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Can the context mediate macro-policy outcomes?

Contextual differences in the returns to Bolsa Familia in Brazil

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Local institutional and structural (meso) factors can play a role in mediating the returns to a macro-social policy. I focus on the Brazilian cash-transfer-programme Bolsa Familia and check how contextual features influence the returns to transfers. Building on Amartya Sen's work, I assess the return to the policy in terms of non-monetary achievement indicators in the dimensions of education, health and employment quality. I use the extensive CadÚnico of the Brazilian Ministry for Social Development comprising all beneficiaries of Bolsa Familia, and a meso-level dataset containing information on economic structure, socio-demographic and institutional characteristics of Brazil's 5565 municipalities in a random coefficients (multilevel) model. First results confirm that a number of contextual factors play a role in increasing the conversion of transfers into human development.

Keywords: conditional cash transfer, meso, institutions, Amartya Sen, conversion factors, Brazil
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1 INTRODUCTION: *MESO*-FACTORS AS POLICY MEDIATORS

Meso as Lying between the Policy and the Beneficiaries Development policy — or social policy in general — attempts to reduce poverty and to alleviate the multidimensional deprivations that disadvantaged people in society face. Policies designed at the macro/country level that target a multitude of individuals or families at the micro level can not *ex ante* foresee in which subnational realities the policy will obtain the desired results and where not. The macro policy incentives and inputs insert within a multitude of different local contexts, in which own mechanisms and dynamics are at play. So while the policy-stimulus may be designed to be unified for all realities of the country, its *interaction* with the local context can produce diversified results.

In this study, I define the context as a web of interrelated *meso*-conditions within which the individual is embedded. The term "*meso*" is broadly used in natural sciences and has an intuitive meaning within social sciences, namely to be "in the middle".[1] The context is therefore identified at a level lying between macro and micro phenomena. In my study, the context plays the role of the *mediator* between an impulse defined at the macro level (the policy) and the result (welfare returns) defined at the micro or individual level. In such a framework, the context is necessarily defined and characterized at the *meso* level.[2] I identify the context at the municipality level, which is the lowest level of governance in Brazil.

Macro, Meso and Micro Studies Within Development Economics, Stewart (1987[76]) and Addison *et al.* (1990[1]) have traced the foundations on how *meso*-factors can deploy a complementary role to macroeconomic policies. Stewart focusses on meso policies, which are "concerned with improving the impact of a given macro variable on the allocation of resources and/or the distribution of income so as better to achieve (macro) priorities" (page 158, parentheses added). The World Bank study by Addison *et al.*, on the other hand outlines the *meso* more generally as the "link between the macro economy and the micro economy" and as comprising "markets (both product and factor, formal and informal); and infrastructure, this consisting of economic infrastructure (roads, communications, irrigation) and social infrastructure (health and education services)" (1990:1[1]).

Both works recognize the importance of local intervention (Stewart) or of

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[1] *Mesos* is derived from ancient Greek, just as *macros* and *micros*, and refers precisely to "in the middle".

[2] "*Meso*" therefore refers to the *level* of i) analysis at which the context can be located conceptually and to that of ii) aggregation of data that characterize the context. Such a level can practically refer to regions, governorates, provinces, municipalities or other sub–national geographical aggregation types.

institutional and non-strictly economic factors (Addison et al.) in chanelling the macro-stimulus to the target population at the micro level. The factors identified are deemed to be important in terms of their *complementarity* to the macroeconomic policy analyzed.[3] With the ambition to further unfold mechanisms of policy transmission I therefore embrace the logic of these pioneering works.

The CCT as Macro Social Policy Conditional Cash-Transfer (CCT) programmes have earned extensive attention in the last decade: their application is wide-ranging throughout different countries and continents.[4] They have increasingly been used in Latin America and the Caribbean in the last 15 years. The CCT design has consolidated as one of the preferential tools for poverty reduction policy. According to CEPAL (Cecchini and Madariaga, 2011[14]), 18 countries of the region were applying a CCT programme in 2011, benefiting more than 25 million families or approximately 113 million people. The incidence of CCT benefits within the region is thought to reach 19% of the total population, at a cost of about 0.4% of regional GDP.

In Brazil, the attention to CCTs has been particularly strong. Extraordinarily high inequality levels and persistent poverty despite of a diversified economy have been a stable component of the country's national profile.[5] CCT programmes are particularly promising for the reduction of inequality when they have wide reach within the targeted poor population: their use represents a major step forward to link extremely poor segments of society to a public and more comprehensive social-protection system. In this view, the Brazilian CCT *Bolsa Familia* (BF) has been introduced to accomplish higher levels of equality in terms of access to education and health services. It is expected to deploy a major role in breaking chronic poverty where it perpetuates in a cycle of low education, poor health and ecomic fragility.

Research Question: which Contextual Features Lead to Higher or Lower Returns to a CCT Policy? Which contextual factors matter for the conversion of Bolsa Familia transfers into human development achievements? The quest to identify relevant meso-factors is tightly linked to the notion of complementarity: there where local characteristics produce

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[3]Both works concentrate on the macroeconomic policy mix used during structural adjustment. The major goal of these studies is the deconstruction of the one-fits-all orthodox macroeconomic policy-disourse. Yet in highlighting structural particularities that violate the predominant assumptions of policy-transmission they provide a base for more detailed empirical work.

[4]Conditional-Cash-Transfer (CCT) programmes are a specific tool of social policy in which a transfer component is combined with conditionalities that require the beneficiaries to comply with specific commitments. The type of commitments typically requested in response to the transfer aim at increasing the human capacities of the beneficiaries (such as education or health).

[5]See for example Barros et. al, 2001[7]; Amorim Simoes, 2012[66].

improved conversion of the programme inputs, we face institutional or structural factors that deploy a complementary role to the macro-policy providing the transfers. Identifying these meso-factors is relevant, as they can serve as best practices or as bench-marks for other localities in which similar features can be found.

To which extent and through which mechanisms the context actually plays a role is a research question that touches upon a variety of literatures, including those concentrating on "poverty traps"[6] and those focussing on institutions and development or more in general, the factor endowments literature.[7] These approaches however tend to be either purely micro or macro: the effort of this study is to bring a group of research questions to the *meso* level and to link them with the more general problem of policy-transmission. Despite of few rather general references to a *meso* level of analysis, there is sufficient room for theory and empirical experimentation of *relevance* and *functioning* of meso factors for development and poverty alleviation.

