.0	9.5

Source: World Bank calculations using PNAD 2004/2012. Note: Where applicable, per capita household incomes are adjusted for cost of living based on Oliveira, et al. (2013).

Table 9. Poverty headcounts with and without adjusting for cost of living (cont.)

Headcounts adjusting income for cost of living								
R\$70	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	6.7	5.9	4.9	5.0	4.1	4.1	4.0	3.3
Brazil RMs	4.5	3.7	2.9	3.2	2.7	2.7	2.3	2.3
Belém	5.5	4.2	3.9	3.2	3.0	3.4	2.9	3.3
Fortaleza	7.2	6.9	4.7	5.5	4.4	4.5	3.2	3.1
Recife	9.0	8.4	5.5	7.4	6.2	5.5	6.2	3.9
Salvador	9.5	7.4	5.3	5.7	4.3	4.2	3.6	3.2
Belo Horizonte	4.0	2.9	2.5	2.4	2.2	2.0	1.5	1.1
Rio de Janeiro	3.0	2.3	2.4	2.9	2.2	2.2	2.2	2.8
São Paulo	3.7	3.1	2.5	2.5	2.1	2.4	1.7	1.9
Curitiba	2.0	2.0	1.2	1.4	2.2	1.6	1.4	1.6
Porto Alegre	2.6	2.3	2.0	2.5	1.9	2.0	1.4	1.4
Distrito Federal	5.5	3.8	2.5	2.1	2.8	2.0	2.3	1.9
R\$70-140	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	13.9	12.4	10.3	9.5	8.3	7.4	5.5	4.7
Brazil RMs	9.6	8.7	6.7	5.9	5.2	4.6	2.9	2.1
Belém	15.3	14.4	11.0	9.6	8.6	7.3	5.5	4.7
Fortaleza	20.0	15.2	13.7	12.5	10.7	7.7	5.9	3.8
Recife	19.5	14.8	13.8	12.1	11.9	7.5	4.5	3.9
Salvador	17.0	16.4	11.8	10.7	9.4	8.6	6.1	4.4
Belo Horizonte	10.7	9.0	7.6	6.5	5.1	4.4	2.2	1.2
Rio de Janeiro	6.5	7.5	4.8	4.7	3.8	4.1	2.7	2.1
São Paulo	6.6	6.1	4.3	3.7	3.4	3.4	1.9	1.0
Curitiba	6.0	4.5	4.4	2.0	2.7	2.0	0.8	1.0
Porto Alegre	6.5	6.4	5.4	4.5	3.7	3.4	2.2	2.0
Distrito Federal	9.6	8.3	6.2	5.6	4.5	4.8	2.5	2.7
R\$140-R\$291	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	22.0	21.1	19.9	18.8	17.7	16.6	15.2	13.9
Brazil RMs	19.5	17.2	16.5	15.7	14.1	13.5	11.6	10.5
Belém	26.9	26.7	26.2	21.8	21.7	22.5	18.4	17.4
Fortaleza	27.7	25.9	26.0	22.7	22.1	22.6	20.1	17.8
Recife	24.3	25.3	25.1	21.5	20.3	21.3	19.8	14.6
Salvador	24.5	22.9	23.0	23.0	21.3	18.1	16.5	17.6
Belo Horizonte	21.2	19.0	18.6	16.9	15.6	13.4	11.2	9.5
Rio de Janeiro	17.1	14.6	14.2	14.4	13.1	10.0	11.5	10.0
São Paulo	18.2	14.3	13.1	13.5	11.2	11.8	8.9	8.4
Curitiba	14.3	14.2	13.6	9.4	8.2	8.9	6.1	5.5
Porto Alegre	15.3	14.4	13.0	12.5	11.4	11.5	8.5	7.8
Distrito Federal	18.4	15.8	15.6	14.3	14.0	12.7	10.5	9.9

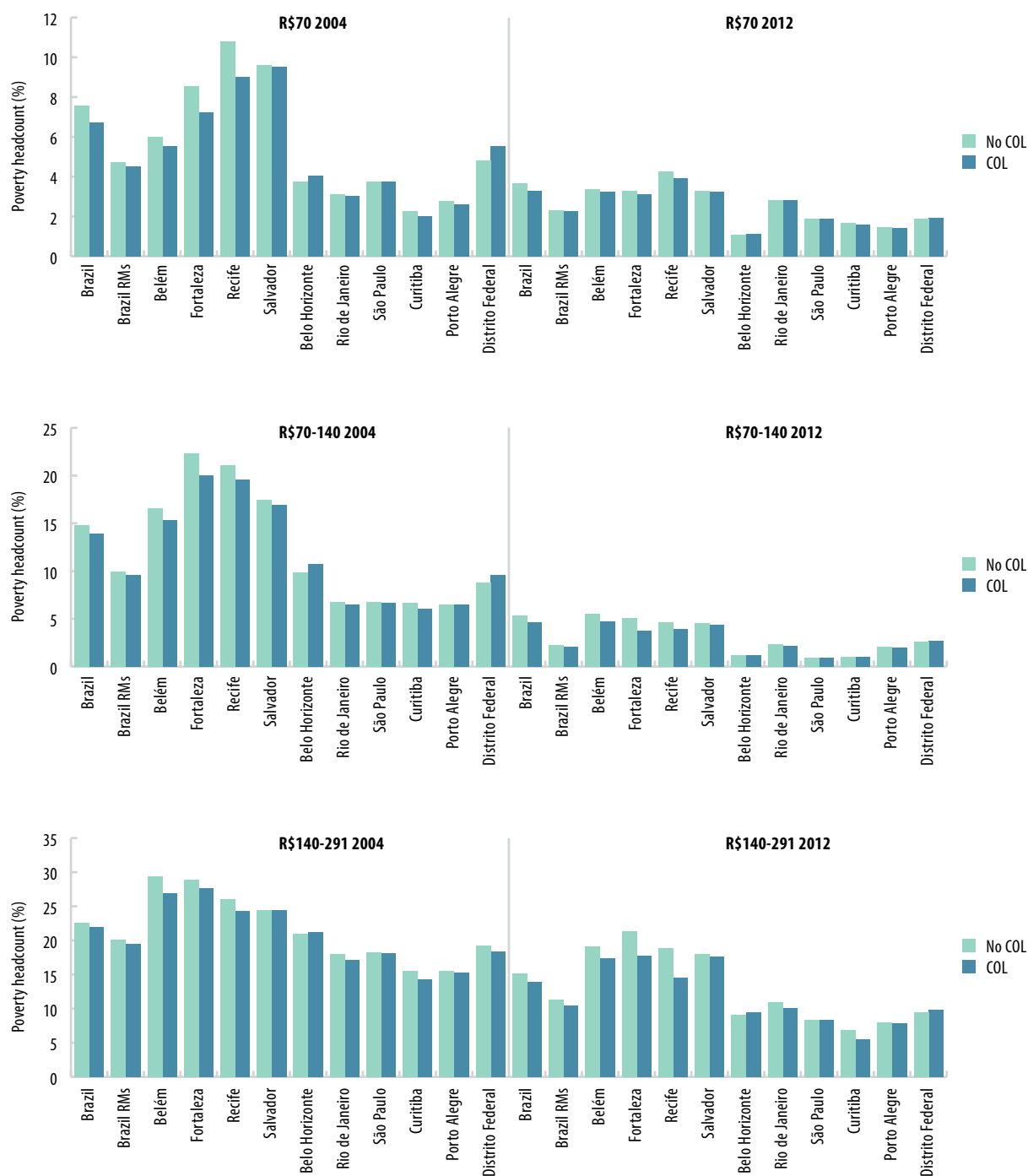
Source: World Bank calculations using PNAD 2004/2012. Note: Where applicable, per capita household incomes are adjusted for cost of living based on Oliveira, et al. (2013).