2 BACKGROUND: BOLSA FAMILIA AND ON-GOING RESEARCH

Structure and Programme Theory of Bolsa Familia Bolsa Familia is a transfer programme that builds upon and combines previous cash transfer experiences (Bolsa Escola, Bolsa Alimentação, Cartao Alimentação, Auxílio Gas). The current format of Bolsa Familia resulted from the national scaling up of local experiences.[8] The design of the programme distinguishes between a *basic* transfer, and a *variable* transfer component. The basic transfer is guaranteed to the extreme poor, while the variable transfer depends on the demographic characteristics of the household.[9]

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[6]Among others, see for example Barrett *et. al*, 2001[5]; Azariadis and Stachurski, 2005[4]; Sachs, 2005[57]; Barrett and Carter, 2006[13]; Bowles *et al.*, 2006[11]; Sindzingre, 2007[67]

[7]See for example Diamond, 1997[20]; Gallup *et al*, 1999[26]; Sachs *et al*, 2001[58]; Sachs, 2003[56]; Easterly and Levine, 2003[21].

[8]Starting from circumscribed experiences in Brasilia, Campinas and Riberao Preto in 1995, cash transfer programmes spread widely throughout different governmental levels in Brazil between 1997 and 1998 (Soares, 2012[74]) until being scaled up to the national level in 2003 when different programmes that were running in parallel were combined.

[9]Transfers for the extremely poor entail 70 Reais for anyone living with a per capita income of up to 70 Reais. Eligibility criteria are not formally indexed to the inflation rate, but have been adjusted in this sense: extremely poor were identified as those with per capita income below 50 Reais from 2003 to 2006, below 60 Reais from 2006 to 2009 and below 70 Reais since 2009 (Osorio and Ferreira de Souza, 2013[44]). The variable component foresees a transfer of 32 Reais for each child below 16 years of age and for each pregnant or breastfeeding woman. 38 Reais are transferred for children between 16 and 17 years old for families with a per capita income above 70 Reais monthly. Values are updated to April 2013, Ministerio do Desenvolvimento Social e Combate Fome (MDS)

One of the reasons why Bolsa Familia has earned so much attention by research is its overall size: it is so far one of the largest CCT-programmes in the world, with a distribution of approximately 7.6 billion US dollars per year to approximately 13.8 million households which implies approximately 45 million people or 24% of the entire Brazilian population.[10]   A second noteworthy characteristic of the programme is its relatively low incidence on overall GDP – about 0.5% (The Economist, 2010[33]).

The Role of Bolsa Familia in Altering the Brazilian Poverty and Inequality Landscape   Depending on the methodology and the time frame used, different studies find that Bolsa Familia accounts for 12% to 31% of the recent decrease in the Gini index (Soares, 2012[74], reviewing existing literature). The neat targeting guarantees that Bolsa Familia has had a progressive effect on income distribution ever since its launch and afterwards. Findings are mixed regarding the increase or decrease of progressivity after later expansions.[11] In terms of impact on poverty, Bolsa Familia is understood to have significantly reduced intensity and severity of poverty, while the small size of its transfers seems not to be enough to effectively lift many beneficiaries above the poverty line, unless they are already quite close to it. Therefore, headcount indexes of poverty do not display great changes between 1999 and 2009 (only 8% improvement) while the poverty gap index (PGI) improved by 18% and the squared poverty gap index (SPG) by 22% (Soares, 2012[74]).[12]

In terms of non-monetary dimensions of well-being, evidence seems to be mixed. Most studies find positive effects on enrolment, a decrease in drop-out rates and in child labour (Glewwe and Kassour, 2010[27]; Ferro *et al.*[24]; Silveira Neto, 2010[41]; Chitolina *et al.*, 2012[17]), in line with international evidence of CCT-programme effects (Saavedra and Garcia, 2012[55]). In terms of cognitive skills, Santarrosa (2011[60]) finds limited effects: Bolsa Familia seems to increase attendency rates but complementary policies are needed yet to improve public school quality. Simões (2012[66]) finds that transfer size and length of participation in Bolsa Familia have positive effects on school test scores. His analysis confirms however that beneficiaries are

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www.mds.gov.br/bolsafamilia/beneficios

[10]Values of beneficiariey families are updated to May, 2013 (MDS). Other estimates are derived by the author.

[11]Ferreira de Souza (2012[75]) finds that the Bolsa Familia became more progressive through time while Soares, 2009[72]; 2012[74] detects that the incidence coefficient slightly decreases (from $-59,8$ to $-50,1$ in the second expansion of 2006 that enlarged the reach to 11.2 million beneficiaries.

[12]Impacts of Bolsa Familia on the Headcount Ratio are thought to increase much more now with the introduction of *Brazil Carinhoso* (PBC) as families get the amount of money that separates them from the extreme poverty line. This also implies that some people should get less through this mechanism, namely those that were already rather close to the extreme poverty line (see Osorio and De Souza, 2013[44] for details).

still mostly attending lower quality schools.

For health outcomes, results tend to be positive: Reis (2010[50]) for example finds positive associations between receiving cash transfer and child health indicators. Still, the literature seems to show that Bolsa Familia alone can not achieve significant health and nutritional outcomes, but that supply-side improvements in health care are necessary complements (Soares *et al.*, 2010[69]; Rasella *et al.*, 2013[47]).

With regards to employment, studies have mainly focussed on the effect of transfers on work supply. They try to assess, whether the transfer of cash is associated to reduced labour market participation. Results are mixed: some find no effect on labour market participation among adults, apart from a marginal decrease in the number of hours worked (Teixeira, 2010[79]). Others report a positive effect on the employment probability of the mother (Chitolina *et al.*, 2012[17]) or of both, mother and father (Ferro *et al.*, 2010[24]; Machado *et al.*, 2011[38]). Heterogeneous responses seem to be likely for diverse employment status of workers, and level of the transfer received (Teixeira, 2010[79]). Machado *et al.* (2011[38]) find positive effects on employment quality through a reduction in informality and increased earning levels.

Going Beyond the Existing Literature   Despite of a rather positive, general analysis of the impacts of Bolsa Familia on poverty and inequality[13] some research has pointed out how Bolsa Familia tends to have an urban bias (Fiszbein and Schady, 2009[25]; Higgins, 2012[31]) or how other fiscal dispositions of Brazil outweigh the overall inequality-reducing effect of its CCT (see Silveira, 2008; Higgins and Pereira, 2013[32]).

- What most of the studies focusing on the impact of Bolsa Familia have in common is to monitor changes on the hand of monetary measures (income, GDP growth rates).[14]   In my study, I propose the use of non-monetary indicators, in particular a group of composite measures that take into account individual achievements in the dimensions of education, employment and health.

[13]For an overview of the Bolsa Familia programme, see Amorim Simoes (2012[66]), Soares (2012[74]) or Videro Vieira Santos (2010[81]). For studies that point out the role of Bolsa Familia in reducing historically choronic inequality and poverty in Brazil see among others Ferreira, Leite and Litchfield, 2006[23]; Kakwani, Neri and Son, 2006[35]; Soares et al. 2006[70]; Barros, Carvalho and Franco, 2007[8]; Oliveira et al., 2007[43]; Osório *et al.*, 2007[73]; Resende and Oliveira, 2008[51]; Haddad, 2008[29]; Tavares, 2008[78]; Helfand, Rocha and Vinhais, 2009[30]; Soares and Sàtyro, 2009[71]; Videro Vieira Santos, 2010[81]; Birdsall, Lustig and McLeod, 2011[10]; Lignani et al. 2011; Ferreira de Souza, 2012[75]; Higgins, 2012[31].

[14]Exceptions are governmental reports as the AIBF — Avaliação de Impacto do programa Bolsa Familia — which focus on health and education specific indicators that derive from the conditionalities of the programme.

- Apart from the distinction between rural and urban areas, I propose to consider other characteristics that might make the local context more or less conducive to greater returns to the Bolsa Familia transfers.

- Typically, studies use the *Pesquisa Nacional por Amostra de Domicílios* (PNAD) or the *Pesquisa de Orçamentos Familiares* (POF) for their data analysis.[15] Both surveys share a sampling structure that is recognized to under-represent agglomerates with less than 100 000 inhabitants. As my study intends to focus on sub-national differences, and at a rather disaggregated level, I use the full record of beneficiaries — the CadÚnico — which allows to include all types of contexts of Brazil.[16]

- Unlike the Mexican *Progresa/Oportunidades* experience, in which the phasing in has allowed to use randomized control trials for the study of its impact, Bolsa Familia has tried to have a universal reach from its start. The study of impacts of Bolsa Familia usually lacks a reliable control group and further often has to rely on (a) coarse measures of the monetary input (PNAD) (b) lack of repeated and comparable data (POF, AIBF). My analysis does not consider any control group but instead focusses on differences within the population of beneficiaries: I try to identify the role that contextual factors play in explaining them.

3 MUNICIPALITIES AND BOLSA FAMILIA

The role of municipalities for Bolsa Familia is crucial, first of all because the design of the Brazilian CCT has emerged from municipal experimentation and activism (Lindert *et al.*, 2007[37]; Sugiyama, 2012[77]; Barrientos, 2013[6]). Secondly, the implementation of the programme depends on mu-

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[15]Both datasets have received much credit from the international research community but present some drawbacks for analyzing the impact of Bolsa Familia: in PNAD, apart from the 2001, 2004 and 2006 CCT supplements to the survey, there is no specific variable on the amount of benefits received by the family. Most studies recur to the decomposition of the more general voice "other income" of the income source variable, which also includes dividends from stocks, interest payments and old-age non contributory benefits. For some exemplary studies using PNAD data to analyze impacts of Bolsa Familia on inequality and poverty see IPEA, 2006; Kakwani, Neri and Son, 2006; Higgins, 2012[31]. POF on the other hand has a dedicated variable but is collected only every five years.

[16]Soares, Medeiros and Osório (IPR-UNDP, 2006) outline the differences between PNAD and administrative records of the CadÚnico, showing that due to the complex sample structure of the PNAD, it cannot capture phenomena well that are very concentrated in a specific geographic area. They confirm that absolute values of the administrative records cannot be reproduced using PNAD data, while the household survey is able to replicate distribution of beneficiaries and their characteristics in relative terms (but only for a very aggregated geographical subdivision of the country, namely the five macro-regions).

nicipal commitment and efficiency.[17]

Within the literature, studies that consider subregional levels in their analysis have mostly focussed on urban-rural differences in the impacts of Bolsa Familia (see e.g. Higgins, 2012[31]; de Brauw *et al.*, 2013[12]). Those that consider the municipality level have so far concentrated on their efficiency in implementing Bolsa Familia (de Janvry *et al.*, 2006[19]), on electoral behaviour (Barrientos, 2013[6]) or on health care quality (Rasella *et al.*, 2013[47]). The need to better understand which local circumstances make the policy a better *vehicle* for improved living conditions is widely recognized, however (among others Rawlings and Rubio, 2005[49]; Lindert *et al.*, 2007[37]; Barrientos, 2013[6]). In what follows, I outline the underlying hypotheses that I test by including contextual characteristics into my analysis. The aim is to identify which complementary features measured at the municipality level can contribute in increasing the *conversion* of Bolsa Familia inputs into human development achievements.

Different Abilities in Improving Citizenship If Bolsa Familia has succeeded in providing more citizenship and opportunities to the vulnerable families in Brazil, this has not only happened through the implicit mechanisms of (i) securing a minimum income and of (ii) breaking the intergenerational chronic poverty cycle through the accumulation of human capital. Together with the monetary transfer comes an "inauguration of special relations between the state and a particular segment of its citizenry, which — intentionally and unintentionally — affect perceptions of rights, responsibilities and citizenship" (Roberts, 2012[53]).

For the beneficiaries of Bolsa Familia, this implies being prioritized for other complementary services in their municipality, as foreseen by the programme (Lindert *et al.*, 2007[37]). Therefore, a first crucial difference in terms of outcomes could be due to the extent of implementation of complementary social programmes within the municipality.[18] A second difference among municipalities may arise from the extent to which the prioritization of beneficiaries is actually implemented. The translation of the policy input into greater achievements can further depend on a series of characteristics of the context, as follows.

Differences in Institutional Quality Why should institutional quality affect the conversion of Bolsa Familia into human development achieve-

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[17]Among others, see De Janvry *et al.*, 2006[19]; Lindert *et al.*, 2007[37]. For a detailed review of the role of municipalities in the implementation of Bolsa Familia, see Lindert *et al.*, 2007[37] or Soares, 2012[74].

[18]Rasella *et al.*[47] run a cross-sectional analysis on all municipalities and confirm that the quality of implementation of complementary health programmes (PSF – programa Saúde da Familia or Family Health programme, FHP) plays a role in decreasing childhood mortality, especially *jointly* with Bolsa Familia.

ments? Institutions provide *reasons* and *resources* — or else put — motivations and opportunities: "The varying scopes and modes of institutionalization affect what collectivities are motivated to do and what they are able to do. (...) Institutions define basic rights and duties, shape or regulate how advantages, burdens, and life-chances are allocated in society (...)" (March and Olsen, 2006:7[39]). One first aspect of institutional quality could therefore be how *redistributive* local institutions and their policies are. There where targeting of actions focusses more on vulnerable groups, opportunities are *reshuffled* to the advantage of Bolsa Familia beneficiaries.