Table 10. Percent difference in headcounts when adjusting income for cost of living

R\$70	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	-11.6	-16.8	-14.5	-12.1	-14.4	-11.4	-10.0	-10.0
Brazil RMs	-4.4	-8.5	-7.1	-5.4	-6.3	-3.4	-3.7	-1.5
Belém	-7.5	-27.8	-20.9	-12.5	-16.3	-8.9	-9.3	-3.0
Fortaleza	-15.4	-18.9	-20.9	-11.7	-20.8	-10.7	-10.9	-4.5
Recife	-16.6	-16.1	-22.0	-10.5	-10.7	-9.8	-3.5	-8.3
Salvador	-0.9	-1.4	-2.7	-3.2	-6.3	-2.7	-1.0	-0.8
Belo Horizonte	7.5	4.2	7.4	1.0	-0.8	2.1	0.0	4.5
Rio de Janeiro	-3.2	-4.0	-2.1	-4.5	-3.0	-2.1	-8.9	0.0
São Paulo	0.0	-4.4	0.0	-1.6	-1.0	0.0	0.0	0.0
Curitiba	-10.1	-13.7	-11.5	-8.9	0.0	0.0	0.0	-5.1
Porto Alegre	-6.0	-5.2	-1.3	-5.5	-2.2	0.0	0.0	-0.4
Distrito Federal	14.6	0.7	1.9	0.0	0.0	2.9	2.7	2.4
R\$70-140	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	-6.2	-10.7	-10.8	-9.3	-10.4	-14.2	-17.7	-11.8
Brazil RMs	-3.4	-6.4	-6.4	-6.1	-7.4	-12.3	-16.4	-8.7
Belém	-7.5	-13.7	-14.7	-7.7	-11.2	-23.3	-29.7	-14.6
Fortaleza	-10.3	-16.4	-11.8	-12.7	-12.1	-27.4	-26.8	-25.6
Recife	-7.4	-21.9	-15.4	-12.9	-16.4	-28.2	-39.8	-16.1
Salvador	-2.9	-1.5	-4.2	-4.1	-2.5	-3.6	-5.1	-4.1
Belo Horizonte	9.1	6.6	5.3	2.6	4.0	5.9	2.5	2.0
Rio de Janeiro	-4.9	0.2	-5.1	-8.5	-7.9	-12.3	-19.3	-8.0
São Paulo	-1.3	1.0	-2.1	-0.3	-2.1	-2.3	0.0	0.0
Curitiba	-9.0	-32.2	-9.1	-16.0	-19.8	-31.2	-40.0	1.4
Porto Alegre	-0.3	-1.7	-4.7	-1.5	-5.4	-5.4	-1.8	-2.0
Distrito Federal	8.7	1.7	1.0	1.7	0.0	2.4	1.5	4.3
R\$140-R\$291	2004	2005	2006	2007	2008	2009	2011	2012
Brazil	-3.0	2.3	0.4	-5.7	-4.8	-8.8	-1.9	-8.7
Brazil RMs	-2.9	-1.0	-0.7	-4.9	-4.1	-6.7	-1.1	-7.0
Belém	-8.6	1.1	1.7	-10.5	-5.1	-9.9	-2.7	-8.9
Fortaleza	-4.2	-3.0	-5.9	-17.8	-11.1	-10.0	-5.8	-16.5
Recife	-6.6	6.3	-1.4	-16.7	-13.6	-10.1	-1.9	-22.9
Salvador	0.3	-2.6	-0.1	-0.1	-1.4	-9.8	-1.9	-2.3
Belo Horizonte	1.1	-0.3	5.6	2.0	3.8	5.5	5.3	4.6
Rio de Janeiro	-4.6	-6.7	-2.6	1.0	-5.4	-16.7	1.8	-8.6
São Paulo	-0.6	-0.5	-0.2	-0.6	-0.3	-0.7	-0.3	-0.2
Curitiba	-8.3	4.9	-9.7	-21.1	-11.4	-14.0	-19.1	-20.0
Porto Alegre	-1.8	-0.8	-0.3	-2.0	-2.4	-1.8	-0.5	-1.6
Distrito Federal	-4.7	1.1	12.8	2.1	3.5	0.2	5.3	4.0

Source: World Bank calculations using PNAD 2004/2012. Note: Where applicable, per capita household incomes are adjusted for cost of living based on Oliveira et al. (2013). Yellow highlights represent percentage differences less than 10 when adjusting income for cost of living versus not adjusting; blue highlights indicate percentage differences greater than 10.

Figure 34. Poverty and vulnerability headcounts with and without adjusting income for cost of living



Source: World Bank calculations using PNAD 2004/2012. Note: Where applicable, per capita household incomes are adjusted for cost of living based on Oliveira, et al. (2013).

Annex 6. Poverty lines in Brazil

Table 11. Comparison of headcounts using different poverty lines in Brazil

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2011	2012
Global Extreme Poverty (US\$ 1.25 PPP/day)	11.8	10.4	11.6	9.8	8.2	7.1	6.9	5.6	5.5	5.1	4.2
National Extreme Poverty Line (R\$70/month)	9.9	7.9	9.0	7.6	7.0	5.8	5.7	4.8	4.6	4.4	3.6
National Moderate Poverty (R\$140/month)	24.7	23.3	24.9	22.4	21.0	17.3	16.1	14.1	13.3	11.1	9.0

Source: World Bank calculations using LAC Equity Lab - SEDLAC data (CEDLAS and World Bank).

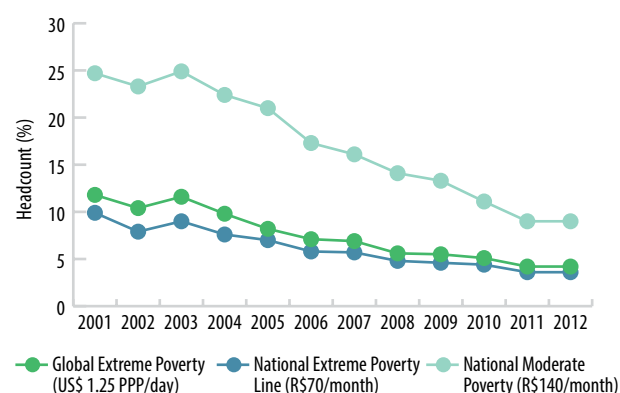
Brazil does not have an official poverty line. Most poverty measurements compare to an absolute poverty line, constructed using monthly household income. Several unofficial lines exist. They include lines constructed as a fraction of official minimum income (one quarter and one half) as well as regionalized monetary lines that reflect variable costs of living in different regions or areas of the country, or a food basket price index based on minimum calorie-intake recommendations by WHO and FAO.³⁶ The lines produced by IPEA were long considered de facto poverty lines for Brazil, and have been used as such by the World Development Indicators (WDI) database of the World Bank.

In recent years, R\$70 and R\$140 per capita per month, administrative poverty lines defined for the *Bolsa Família* and *Brasil Sem Miséria* programs, have been increasingly used in place of official poverty lines. It has become crucial to monitor poverty rates using these administrative lines, particularly in studies of the evolution of poverty in

the country. The international US\$1.25 extreme poverty line is also used on occasion by Brazil, notably in relation to the Millennium Development Goals (MDG). Complementary to those lines, the lines used by the World Bank (US\$1.25, US\$2.50 or US\$4 with purchase power parity—PPP) serve to harmonize poverty measurement and compare the evolution of poverty across countries. The choice of a line may reflect the objectives of the analysis, for instance, an international comparison or the definition of a public policy.

As a result of methodological differences in the computation of lines and income aggregates, there are sometimes small differences between government and World Bank estimates. However, trends in Brazil are broadly consistent across methodologies.

Figure 35. Comparison of poverty lines in Brazil



36 Based on consumption baskets established for each of the nine metropolitan areas and Brasília, values are derived for 15 urban and rural areas in different regions, defining a total of 25 extreme (*indigência*) and moderate (*pobreza*) poverty lines. These amounts are adjusted to the reference date each year with varying prices for each product, based on IBGE National Consumer Price Index. Concerning regional poverty lines, see Rocha, S. (2006) : *Pobreza no Brasil. Afinal, de que se trata?*, Editora FGV, Rio de Janeiro, 2006. See also www.ipeadata.gov.br. In December 2013, IPEA updated its extreme poverty and poverty numbers for the period ranging from 2009 to 2012, but no updated data on the regional lines used is available. For 2012, IPEA puts extreme poverty at 5.3% while all poverty is at 15.9%.

Annex 7. Intra-generational mobility through synthetic panels in Brazil's RMs

In the absence of panel data, the analysis of the evolution of income over the period is complemented by a zoom-in on income mobility using synthetic panels, based on the approach recently developed by Dang, Lanjouw, Luoto and McKenzie (2011). The analysis identifies those who left and those who stayed in poverty. The main advantage of this approach is that it does not need to impose much structure of the individual income generating process. Instead, it allows us to calculate lower and upper bounds on the movements in and out of poverty, depending on the assumption regarding the individual-specific error term. Synthetic panels are built using two cross-section datasets (2004 and 2012), by estimating the relationship between income and two sets of variables: i. Time-invariant variables at the household level: traits such as gender, year of birth and parental education that do not change throughout a lifetime—for each year; ii. Time-invariant variables at the metropolitan area level such as unemployment rate, population of working age, and displacement rate.

Using the second round (2012), the relationship between income and invariant household characteristics is modeled using OLS and the income is estimated for round 1 (2004) with the resulting coefficients as follows:

► $\hat{y}_{i1}^{2L} = \hat{\beta}_1' x_{i1}^2 + \varepsilon_{i2}^2$, where perfect positive correlation of the error term is assumed to establish the lower bound.

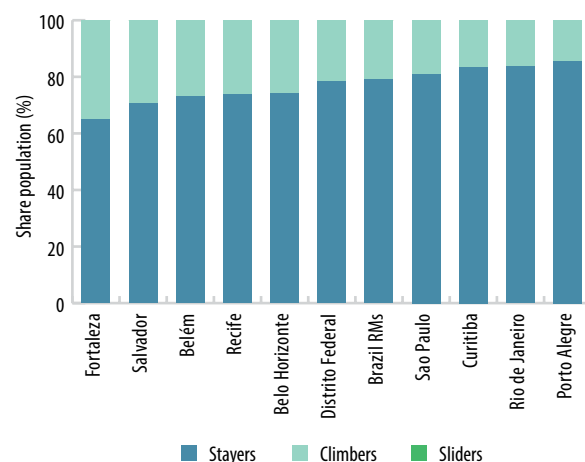
This yields incomes for the two periods, one real, and the other estimated, to track households' movements in and out of poverty, e.g., the probability of a household that was poor in period 1 to escape poverty by period 2 where p is the poverty line:

► $Pr(\hat{y}_{i1}^{2L} < p | y_{i2}^2 > p)$

This approach has been validated in a recent paper by Cruces et al. (2011) in the context of Latin America.

Note: Different assumptions about the residuals yield the lower and upper income bounds—the assumption that error terms between periods are perfectly correlated systematically underestimates the mobility between periods. This functional form is thus used to estimate the lower bound on mobility. Conversely, assuming that the error terms are perfectly uncorrelated overstates the amount of mobility; this equation is thus employed to calculate the upper bound on mobility.

Figure 36. Stayers, sliders, climbers from 2004 to 2012 in Brazil RMs



Source: World Bank calculations using PNAD 2004, 2012. Note: Income groups based on poverty lines R\$70 (extreme) and R\$140 (moderate) and middle class thresholds R\$291 (lower) and R\$1,019 (upper).

Annex 8. General aspects by income group across Brazil's RMs

Table 12. Characteristics by income group living in Brazil RMs 2012

	All	R\$70	R\$70-R\$140	R\$140-R\$291	R\$291+
Individuals based on HH access (%)					
Assets	99.7	97.6	98.9	99.5	99.8
Sanitation	90.9	81.8	73.8	81.7	92.6
Shelter	97.0	95.4	92.9	95.4	97.2
Water	98.3	93.6	94.4	96.2	98.7
8 years of education (for at least 1 member)	90.1	75.8	82.9	87.9	90.5
Enrollment of children	90.8	86.3	82.4	87.6	92.6
Adults (15yrs+)					
Education less than primary (%)	30.3	46.1	54.0	45.3	28.6
Education secondary + (%)	36.5	26.4	17.2	26.1	37.9
Hourly wage (R\$2012)	14.53	1.96	3.73	5.12	15.25
Informality (%)	22.2	96.8	66.9	37.5	20.5
Labor force participation (%)	65.8	32.0	51.9	55.6	67.6
Unemployment (%)	7.2	84.0	26.8	20.5	5.2
Population Share (%)					
15 to 25 year household head	9.8	22.5	22.4	24.5	8.1
Afro-descendant household head	49.6	58.3	73.3	68.7	47.6
Female household head	42.3	56.8	57.6	46.7	41.1
Single mother household head	10.0	26.4	37.5	23.6	7.9
Afro-descendant individuals	49.6	60.8	70.9	67.4	46.5
0 to 15 years old	20.9	34.1	47.5	38.7	17.8

Source: World Bank calculations using PNAD 2012. Note: Afro-descendants include individuals self-identifying as "preto" (black) or "pardo" (mixed origin).

Table 13. Probability of being moderate poor vs. extreme poor, vulnerable vs. moderate poor, or middle class vs. vulnerable (logit regressions) for individuals living in Brazil's RMs

Characteristics	2004			2012		
	Moderate	Vulnerable	Middle class	Moderate	Vulnerable	Middle class
Age	-0.008*** (0.000)	-0.009*** (0.000)	-0.046*** (0.000)	0.018*** (0.000)	-0.009*** (0.000)	-0.049*** (0.000)
Age^2	0.000*** (0.000)	0.000*** (0.000)	0.001*** (0.000)	-0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)
Female	-0.036*** (0.002)	-0.078*** (0.001)	-0.122*** (0.001)	0.045*** (0.003)	-0.163*** (0.002)	-0.157*** (0.001)
Afro-descendant (vs. white)	0.042*** (0.002)	-0.238*** (0.001)	-0.724*** (0.001)	0.384*** (0.003)	-0.132*** (0.002)	-0.680*** (0.001)
Dwelling has sanitation	-0.074*** (0.002)	0.427*** (0.001)	0.778*** (0.001)	-0.400*** (0.003)	0.368*** (0.002)	0.677*** (0.001)
Dwelling walls masonry materials	0.144*** (0.003)	0.140*** (0.002)	0.273*** (0.002)	-0.417*** (0.006)	0.316*** (0.004)	0.231*** (0.002)
Household has 2 of 3 key assets (refrigerator, phone, clean stove)	0.708*** (0.002)	0.595*** (0.002)	1.048*** (0.003)	1.029*** (0.011)	0.595*** (0.011)	0.402*** (0.007)
Dwelling has piped water	0.305*** (0.003)	0.250*** (0.002)	0.761*** (0.003)	0.406*** (0.006)	0.180*** (0.005)	0.586*** (0.003)
Dwelling with electricity	0.012*** (0.000)	0.061*** (0.000)	0.159*** (0.000)	-0.062*** (0.000)	0.055*** (0.000)	0.144*** (0.000)
Average years of education	0.110*** (0.002)	0.060*** (0.001)	-0.043*** (0.001)	-0.008*** (0.003)	-0.015*** (0.002)	0.102*** (0.001)
Migrant	-0.246*** (0.004)	-0.657*** (0.003)	-1.811*** (0.004)	-0.670*** (0.013)	0.199*** (0.012)	-0.099*** (0.008)
Constant	-0.008*** (0.000)	-0.009*** (0.000)	-0.046*** (0.000)	0.018*** (0.000)	-0.009*** (0.000)	-0.049*** (0.000)
Observation	7,812,334	16,005,305	45,330,264	2,566,405	7,668,301	53,952,417

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: World Bank calculations using PNAD 2004, 2012. Note: Afro-descendant includes individuals self-identifying as "preto" (black) or "pardo" (mixed origin). Note: Income groups based on poverty lines R\$70 (extreme) and R\$140 (moderate) and middle class lower threshold R\$291.