A second, crucial aspect is the *ability* of local institutions to provide opportunities to their citizens. Within the macro-development discourse, this ability has been studied as *state effectiveness* (among others, see Besley and Persson, 2011[9]; Pritchett, 2012[45]) or as *state capability* (e.g. Sarker, 2006[61]). State effectiveness is usually considered greater where more direct taxes are being collected, and where legal capacities (separation of powers) are better developed. State capability under the New Public Management perspective refers to public management elements such as "administrative systems governing policy-making and budgeting, basic service provision, and economic regulation (...)" (Trebilcock and Mota Prado, 2011[80] quoting Sarker, 2006). Especially within a decentralized country like Brazil, local differences in the competence, rigour and effectiveness of local administrations can be big.

Differences in Economic Texture Apart from their role in increasing human capital investment, conditional cash transfer programmes play an important role in lifting income levels of beneficiaries. In contexts in which the share of poor people is high, the policy can be expected to be similar to a *positive liquidity shock*.[19] The Keynesian multiplier effect would expect this additional liquidity inflow to translate into increased demand, investment and – consequently — employment opportunities.[20]

For many rural and remote realities, in which the monetarization of the economy is limited (for example in the Amazon), the liquidity inflow can be expected to make a huge difference: "In lagging regions, inflows of social protection resources can stimulate local markets and contribute to economic vibrancy" (Addison *et al.* 2008[2]).

The question that arises naturally is: for which goods or services is the money spent? Does the liquidity inflow translate into a higher demand for local goods? This could imply an increase of local production and — possibly — of jobs. On the other hand, if the additional liquidity is directed

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[19]I am thankful to James Thurlow from UNU-WIDER for very helpful discussions on this topic.

[20]As the beneficiaries are very poor, their consumption propensity is supposed to be very high. Further, the amount transferred is rather low, therefore investments could be minimal.

towards goods and services that are produced outside of the own municipality, we might not detect any benefits in terms of employment creation or upgrading. The local economic texture is therefore expected to play a role in the conversion of Bolsa Familia inputs into higher employment quality.

Social Heterogeneity Apart from the quality of formal institutions, the institutional literature has often stressed the implicit role that informal norms play (among many others, see North, 1990[42]). These are recognized to influence not only the emergence of institutions, but also their aims and quality, and further the degree of enforcement that they achieve. On the background of informal norms, a series of other social factors must be considered, such as tradition, history, geography and cultural anthropology. One of the features that has received attention is the degree of heterogeneity present within the society.[21] More homogeneous societies are thought to be more prone to request public goods from their governments.

More homogeneous societies are further expected to succeed in the creation and adaptation of functioning institutions, which require some sort of *consensus* among different social groups:

> The political costs of trying to disturb the status quo are far greater where the struggle involves many actors with diverse preferences rather than only a few with homogeneous preferences (Rhodes *et al.*, 2006[52]).

My major hypothesis with regards to social heterogeneity is that substantial differences among citizens inhibit their willingness to collectively deliberate, and therefore the success in achieving a local consensus. This should have negative implications for the overall institutional quality and the provision of public goods within the context.[22]

The Presence of Natural Resources Natural resources are either seen as "curse" for an economy when they trigger a *Dutch Disease*[23] or as better

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[21]Usually, heterogeneity is conceived in ethnic terms. See manifold works using the Ethno-linguistic Fractionalization Index, for example by Alesina or La Ferrara.

[22]The concept of social heterogeneity is not identical to social capital: "Social capital includes shared norms and mutual trust, which facilitate coordination and cooperation for mutual benefit" (Sampson, 2006:136 quoting Putnam, 1993[59]). Social heterogeneity is somehow a preceeding condition for the emergence of social capital in the sense that the shared norms and mutual trust implied by social capital arise more easily in contexts that are less heterogeneous. In addition to some social homogeneity, social capital usually further requires a "resource stock of neighborhood organizations and the linkages with other organizations, both within and outside the community" (Morenoff et al, 2001[40]).

[23]The expression is used to identify situations in which the export of natural resources appreciated the real exchange rate through an increased demand for local currency.

starting point for economic development when they introduce advantages in labour market specialization and subsequent institutional development.[24]

In Brazil, a sophisticated redistributive system[25] compensates municipalities and states within which petroleum or other mineral resources are extracted. The system is meant to (i) remunerate those territories in which the resources are extracted (ii) compensate those territories through which the resources are transported (iii) compensate those territories that are close to production sites and that are socially or environmentally negatively affected by the extraction (iv) redistribute part of the national revenues to all municipalities, irrespective of whether they are producers or not.

The system is complex and a change to the redistributing mechanism in light of the discovery of new, substantial, sources of petroleum are under discussion. In 2010, the system guaranteed that producing municipalities received more transfers from the Federal Union than municipalities that were only indirectly involved (pass-through). A similar financial mechanism is in place for water and for mineral resources, which allows to identify those municipalities that have greater abundance in any of these natural resources.

The main hypothesis that I test in the empirical part is whether the presence of natural resources has any positive effect on human development outcomes. A positive effect could be directly linked to a greater amount of resources available for public spending. On the other hand, the presence of natural resources can also have indirect effects on development through an *experience* factor: municipalities that have to manage the production of natural resources (collection of revenues, controls of larger instrastructural work, supervision of standards) might benefit from a technical upgrading of their administration, which can also spill-over into other public activities. Natural resources might further affect the labour market through the creation of jobs, but this effect might be reduced where capital-intensive strategies are pursued, as typical in the extractive sector.

Spending, Public Goods and Collective Preferences I include some measures of spending on social sectors and on public goods into the analysis. They can be regarded a proxy for collective preferences, if we assume that democratically elected local governments implement collective preferences. Apart from spending levels, which can be proportionally higher where deprivations are widespread, I also control for the presence of "*cul-*

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[24]See for example Engerman and Sokoloff, 2002[22], who trace the mechanism through which natural resource endowment can influence institutional quality through time.