Annex 9. Multi-dimensional poverty in Brazil's RMs and Brazil as a whole

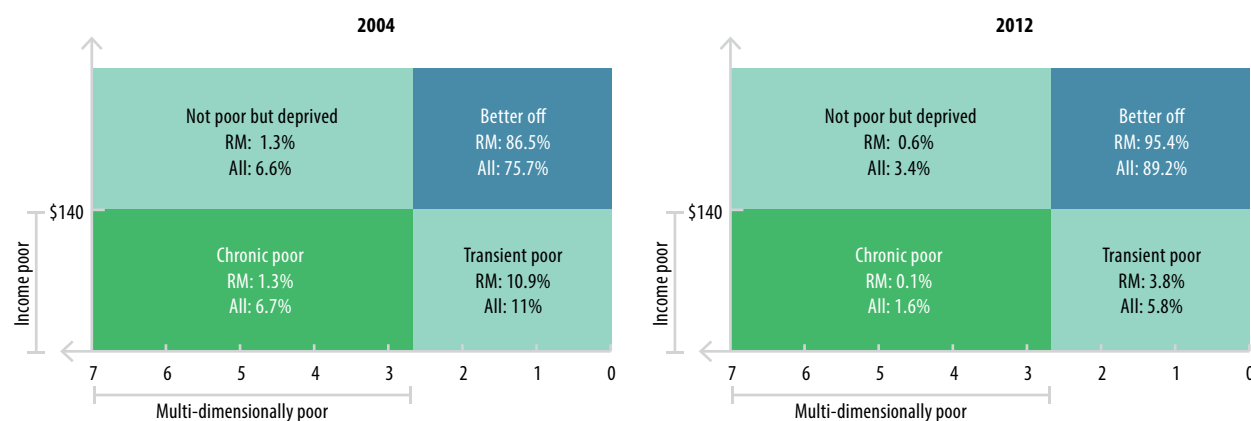
Poverty has been defined as the “pronounced deprivation in wellbeing” (Houghton et al.). This is a difficult condition to measure statistically and is thus typically expressed as the amount of income required to attain a certain level of well-being. However, there are other elements that are non-monetary that effect the level of individuals’ well-being, their ability to compete in the labor market, and their resilience to economic shocks. In order to capture some of these dimensions, a different measure or indicator must be utilized.

Multi-dimensional poverty examines the non-monetary measures of poverty evident in a society. Similar to an absolute poverty line, it is based on the total number of non-monetary deprivations that an individual faces. Rather than simply measuring the level of income of an individual or household, multi-dimensional poverty examines the deprivation of indicators that are believed to be closely linked with income levels and well-being. These dimensions are: (1) a school-aged child (7 to 15) is out of school, (2) none of the household members has completed at least eight years of schooling, (3) the dwelling is constructed with precarious wall materials, (4) no access to tap water in

dwelling, (5) no flush toilet or pit latrine in the dwelling, (6) no electricity, and (7) lack of assets. Individuals are considered to have a lack of assets when they do not own either a refrigerator/freezer or a telephone/mobile. When a household is deprived of three or more of these opportunities, it is considered to be “multi-dimensionally poor.”

Utilizing a combination of multi-dimensional poverty and monetary poverty can provide a clearer portrait of poverty and those who face it. When these two indicators of poverty are combined, four separate groups emerge; (1) the chronic poor (those poor both in income and multi-dimensional terms), (2) the transient poor (those poor only in income terms), (3) the “not poor but deprived” (those poor only in multi-dimensional terms), which could be considered as a form of vulnerability, and (4) the better off (those not poor in either term). The chronic poor may be divided into those who fall below the moderate and extreme poverty lines. These groups make up the different elements of poverty and problems faced by different groups within society, providing stakeholders and policy makers with a tool to better understand the problem and act on it.

Figure 37. Matrix of multidimensional and income poverty in Brazil



Source: World Bank calculations using PNAD 2004/2012.

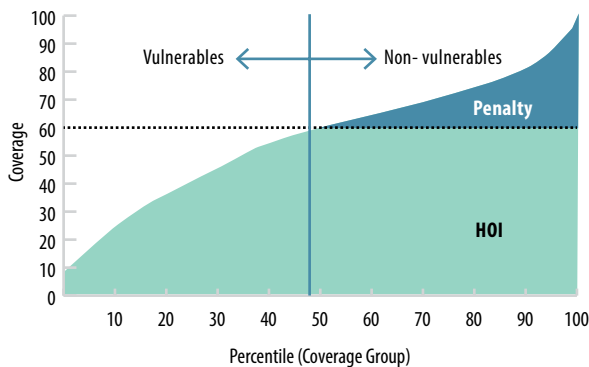
Annex 10. The Human Opportunities Index in Brazil's RMs

The Human Opportunities Index is an equity-penalized measure of the coverage of services deemed necessary for the development of human capital in children. These services are electricity, sanitation, access to education (measured by school attendance) and completion of primary education on time. While the coverage rate allows policy makers and stakeholders to see overall access, the HOI also examines how access is affected by circumstances outside of the child's control (i.e., parents' education, ethnicity and location of birth). HOI penalizes the coverage rate for the differences in access based on these circumstances.

The penalty can be interpreted as the percentage of people whose access would have to be reassigned to people in the groups with below-average coverage rates in order to achieve equality of opportunity. If all groups had exactly the same coverage rate, the penalty would be zero, and no reassignment would be needed. As coverage approaches universality for all groups, that reassignment becomes smaller.

The Dissimilarity Index, or D-Index, measures the differences in coverage as a result of being a member of a cer-

Graphically, the HOI can be explained as follows



Note: Vulnerability is defined here in terms of opportunities and is distinct from the vulnerability line (R\$291) based on income used in the rest of the analysis.

tain circumstance group. When this is disaggregated, it represents the amount of the penalty that is contributed to each specific circumstance.

The six steps of building the Human Opportunity Index

1. Estimate a separable logistic model on whether child i had access to a given basic good or service as a function of his or her circumstances. For education, age is also used to predict the probability of completing each grade. The specification is chosen according to the needs of each circumstance: quadratic for years of education, logarithmic for real income, and categorical for age and the other dimensions. In all cases the functions are linear in the parameters. From the estimation of this logistic regression, obtain coefficient estimates.

2. Given these coefficient estimates, obtain for each child in the sample the predicted probability of access to the basic good or service in consideration \hat{p}_i based on the predicted relationship $\hat{\beta}_k$ and a vector of their circumstances x_{ki} :

$$\hat{p}_i = \frac{\exp(\hat{\beta}_0 + \sum_{k=1}^m x_{ki}\hat{\beta}_k)}{1 + \exp(\hat{\beta}_0 + \sum_{k=1}^m x_{ki}\hat{\beta}_k)}$$

3. Compute the overall coverage rate C ,

$$C = \sum_{i=1}^n w_i \hat{p}_i$$

where $w_i = 1/n$ or some sampling weights.

4. Compute the Dissimilarity Index,

$$\hat{D} = \frac{1}{2C} \sum_{i=1}^n w_i |\hat{p}_i - C|$$

5. Compute the Penalty,

$$P = \frac{1}{N} \sum_{k=1}^v (M_k - \bar{M}_k)$$

Or

$$P = C * \hat{D}$$

6. Compute the HOI,

$$HOI = C - P$$

Table 14. Human Opportunities Index 2004 and 2012

Area	Attendance	Grade Progression	Water	Sanitation	Electricity	Internet	Cellphone
2004							
Brazil All	94.6	47.0	74.8	48.7	91.7	62.8	32.0
Brazil RMs	96.0	58.1	94.3	76.0	99.6	64.7	50.0
Belém	93.5	34.2	77.1	76.7	98.7	50.8	41.7
Fortaleza	94.7	48.6	80.5	48.3	98.2	61.0	34.9
Recife	94.2	41.8	85.1	28.8	100.0	63.4	39.8
Salvador	95.2	37.7	95.4	77.8	99.9	69.8	40.7
Belo Horizonte	95.6	59.4	97.5	80.3	99.3	57.3	55.4
Rio de Janeiro	96.7	49.4	95.9	81.9	99.9	66.7	53.1
São Paulo	96.3	74.1	98.7	84.2	100.0	64.9	47.9
Curitiba	96.3	59.6	95.7	81.3	99.5	64.2	52.2
Porto Alegre	96.1	59.1	97.0	87.1	99.3	65.1	73.5
Distrito Federal	97.0	55.8	97.1	94.2	99.4	67.0	72.3
2012							
Brazil All	97.0	56.9	86.7	62.3	98.7	79.5	86.7
Brazil RMs	97.3	59.9	97.1	85.5	99.9	85.7	96.1
Belém	97.9	50.8	96.2	59.8	100.0	76.4	95.3
Fortaleza	96.8	51.3	90.2	65.3	99.9	76.2	96.6
Recife	97.0	54.9	95.2	60.2	99.7	87.8	95.7
Salvador	96.7	43.4	96.6	89.6	99.8	89.1	97.3
Belo Horizonte	97.0	56.7	97.8	84.1	100.0	77.7	97.9
Rio de Janeiro	97.3	50.1	97.4	90.2	100.0	86.9	94.5
São Paulo	97.6	72.9	98.0	93.7	99.9	90.0	95.4
Curitiba	92.3	54.0	98.4	85.1	100.0	78.6	94.7
Porto Alegre	98.2	59.6	99.2	90.2	100.0	77.4	97.7
Distrito Federal	98.1	54.4	96.0	95.0	100.0	87.5	98.2

Source: World Bank calculations using PNAD 2004, 2012. Note: HOI is calculated based on access of children age 16 and younger to services, adjusting for equality of distribution among the following circumstance groups: education and gender of the household head, per capita household income, gender, race, urban/rural location, the number of children in the household, and whether two parents are in the household.

Annex 11. Differences between cores and inner peripheries in the RMs of Brazil's Northeast and Southeast, 2010

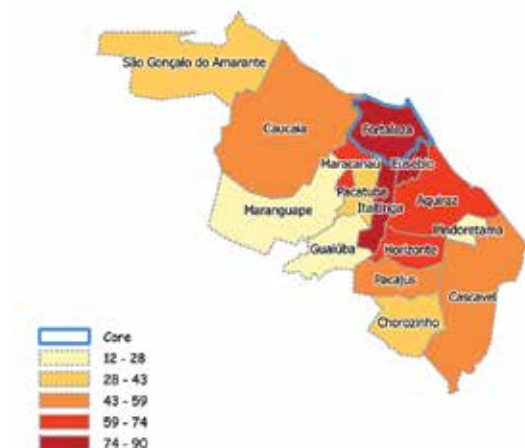
Table 15. Characteristics of core and inner periphery by income group 2010

	All		R\$70		R\$70-R\$140		R\$140-R\$291	
	periphery	core	periphery	core	periphery	core	periphery	core
RM Fortaleza								
Education less than primary	48.5	34.6	63.5	55.5	63.4	61.0	54.0	51.1
Hourly wage (R\$, 2012)	5.7	11.6	1.4	1.9	3.0	3.6	3.8	4.1
Informality (%)	38.5	30.3	93.7	90.6	62.7	54.6	46.0	43.6
Labor force participation (%)	58.4	63.9	28.0	20.3	46.2	46.6	54.8	56.9
Unemployment (%)	9.2	7.6	45.6	62.1	17.0	19.9	11.6	13.4
Sanitation	43.2	74.2	33.5	70.4	34.7	64.5	39.2	66.5
RM Recife								
Education less than primary	43.3	34.1	62.1	55.7	63.7	60.9	53.8	51.7
Hourly wage (R\$, 2012)	8.3	14.2	1.8	2.0	3.4	3.4	4.3	4.3
Informality (%)	26.8	23.9	91.0	87.1	52.3	51.8	36.5	38.8
Labor force participation (%)	58.5	61.7	29.9	29.3	47.8	47.5	55.1	56.9
Unemployment (%)	14.7	12.3	71.9	75.9	29.5	31.0	20.6	21.6
Sanitation	48.1	69.5	38.1	60.9	35.5	56.2	39.5	56.1
RM Salvador								
Education less than primary	43.7	31.5	61.6	50.1	64.4	56.5	55.1	48.5
Hourly wage (R\$, 2012)	8.9	12.4	1.6	1.7	3.2	3.9	4.2	4.6
Informality (%)	28.0	22.3	91.0	91.9	57.9	51.9	39.3	38.6
Labor force participation (%)	65.2	67.3	38.8	32.5	53.0	54.2	60.3	62.9
Unemployment (%)	15.9	12.9	70.2	75.7	31.7	33.9	21.5	22.7
Sanitation	66.5	93.0	54.9	87.8	53.3	87.5	59.8	87.8
RM Belo Horizonte								
Education less than primary	44.8	30.1	59.2	40.2	65.9	59.0	59.3	53.0
Hourly wage (R\$, 2012)	8.7	16.5	2.4	2.6	3.7	4.0	4.3	4.7
Informality (%)	19.3	16.2	85.4	77.3	37.6	34.1	28.5	25.1
Labor force participation (%)	67.4	68.3	22.7	17.5	47.3	47.2	57.3	57.7
Unemployment (%)	7.7	6.4	76.8	82.5	28.3	31.9	16.8	19.8
Sanitation	81.9	96.2	74.1	93.8	69.5	91.9	73.9	90.7
RM Rio de Janeiro								
Education less than primary	38.8	28.5	52.9	42.9	60.2	56.6	52.2	49.2
Hourly wage (R\$, 2012)	10.4	17.9	2.3	2.7	4.2	4.5	5.2	5.3
Informality (%)	25.2	18.7	88.6	87.8	48.2	39.6	36.7	29.8
Labor force participation (%)	61.0	61.6	20.9	14.7	47.0	43.7	55.3	54.8
Unemployment (%)	10.0	7.2	81.3	82.9	28.0	25.6	18.7	17.7
Sanitation	82.8	94.4	77.0	91.7	71.8	87.4	75.4	88.8
RM São Paulo								
Education less than primary	35.8	32.2	50.0	45.6	57.4	57.8	50.4	51.9
Hourly wage (R\$, 2012)	12.1	19.1	1.9	1.9	3.9	4.7	5.1	5.7
Informality (%)	19.6	19.3	87.1	90.4	46.5	45.5	31.3	32.1
Labor force participation (%)	66.8	66.8	19.5	14.5	47.9	45.5	57.8	56.2
Unemployment	9.2	7.3	83.1	85.1	31.7	30.9	22.0	20.0
Sanitation	86.9	92.7	81.1	89.2	73.1	80.1	77.4	83.1

Source: World Bank calculations using Census 2010.