[25]The *Confederação Nacional dos Municípios* outlines how the revenues of petroleum are distributed among producing, distributing and non-producing municipalities. All mineral resources are considered to be property of the Brazilian state, but producing municipalities and states are compensated by the Federal Union through special transfers. On average, the Federal Union keeps 39,4% of revenues, and transfers 33,8% back to the producer states and 26,8% to the producer municipalities. See CNM, 2010:20.

tural equipment", which I identify with structures/facilities that promote the acquisition of knowledge and information through a generalized access to it. I interpret information and knowledge as public goods and therefore see *cultural equipment* as strategic locations for their distribution.[26]

4 METHODOLOGY

4.1 Analytical Framing

For measuring human development achievements, I refer to the Capability Approach as introduced by Amartya Sen (1985[62], 1987[65], 1999[63], 2009[64]). His framework identifies progress with the expansion of opportunities to *choose* a way of life the individual "has reason to value".[27] Development is therefore not what one *does*, or *has*, or *is* but the improvement in what one *can choose to do, to be or to have.* What one ultimately chooses is called a *functioning* or achievement.[28]

Sen's conceptual framework does not only provide guidelines for evaluative measures (dependent variables) but can also serve as point of departure for framing the role of explanatory factors (independent variables). According to the framework, there might be resources that are at disposal of the individual: *endowments*, which are goods and resources the individual is initially endowed with.[29] Cash-transfers such as Bolsa Familia can be interpreted as additional endowments that are being provided to beneficiaries through the public policy.

Apart from considering the resources at disposal, Sen stresses the relevance of the ability to transform these resources into desired outcomes. In transforming endowments (inputs) into achievements (outputs), a *conversion function* (technology) is used by the individual. The conversion

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[26]Public goods are redistributive in their nature, as they facilitate the access to opportunities on behalf of poorer segments of the society. Therefore, I expect the presence of public goods and of spending on public goods to be associated to relatively higher levels of human development among the beneficiaries of Bolsa Familia.

[27]For an introduction and better understanding of the capability approach, see A. Sen (among others 1985[62], 1987[65], 1999[63], 2009[64]); Comim *et al*(2008[18]); Robeyns (2003[54]); Kuklys (2005[36]).

[28]Functionings are "the various things a person may value doing or being" (Sen, 1999[63]), which can be specific activities and states of being, such as being healthy, having a secure job, being educated or moving about freely. The notion of capabilities is a derived notion (Kuklys, 2005:10[36]) as it refers to the pool of potential functionings an individual has access to. Capabilities thereby relate to the notion of substantive freedoms: they refer to the range of life choices an individual can opt from when ultimately choosing the life she/he wants.

[29]Sen refers to *commodities* in earlier work, e.g. 1985[62].
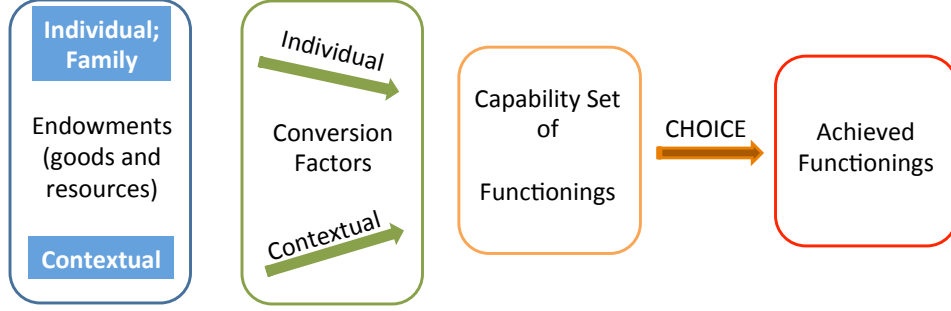
Figure 1: The Capability framework. *Source*: Author's elaboration.

function is an element of the capability function:[30]

$$Q_i(X_i) = \{b_i \mid b_i = f_i(c(x_i) \mid z_i, z_s, z_e)\} \tag{1}$$

where $Q_i(X_i)$ is the capability set, defined over the potential functionings b_i that result from the endowments x_i and the conversion function f_i which transforms the endowments into potential functionings and is constrained by conversion factors such as z_i, z_s, z_e. The subscripts $_{i,s,e}$ of the conversion factors stand for — respectively — individual, environmental and social characteristics.[31]

Within the *conversion function*, therefore, a number of characteristics (*conversion factors*) combine to jointly determine the degree of "efficiency" (*conversion rate*) with which resources are converted into achievements. The *conversion factors* "act as technical constraints and determine the conversion rate" (Chiappero–Martinetti and Salardi, 2008:7[16]) of the single individual.

The common understanding behind conversion factors can be synthetically summarized as follows: it is not sufficient to just consider the resources an individual is endowed with. It is also to which extent the individual can make *use* of these endowments to achieve personal satisfaction and human development, that matters. The framework is synthesized in figure 1. In the analysis that follows, I focus on the influence that contextual factors have on the conversion rates of Bolsa Familia beneficiaries.

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[30]The capability set can be interpreted as the "individual space of potential functionings" (Sen, 1985:11[62]; Chiappero–Martinetti and Salardi, 2008:5[16]).

[31]All authors treating the conversion function specify that the model should not imply a unique mechanism of conversion for all individuals, but that the individual conversion function $f_i \in F$, where F is the set of all possible conversion functions. For detailed treatment of the conversion function see Sen (1985:11[62]), Kuklys (2005:11[36]), Chiappero–Martinetti and Salardi (2008:5[16]).
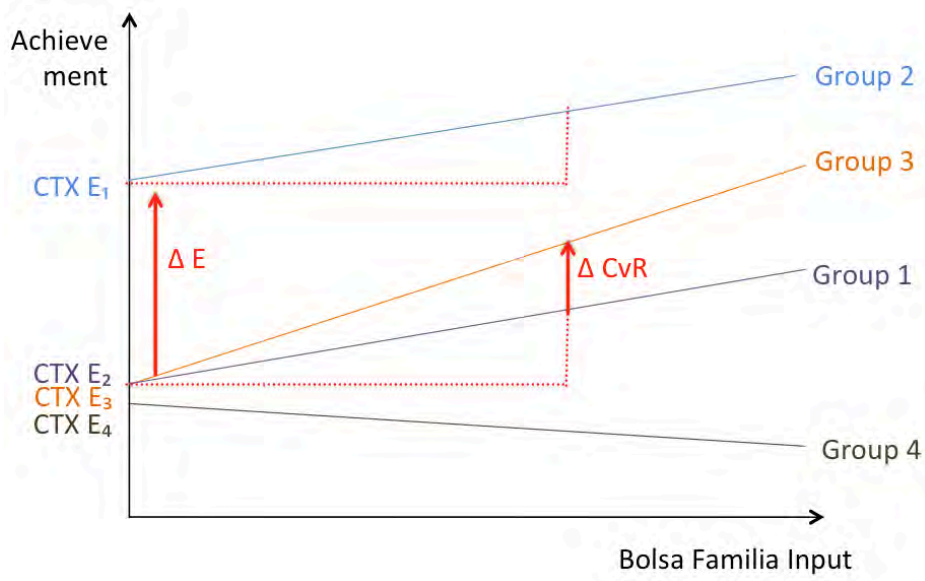
Figure 2: Contextual characteristics and policy outcomes. *Source*: Author's elaboration.