Annex 12. Various indicators in Brazil's Northeast and Southeast RMs

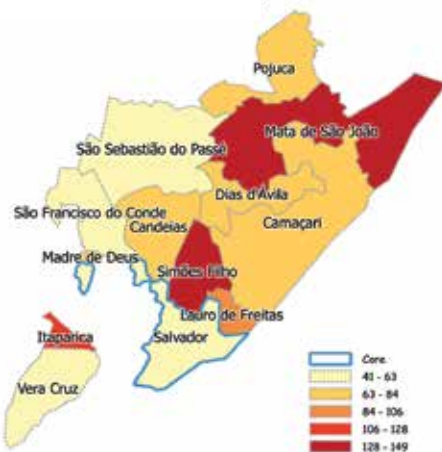
RM Fortaleza Homicide Rate 2012



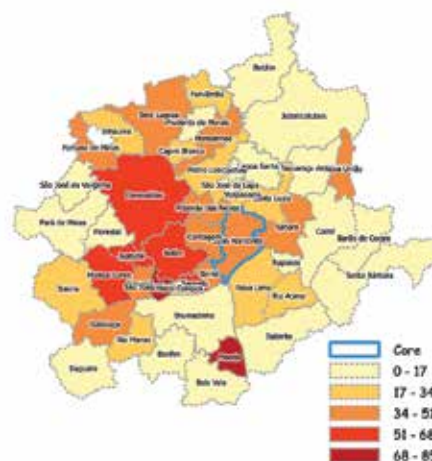
RM Recife Homicide Rate 2012



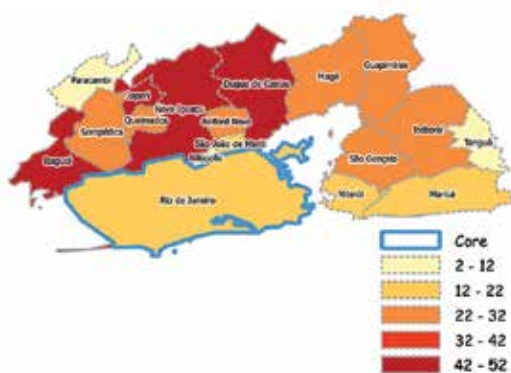
RM El Salvador Homicide Rate 2012



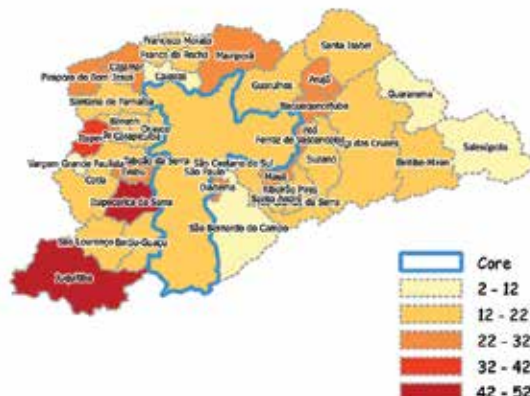
RM Belo Horizonte Homicide Rate 2012



RM Rio de Janeiro Homicide Rate 2012



RM Sao Paulo Homicide Rate 2012



RM Recife Gini 2010

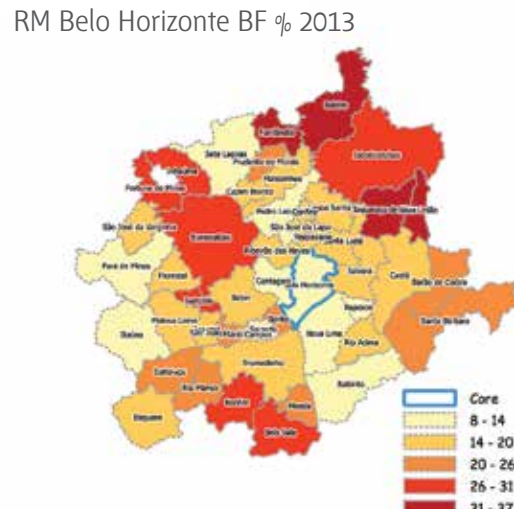
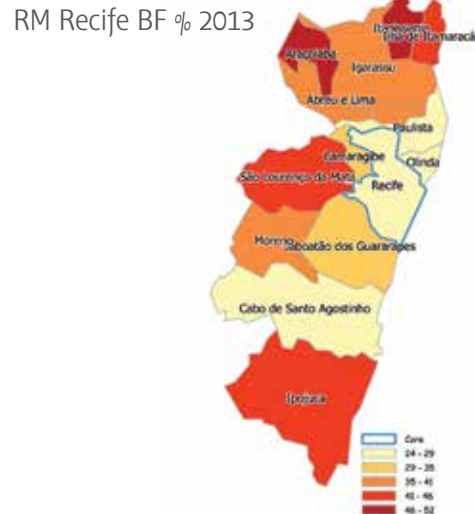
Map of the Rio de Janeiro Metropolitan Region (RM) in 2010, showing the Gini index by municipality. The map uses a color scale from light yellow (1-1) to dark red (1-1). Municipalities include Pojuca, Mata de São João, São Sebastião do Passé, Dias d'Ávila, São Francisco do Conde, Candeias, Camacari, Madre de Deus, Simões Filho, Itaparica, Vera Cruz, Salvador, and Lauro de Freitas. A legend indicates the Gini index ranges for each color.

Cor	Índice de Gini
Amarelo claro	1-1
Amarelo	1-1
Laranja claro	1-1
Laranja	1-1
Vermelho claro	1-1
Vermelho	1-1

Map of Rio de Janeiro state showing the Gini index by municipality in 2010. The map uses a color scale from light yellow (0-0) to dark red (1-1). The city of Rio de Janeiro is highlighted in dark red, indicating the highest Gini index. Other municipalities like Ilheus and Maricá are also in dark red. Most other municipalities are in lighter shades of yellow and orange, indicating lower Gini indices. A legend on the right shows the color scale and the 'Core' area.

Color	Gini Index Range
Light Yellow	0 - 0
Yellow	0 - 1
Orange	1 - 1
Red	1 - 1
Dark Red	1 - 1

[illegible]



RM Rio de Janeiro BF % 2013

Map showing the percentage of the Black population (BF %) in Rio de Janeiro state in 2013, categorized by municipality. The legend indicates the following ranges:

- Core (Blue outline)
- 10 - 15 (Light yellow)
- 15 - 20 (Yellow)
- 20 - 24 (Orange)
- 24 - 29 (Red-orange)
- 29 - 34 (Dark red)



Mapa de Chile que muestra la distribución de la actividad turística por región. Las regiones están coloreadas según su nivel de actividad, con una leyenda que indica:

- Core (rojo oscuro)
- 0-1 (amarillo)
- 1-1 (naranja claro)
- 1-1 (naranja)
- 1-1 (rojo)
- 1-1 (rojo oscuro)

Las regiones etiquetadas en el mapa son: Puntarenas, Biobío, Valparaíso, Antofagasta, Tarapacá, Atacama, Coquimbo, Magallanes, Los Ríos, Los Lagos, Aysén, Chilo, y Valdivia.

Mapa de Fortaleza Informal % 2010

Legenda:

- Core
- 24 - 33
- 33 - 42
- 42 - 51
- 51 - 60
- 60 - 69

Regiões mostradas no mapa:

- São Gonçalo do Amarante
- Caucaia
- Fortaleza
- Maracanau - Eusébio
- Pacatuba
- Itaitinga
- Maranguape
- Guaíba
- Horizonte
- Aquiraz
- Pindoretama
- Pecajus
- Cascavel
- Chorozinho

RM El Salvador Informal % 2010

Map showing the percentage of informal economy in the Municipality of El Salvador in 2010, categorized by neighborhood (Cidade).