Implications for Poverty and Inequality Analysis   The focus on conversion rates helps to understand, whether we can expect increasing or decreasing inequality between different groups that get the same amount of transfers/additional endowment from the public policy. When applied to subgroup analyses, the framework helps in identifying convergent or divergent trends among different groups providing insight on horizontal inequality. Groups can be defined along individual characteristics (such as sex, ethnicity, age, etc.) or contextual characteristics (such as degree of urbanization, institutional articulation, economic diversification, etc.).

Figure 2 summarizes the analytical framework, in line with results that can be obtained in a multilevel analysis. It exemplifies how different levels of a conversion factor and different conversion rates associated to them can make a difference for policy outcomes. In figure 2, the population is divided on the hand of a conversion factor. Four subgroups of the population are shown (Group 1, 2, 3 and 4). For each group, the performance in terms of an achievement (y-variable) is plotted against the policy input (x-variable). For each subgroup of the population it is possible to identify an average "starting position" (the intercept), and an average conversion rate (the slope) with which the endowment is transformed into achievement.

The graphical display helps in visualizing inequality between and within subgroups: *between-group* inequality can be identified with differencens in their respective starting positions. *Within-group* inequality on the other hand can be deduced from the steepness of the slope. Steeper slopes show that achievement levels can be very different within the group. Flatter slopes on the other hand reflect greater homogeneity in terms of the considered

achievement.

By interpreting the slopes as conversion rates, figure 2 also helps in visualizing inequality dynamics: it is easy to see that group 1 and 2 have identical conversion rates, but because group 2 starts from a higher intercept it is not converging with group 1 in terms of achievement. Group 3, on the other hand starts from lower endowments than Group 2 but has higher conversion rates, it is therefore "catching up" and contributing to the reduction in overall inequality. Group 4 is an example of subgroup for which the policy input is not relevant. In comparison to the other groups, we can actually detect divergence, which might increase overall inequality. Group 4 appears to be *marginalized*, and what is worse: the policy is not able to change this condition.

4.2 Data

4.2.1 The Universe of Bolsa Familia Beneficiaries: Using the CadÚnico

The use of the CadÚnico dataset described in this section represents one of the most innovative contributions of my study. At the individual level (of a two-level model) I use the administrative data of the Brazilian Ministry for Development, which comprise the Unified Record for Social programmes (*CadÚnico*) and the Benefit Payment System (*Folha de Pagamento do programa Bolsa Familia*).[32] The Unified Record serves as systematic tool to identify and characterize the socio-economic conditions of low-income families.[33] Families with per capita income below half the minimum wage that want to apply for social programmes have to first register in the CadÚnico.[34]

The *CadÚnico* exists since 2001 but became fully effective with the creation of the Social Development Ministry (*Ministerio do Desenvolvimento Social e Combate a Fome*).[35] It has played a crucial role for the unification

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[32]The information contained in CadÚnico is collected by the municipal agents of Bolsa Familia — preferably through household interviews (Simões, 2012[66]) — throughout the country and is then checked and consolidated by the Caixa Federal, a federal bank which manages the national information system. The *Caixa Economica Federal* receives and processes information which is then passed on to the SENARC (*Secretaría Nacional de Renda de Cidadania*) of the MDS. In operational terms, the Caixa Economica implements most steps of Bolsa Familia. For a detailed – though skeptical – description of the role of Caixa Economica Federal within the Bolsa Familia programme see Soares (2012[74]) who also provides details on the data collection process of CadÚnico.

[33]Translated from the official site of the MDS. See http://www.mds.gov.br/bolsafamilia/cadastrounico

[34]Families will be accepted in the CadÚnico if their total family income does not exceed three minimum wages, regardless of household size.

[35]The relevant laws determining the functioning of the CadÚnico are the following: Decreto n 6.135/07, pelas Portarias n 177, 16th of June 2011, n 274, 10th of October 2011, Instrues Normativas n 1 e n 2, 26th of August 2011, and as Instrues Normativas n 3 e n 4, 14th of October 2011

14

of previous different CCT-programmes and is at the heart of the efficiency with which the programme has been able to target and to monitor such a large scale amount of beneficiaries (Soares, 2012[74]).

The CadÚnico datasets provide a unique opportunity to observe the universe of vulnerable households in Brazil. Although clearly not representative of the overall Brazilian population, the CadÚnico has an implicit advantage in comparison to other household surveys when it comes to studying poverty and vulnerability: by not relying on PNAD's sampling structure, it includes households belonging to very small, rural, remote realities which are chronically underrepresented in the standard surveys.

Using the CadÚnico for research is not an easy task, first of all because of its size. The extract of August 2010 that I use contains over 26 million observations at the household level (*Domicílio* dataset), and over 99 million observations at the individual level (*Pessoa* dataset).[36] The analysis of these datasets therefore requires powerful computational systems and — a lot of time and patience. I use the facilities of the Center for Computational Science at Tulane University to analyze the CadÚnico dataset.[37]

How reliable is the information of CadÚnico really? There are some drawbacks which mainly have to do with the law regulating its constant update.[38] I have extensively checked and controlled the dataset and do not find inconsistencies that make the data unreliable. I get to the conclusion that it is unlikely for a municipal social worker to interview a household and to only fill out one, random question of the questionnaire — even more so because the number of variables collected is rather limited. According to my analysis, the updating mechanisms work well, when they are implemented.

A different issue is the general effort of the municipalities to update the information at all: the amount of transfers received by the municipality depends on the number of beneficiaries (also requires municipality effort in identifying beneficiaries) and on the number of beneficiaries being updated within the 24 months timeframe. I find that rates of updating are higher in poorer states, whereas more wealthy states tend to put less effort in updating their CadÚnico information.[39]

In my econometric analysis I restrict the pool of data to those observations that have been updated within the last 24 months, although this

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[36]Values refer to the extract of August, 2010, which is the one I use for my analysis

[37]For more information on the center see http://wiki.ccs.tulane.edu.

[38]According to the Decree 6.135/07, an observation in the CadÚnico is regarded as updated if i) the information is valid ii) the change in *any* of the following information is being recorded at least every 24 months: address, familiy income, inclusion or exclusion of member of the family, inclusion of an identification document, legal responsible of the household, the code of the school the child/children is/are attending, the school grade the child/children is/are attending. Strictly speaking, the dataset does therefore not guarantee that all these variables are equally updated.