Legend (Cidade):

- 22 - 26
- 26 - 30
- 30 - 34
- 34 - 38
- 38 - 42

Neighborhoods labeled on the map:

- Pojuca
- Mata de São João
- São Sebastião do Passé
- São Francisco do Conde
- Candelas
- Dias d'Ávila
- Carnaúba
- Madre de Deus
- Simões Filho
- Lauro de Freitas
- Salvador
- Itapirica
- Vera Cruz

[illegible]

Annex 13. Evolution of commuting time in Brazil's RMs

Table 16. Breakdown of workers' commuting time house-to-work by RM

RM	Minutes from house to work			More than an hour to go to work (%)		
	1992	2012	Change (min)	1992	2012	Change (ppt)
Belém	24.30	32.80	8.50	3.3	10.1	6.80
Fortaleza	30.90	31.70	0.80	8.1	9.8	1.70
Recife	32.30	38.00	5.70	9.6	14.0	4.40
Salvador	31.20	39.70	8.50	8.3	17.3	9.00
Belo Horizonte	32.40	36.60	4.20	10.6	15.7	5.10
Rio de Janeiro	43.60	47.00	3.40	22.2	24.7	2.50
São Paulo	38.20	45.60	7.40	16.6	23.5	6.90
Curitiba	30.20	32.00	1.80	8.6	11.3	2.70
Porto Alegre	27.90	30.00	2.10	6.1	7.8	1.70
Distrito Federal	32.10	34.90	2.80	8.7	10.6	1.90

Source: IPEA, 2013/ PNAD 1992, 2012, IBGE.

Annex 14. Oaxaca-Blinder Recentered Regression (RIF) for core/inner periphery and core/outer periphery of the RMs of Brazil's North/Northeast and Southeast, 2010

Let's consider two groups: A and B. The overall change in the distributional statistic v of per capita income Y overtime can be defined as:

$$\Delta_o^v = v(F_{Y_B|D_B=1}) - v(F_{Y_A|D_B=0})$$

Where F is the cumulative distribution. Following Firpo, Fortin and Lemieux (2007, 2009) we can add and subtract the counterfactual distribution statistic $v(F_{Y_A|D_B=1})$ for obtaining the Oaxaca-Blinder distribution

$$\Delta_o^v = [v(F_{Y_B|D_B=1}) - v(F_{Y_A|D_B=1})] + [v(F_{Y_A|D_B=1}) - v(F_{Y_A|D_B=0})]$$

where $[v(F_{Y_B|D_B=1}) - v(F_{Y_A|D_B=1})]$ is the structure effect or the difference due to changes in coefficients and $[v(F_{Y_A|D_B=1}) - v(F_{Y_A|D_B=0})]$ is the composition effect or the difference explained by changes in characteristics between the two groups.

The standard Oaxaca-Blinder method (Oaxaca, 1973; Blinder, 1973) is a particular case of the above equation where we decompose the difference in mean wages. Typically applied to analyze difference in wages (for instance, between men and women), it can be interpreted as follows: if the wage structure of the reference group was held constant, how much of the gap could be explained by the differences in characteristics?

However, the traditional OB method presents limitations. Indeed, while decomposing the mean is fairly straightforward, thanks to the statistical properties of the expected value, decomposing quantiles is not. In the former, thanks to the law of iterated expectations (an extension of the law of total expectations—LTE), the estimated coefficient of a simple OLS regression can be interpreted as the effect of a change on the mean value of the covariate on the unconditional mean value of the dependent variable. On the other hand, the coefficient in the conditional quantile regression can only be interpreted as the effect of a change in the mean value of the covariates on the T th conditional quantile of the dependent variable, as the law of iterated expectation does not hold. Instead, the two-step method introduced by Firpo, Fortin and Lemieux (2007, 2009) replaces the dependent variable Y by the recentered influence function $RIF(y;v)$ of the statistic v . The recentering consists of adding back the distributional statistic v to the influence function $IF(y;v)$: $RIF(y;v) = v + IF(y;v)$.³⁷ Hence we can apply OLS to obtain regression coefficients from RIF transformed variables and go back to the standard Oaxaca-Blinder decompositions. This allows generating counterfactuals for any distributional statistic like quantiles and Gini.

In the present analysis, we apply the two-step method to provide a more granular view on the metropolitan dynamics between the center of the metropolitan region (i.e., its capital), the inner periphery of the metropolitan region, and its immediate outer periphery. Previous works have used mean decomposition methods to explain disparities between urban and rural areas (Ravallion and Wodon, 1999), and between regions and within regions (López-Acevedo and Skoufias, 2010). A more recent paper explores its application to intra-city welfare taking the case of Bogotá (Aguilar and Yepes, 2013). To the best of our knowledge, the application of the RIF method in combination with the Oaxaca-Blinder decomposition has not been used to look at metropolitan spatial disparities.

37 For a more extensive description of the respective methods see N. Fortin, T. Lemieux, and S. Firpo (2010): Decomposition in Economics, NBER Paper N.16045

Annex 15. Labor regressions by year and income group for working age adults living in RMs of Brazil

Table 17. Hedonic wage regression by year and income group across Brazil's RMs (18 to 64 yr olds)

Characteristics	All 2004	Poor 2004	Vulnerable 2004	All 2012	Poor 2012	Vulnerable 2012
Migrant	0.074*** (0.006)	0.066*** (0.016)	0.060*** (0.009)	0.053*** (0.006)	0.098* (0.056)	0.064*** (0.017)
Weekly hours worked	-0.020*** (0.000)	-0.020*** (0.001)	-0.020*** (0.000)	-0.032*** (0.000)	-0.024*** (0.002)	-0.030*** (0.001)
Unionized	0.178*** (0.007)	0.018 (0.031)	0.088*** (0.014)	0.148*** (0.008)	-0.044 (0.118)	-0.012 (0.027)
Female	-0.304*** (0.006)	-0.166*** (0.017)	-0.238*** (0.010)	-0.324*** (0.006)	-0.308*** (0.060)	-0.219*** (0.018)
Informal	-0.288*** (0.006)	-0.411*** (0.018)	-0.278*** (0.010)	-0.268*** (0.007)	-0.508*** (0.067)	-0.363*** (0.019)
Age	0.060*** (0.002)	0.045*** (0.005)	0.047*** (0.003)	0.038*** (0.002)	0.057*** (0.017)	0.031*** (0.005)
Age^2	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Average years education	-0.046*** (0.003)	0.020*** (0.007)	0.022*** (0.005)	-0.081*** (0.003)	0.026 (0.024)	0.016* (0.008)
Average years education^2	0.009*** (0.000)	-0.000 (0.001)	-0.000 (0.000)	0.010*** (0.000)	-0.001 (0.002)	-0.000 (0.001)
Constant	0.731*** (0.034)	0.856*** (0.098)	1.011*** (0.055)	2.193*** (0.035)	1.243*** (0.321)	2.094*** (0.103)
Observations	43,624	3,424	7,547	45,718	448	3,193
R-squared	0.550	0.353	0.375	0.507	0.319	0.382

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: World Bank calculations using PNAD 2004, 2012. Note: Afro-descendants include individuals self-identifying as "preta" (black) or "pardo" (mixed origin). Note: Income groups based on poverty lines R\$70 (extreme) and R\$140 (moderate) and middle class lower threshold R\$291.

Table 18. Probability of being employed by year and income group across Brazil's RMs (18 to 64 yr olds)

Characteristics	All 2004	Poor 2004	Vulnerable 2004	All 2012	Poor 2012	Vulnerable 2012
Age	0.103*** (0.000)	0.100*** (0.000)	0.111*** (0.000)	0.089*** (0.000)	0.068*** (0.001)	0.135*** (0.001)
Age^2	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Female	-0.294*** (0.001)	-0.290*** (0.002)	-0.354*** (0.001)	-0.301*** (0.001)	-0.005 (0.003)	-0.563*** (0.002)
Afro-descendant (vs. white)	-0.138*** (0.001)	0.039*** (0.002)	0.041*** (0.002)	-0.128*** (0.001)	0.112*** (0.004)	-0.001 (0.002)
Dwelling has sanitation	0.040*** (0.001)	-0.251*** (0.002)	-0.140*** (0.002)	0.071*** (0.001)	-0.277*** (0.004)	-0.061*** (0.003)
Dwelling walls masonry materials	-0.131*** (0.002)	-0.227*** (0.003)	-0.158*** (0.003)	-0.065*** (0.002)	-0.250*** (0.008)	-0.029*** (0.006)
Household has 2 of 3 key assets (refrig., teleph., clean stove)	0.081*** (0.002)	-0.167*** (0.003)	-0.025*** (0.004)	0.212*** (0.006)	-0.254*** (0.013)	0.165*** (0.015)
Dwelling has piped water	0.064*** (0.002)	0.004 (0.003)	-0.099*** (0.004)	0.087*** (0.003)	-0.112*** (0.007)	-0.242*** (0.006)
Dwelling with electricity	-0.219*** (0.009)	-0.018 (0.012)	-0.698*** (0.022)	-0.352*** (0.027)	0.352*** (0.038)	
Average years of education	0.029*** (0.000)	-0.046*** (0.000)	-0.037*** (0.000)	0.021*** (0.000)	-0.084*** (0.000)	-0.038*** (0.000)
Migrant	0.095*** (0.001)	-0.000 (0.002)	0.086*** (0.002)	0.065*** (0.001)	-0.012*** (0.004)	0.046*** (0.002)
Constant	-0.941*** (0.009)	-0.729*** (0.015)	0.157*** (0.024)	-0.419*** (0.027)	-0.552*** (0.041)	-1.113*** (0.019)
Observation	26,716,992	2,485,089	4,334,240	30,121,432	580,293	2,058,796