[39]According to my view this is directly linked to the dependency of poorer municipalities from the transfers received.

implies loosing big portions of the sample (between 24% and 46% depending on the state — see table 1). Individuals that are not updated tend to have slightly higher employment achievements, which hints that it is slightly older individuals that are not tracked as consistently as younger ones that have been included more recently.

Table 1[40] and 2[41] summarize the features of the CadÚnico dataset of August 2010. As can be seen, the dataset is consistent in terms of transfers received by families that are registered as enrolled into a social programme, with inconsistencies ranging between 0.5% and 1.2% depending on state (see table 2).[42]

Out of the initial 99 084 125 individuals registered in the CadÚnico, 18.5% are currently not enrolled in any social programme because not eligible (at all or anymore) or because death occurred in the meantime. Within enrolled households there are individuals that are beneficiaries (e.g. children and pregnant or breast-feeding mothers) and individuals that are not (e.g. fathers or other household members). Within eligible households, only 10.9% of family members are not elegible.

In my extract of the CadÚnico, 72.6% of all registered individuals are beneficiaries of Bolsa Familia, or 71 946 076 individuals as of August, 2010 (own calculation, CadÚnico). Among the individuals pertaining to eligible households, 62.4% report updated information on their socio-economic living conditions. As I restrict my analysis to updated records, the number of individuals included into my empirical investigation amounts to 50 418 935 (50.5 million) when including non-beneficiaries within beneficiary households, and to 41 604 761 (41.6 million) when only considering direct beneficiaries.

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[40]The table reports the total initial observations found in the dataset (pessoas); the number of individuals remaining in the dataset after dropping those that are not participating in the Bolsa Familia programme (post-obsdrop); the % of observations thereby excluded; the % of individuals who are excluded from the programme despite of living in a household that is receiving Bolsa Familia transfer (P.excl); the total % of observations that are not direct beneficiaries of Bolsa Familia (Totdrop); the salient characteristics of individuals excluded from the programme (Char.s excluded) and whether the difference between them and the beneficiaries can be regarded as structural (str.D); the % of individuals that are updated although they are part of a HH that has not been updated (Iut/Dot); the % of individuals whose HH is updated, but their own information is outdated (Dut/Iot); the % of observations dropped because of the update-restriction (UPdrop); the salient characteristics of outdated individuals (Char.s outdated) and whether they are structurally different from updated individuals (str.D).

[41]The table reports the initial number of observations, the final number of observations, the number of cases in which a HH that is officially not participating in Bolsa Familia is nethertheless receiving a monetary transfer according to the *Folha de Pagamentos*; the % of incoherent cases.

[42]An inconsistency is here intended as a family receiving Bolsa Familia benefit although it figures as not enrolled into any social programme.

Table 1: Data Management steps performed on CadÚnico, August 2010

	Tracking Excluido and Non							Tracking Updated and Non					
state	tot.obs.	post-obs	drop	P.excl	Totdrop	Char.s excluded	str.D	Iut/Dot	Dut/Iot	UPdrop	% drop	Char.s outdated	str.D
RO	884698	712656	19.4%	6.5%	24.66%	+hea,emp;-edu	no	20.00%	40.00%	313386	43.97%	-edu	no
AC	574444	473487	17.6%	10.0%	25.85%	+hea,emp;-edu	no	20.00%	40.00%	143863	30.38%	-edu;+emp	yes
AM	1977836	1720647	13.0%	8.2%	20.15%	-edu	yes	20.00%	40.00%	553180	32.15%	-hea,edu;+emp	yes
RR	349307	262630	24.8%	11.4%	33.35%	+hea,emp;-edu	no	23.00%	60.00%	64510	24.56%	-hea,edu;+emp	yes
PA	4997525	4244136	15.1%	9.5%	23.16%	NONE	no	15.00%	40.00%	1456214	34.31%	-emp;edu	no
AP	363802	325534	10.5%	6.9%	16.67%	-edu	no	20.00%	40.00%	136265	41.86%	+emp;-edu	yes
TO	1119410	876585	21.7%	11.4%	30.61%	-edu	no	20.00%	40.00%	315960	36.04%	-hea,edu	no
MA	6118932	4973270	18.7%	11.6%	28.16%	-edu	no	23.00%	45.00%	1780375	35.80%	-edu;+emp,hea	yes
PI	3050310	2447099	19.8%	12.7%	29.93%	+emp	no	20.00%	55.00%	895876	36.61%	- hea,edu;+emp	yes
CE	7974690	6277297	21.3%	13.4%	31.80%	-edu	no	20.00%	40.00%	1961034	31.24%	-edu;+emp	yes
RN	2614760	2131412	18.5%	12.8%	28.91%	NONE	no	20.00%	40.00%	746008	35.00%	-edu;+emp	yes
PB	3460901	2729309	21.1%	12.3%	30.85%	NONE	no	20.00%	45.00%	1064650	39.01%	+emp;-edu	yes
PE	7156160	5917802	17.3%	11.9%	27.17%	+ emp	no	20.00%	45.00%	2173075	36.72%	+emp;-edu	yes
AL	2839098	2273072	19.9%	12.1%	29.66%	-emp;+edu	no	20.00%	45.00%	779530	34.29%	+emp;-edu	yes
SE	1621763	1347695	16.9%	12.9%	27.62%	NONE	no	20.00%	45.00%	431766	32.04%	+ emp;-edu	yes
BA	12040027	9851811	18.2%	13.1%	28.91%	NONE	no	20.00%	45.00%	3275614	33.25%	-edu	yes
MG	11110369	8883982	20.0%	10.8%	28.71%	NONE	no	20.00%	35.00%	3601907	40.54%	+ emp;-edu	yes
ES	1741354	1415425	18.7%	9.4%	26.35%	-edu	no	20.00%	20.00%	570837	40.33%	+emp;-edu	yes
SC	1905372	1452819	23.8%	9.4%	30.88%	NONE	no	20.00%	20.00%	645884	44.46%	-edu	yes
RJ	4452230	4074454	8.5%	7.2%	15.07%	+emp	no	20.00%	40.00%	1878908	46.11%	+ emp;-edu	yes
SP	10791250	9166271	15.1%	8.2%	22.05%	+emp;-edu	no	20.00%	20.00%	3684494	40.20%	+emp;-edu	yes
PN	5170216	3916700	24.2%	10.6%	32.30%	-edu	no	20.00%	40.00%	1585045	40.47%	-edu	yes
RS	4225279	3314283	21.6%	10.6%	29.84%	NONE	no	20.00%	30.00%	1512770	45.64%	-hea,edu;+emp	yes
MS	1150030	916470	20.3%	10.0%	28.31%	-edu	no	20.00%	40.00%	310369	33.87%	-edu	yes
MT	1394362	1055394	24.3%	9.6%	31.59%	+emp;-edu	no	20.00%	40.00%	459795	43.57%	-edu	yes
BR	99084125	80760240	18.5%	10.9%	27.39%	NA	NA	NA	NA	30341315	37.57%	NA	NA

Source: Author's elaboration on CadÚnico, 2010.