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: World Bank calculations using PNAD 2004, 2012. Note: Afro-desc. include individuals self-identifying as “preto” (black) or “pardo” (mixed origin). Note: Income groups based on poverty lines R\$70 (extreme) and R\$140 (moderate) and middle class lower threshold R\$291.

Annex 16. Measuring shared prosperity at the sub-national level

The World Bank has recently identified two strategic goals: ending extreme poverty and boosting shared prosperity. The two goals should be achieved in a sustainable way. Here, sustainability is meant in a broad sense, that is, the economic, social, and environmental dimensions must be considered together.

Boosting shared prosperity has been defined as “expanding the size of the pie continuously and sharing it in such a way that the welfare of those at the lower end of the income distribution rises as quickly as possible” (World Bank 2013). Income growth among the bottom 40 percent of the income distribution in the population (the “bottom 40”) has been chosen as the indicator to be used to measure shared prosperity. Complementary to this indicator, pro-poor growth is measured by the growth of the bottom 40% compared to the mean.

This indicator presents measurement advantages in that it is largely unaffected by measurement problems associated with anyone who is not in the bottom 40 percent of the distribution. This feature is particularly important in the case of an upper middle-income country such as Brazil. Indeed, non-response is a problem more pronounced in the case of richer countries, where refusal rates increase with income levels (see Meyer et al. 2009 on the issue of nonresponse in the United States). This means that measures of inequality that are derived from household survey data may not adequately capture the full magnitude of changes in inequality if top earners are not represented in the samples. However, since the shared prosperity measure places close to no weight on anyone above the 40th percentile, nonresponse of top earners has a relatively small effect on the measure. When the rich completely drop out of the survey, the “bottom” 40 percent will somewhat overstate the location of the 40th percentile, but the effect of this on the mean of the bottom 40 percent is much smaller than the change in the mean of the distribution and the measure of inequality. However, if top earners participate in the survey, but

under-report consumption and/or income, the measure of shared prosperity will still be completely robust. (World Bank 2014).

In a large and federal country such as Brazil, measuring shared prosperity at the national level may not fully capture some of the important within variation at the sub-national level that particularly matters from a policy prioritization perspective. While the indicator of shared prosperity monitored by the World Bank is measured by the growth of the income per capita of the bottom 40 percent of the income distribution, given the present focus of the study on metropolitan regions, measures at the national level (bottom 40% of Brazil residing in the given RM) and at the state level (bottom 40% of the state residing in the corresponding RM) are both used to provide a finer lens on the reading of shared prosperity in a large federal country such as Brazil. However, the use of Shared Prosperity Indicators (SPI) at the sub-national level is not without potential problems. As noted by Onder (2013), countries with strong heterogeneity between regions could face a case of “Simpson’s Paradox”—a special case of ecological fallacy where correlation of aggregates differs from the correlation of components. Incidentally, as the measurement of shared prosperity continues to be tested, the benchmark for shared prosperity in Brazil remains at the national level.

Annex 17. From Favelas to “Areas of Special Social Interest” (AEIS)

Table 19. Ten Largest Favelas (2010 census, IBGE)

	Name	State	Population
1	Rocinha	RJ	69,161
2	Sol Nascente	DF	56,483
3	Rio das Pedras	RJ	54,793
4	Coroadinho	MA	53,945
5	Baixas da Estrada Nova Jurunas	PA	53,129
6	Casa Amarela	PE	53,030
7	Pirambú	CE	42,878
8	Paraisópolis	SP	42,826
9	Cidade de Deus	AM	42,476
10	Heliópolis	SP	41,118

According to the 2010 census, over 11.4 million people (about 6% of the population of Brazil and equal roughly to the total population of Portugal) live in *aglomerados subnormais*, *subnormal agglomerations*. These are more commonly known as favelas, although this term covers various realities, including “areas of special social interest.”³⁸ The vast majority (88.6%) of those people are located in 20 large metropolitan areas, notably the metropolitan regions of São Paulo (596,479 individuals), Rio de Janeiro (520,260), Belém (291,771), Salvador (290,488) and Recife (249,432).

If favelas concentrate poor and vulnerable people, they are not devoid of social mobility either. A recent IPEA study estimated that up to 65% of the population living

in favelas can be considered part of the middle class (i.e., having an income between R\$1,000 and R\$4,000).³⁹

IBGE defines a favela as a “settlement of 51 housing units or more located on public or private property and characterized by disordered occupation without the benefit of essential public services.” But as noted by Perlman (2009), while ‘favelas’ and ‘slums’ are both territories of exclusion in cities that increasingly criminalize poverty, they exist in very different contexts and serve different functions. The word favela has taken such negative connotations that most people use *morro* (hill), *comunidade popular* (popular community), or simply *comunidade*. There are other forms of informal housing which have traditionally accommodated the poor. Among them are Cortiços (old single-family houses that have been subdivided to accommodate multiple families); Cabeças de porco (tenements), and vilas (workers’ housing consisting of attached,

38 In Brazil, federal law (City Statute 10,257/2001) permits the designation of certain areas as “special districts,” which allows for different or more flexible zoning codes. The designation of an Area (or Zone) of Special Social Interest (AEIS or ZEIS) allows cities in Brazil to re-zone and create targeted services for a specific, legally defined geographical area

39 <http://www.sae.gov.br/site/?p=14901>

one-room apartments running back from the street along both sides of a narrow passageway).

The IBGE's favela definition itself is problematic. There are many settlements "of 51 or more shacks" that have gone unnoticed by the authorities, either because they are adjacent to another favela, between two conjuntos or in a particularly remote area. "Located on public or private property" is meaningless, because all housing is on public or private property, and this definition doesn't specify whether the land is being occupied legally or illegally. "Characterized by disordered occupation" only applies to some favelas, because others consist of very ordered villas – classic workers' housing on both sides of a narrow passageway with utilities and drainage running down the center of it, for example. As for "without the benefit of public services," it is well-known that older favelas are fully serviced (for instance, in Rio), whether as a result of government upgrading or the hard work of its residents (Perlman, 2009).

The prevalence of *subnormal agglomerations* is induced and compounded by Brazil's large housing deficit. Indeed, like other countries in LAC, Brazil faces an acute problem of housing scarcity, evident in the 8 million-unit "housing deficit" in 2011—a climb from 6.4 million units in 2005. Of this, 90% relates to the lowest income bracket. For many Brazilians, especially the poor, high property prices have made housing unaffordable, and poor households may in fact pay a higher price in slum areas relative to formal dwellings due to the low supply elasticity of housing in those areas (Abramo, 2003). For instance, according to a recent study by the Inter-American Development Bank (IDB, 2012), around 62% of families in São Paulo found it too expensive to own a house.



The World Bank
1818 H Street, NW,
Washington, DC 20433, USA.
www.worldbank.org