17

Table 2: Incoherent cases, CadÚnico August 2010

State	Initial population	Final population	Receiving Benefit and Non	
			dom excl w ben	inc.cases in %
RO	884698	399270	2057	1.2%
AC	574444	329624	755	0.7%
AM	1977836	1167467	2532	1.0%
RR	349307	198120	585	0.7%
PA	4997525	2787922	7558	1.0%
AP	363802	189269	364	1.0%
TO	1119410	560625	1944	0.8%
MA	6118932	3192895	8736	0.8%
PI	3050310	1551223	3664	0.6%
CE	7974690	4316263	9532	0.6%
RN	2614760	1385404	3007	0.6%
PB	3460901	1664659	4012	0.5%
PE	7156160	3744727	8974	0.7%
AL	2839098	1493542	4180	0.7%
SE	1621763	915929	2425	0.9%
BA	12040027	6576197	20261	0.9%
MG	11110369	5282075	12311	0.6%
ES	1741354	844588	3251	1.0%
SC	1905372	806935	2663	0.6%
RJ	4452230	2195546	3988	1.1%
SP	10791250	5481777	11320	0.7%
PN	5170216	2331655	7984	0.6%
RS	4225279yes	1801513	4305	0.5%
MS	1150030	606101	2214	0.9%
MT	1394362	595599	2880	0.8%
BR	99084125	50418925	131502	0.7%

Source: Author's elaboration on CadÚnico, 2010.

4.2.2 Capitalizing Brazils Data Abundancy: the Meso-level Dataset

At the meso-level, I construct a dataset that combines publicly available measures of demographics, economic performance, labour market structure, institutional organization, productivity, local public finance and other characteristics of the context, defined at the municipality level.

All data refer to the year 2010, in some cases to 2009. The data sources that I use comprise the latest census available CENSO 2010 (IBGE), FAZENDADATA which comprise all public accounts of each municipality,[43] IPEA-DATA which provides information on agricultural productivity, GDP per capita, export values and their recent growth rates. Further, I include the variables collected by a municipality survey — the PERFIL DOS MUNICI-PIOS (IBGE) which provides details on local institutions, their activity, organization and internal structure. The resulting *Meso-level Dataset* comprises geographic, economic, institutional and social variables that cover many different features of the context for all municipalities of Brazil.

The accuracy and tidiness with which these datasets are put at disposal of the public allows to adopt an exploratory approach in which innovative measures of institutional quality can be constructed.[44]

4.3 Dependent Variables

The dependent variables used in this study are composite indicators that measure the achievements of an individual. They range from 0 to 1, where 0 indicates a condition in which the individual is not enjoying any achievement or in which the individual is suffering deprivation. The upper boundary of the indicator (value 1) represents a condition in which the individual enjoys the best achievement possible in the dimension considered. Often, the reference for this upper boundary can be derived from the goals and standards envisaged by public policies and legal frameworks. Figure 3 synthesizes the logic behind the construction of the single indicators.

Each indicator measures achievements at the individual level and tries to consider elements of objective deprivation in addition to elements of potential vulnerability. The exact construction of each indicator is reported in figures 4, 5 and 6.

Achievements in Health   The health indicator combines information on health-relevant housing infrastructure with the participation in public health

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[43]The compliance with providing information is rather high, although some municipalities are still missing in the dataset

[44]Constructing the *meso*-level dataset has not been an easy task. It has required months of work in terms of data collection and data management as the merge of the different sources has not always been easy due to differences in the shape of key variables.
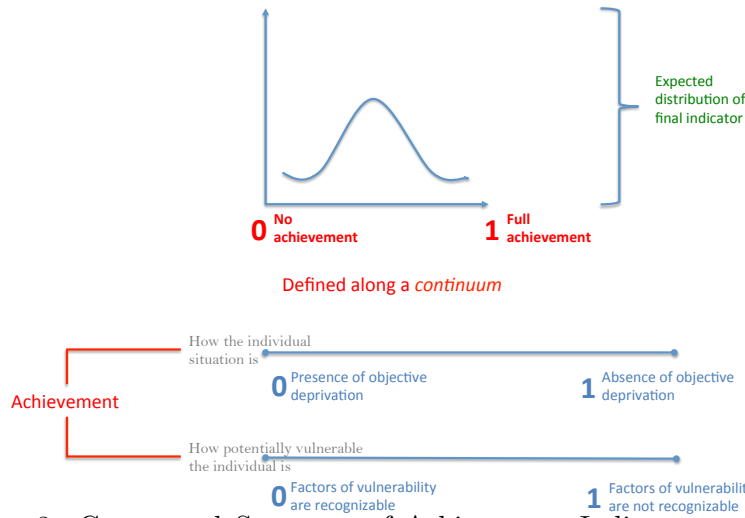
Figure 3: Conceptual Structure of Achievement Indicators. *Source*: Author's elaboration.

programmes[45] and the presence of chronic disabilities, such as being blind, deaf, mute, or being chronically subject to other physical or mental problems.

Greater weight has been attributed to the household-level infrastructure, as this indicator is less upward-skewed than the other two and relies on a greater number of subindicators. Figure 4 outlines the structure of the health indicator.

In designing the Household Infrastructure Indicator ($HHinfra$), I have tried to avoid variables that automatically introduce an urban bias, such as construction material.[46] For this reason, this indicator is upward skewed and reports generally high achievement levels among all beneficiaries in all states.

Achievements in Employment   In measuring employment achievement, I consider three subdimensions that are combined with equal weights: the aim is to capture the quality of one's position on the labour market. The subdimensions that I include into the index therefore detect the employment

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[45]No qualitative distinction is made between the PACS (programa Agentes Comunitários de Saúde) and PSF (programa Saúde da Família).

[46]The subindicators included into $HHinfra$ are: (1) water source which can be potentially risky (e.g. from the river), sold from a tank (carro pipa), or comes directly from a spring or public provision (2) water treatment which can be completely absent, obtained through boiling of water, or through standard methods (filtering, use of chloroids) (3) disposal of sewage which can occur in open air, with underground holes, rudimentary latrines, or systems that foresee some treatment — like latrines or a proper sewage system (4) disposal of waste which can occur in open air, buried or burnt, or collected and disposed by the system.
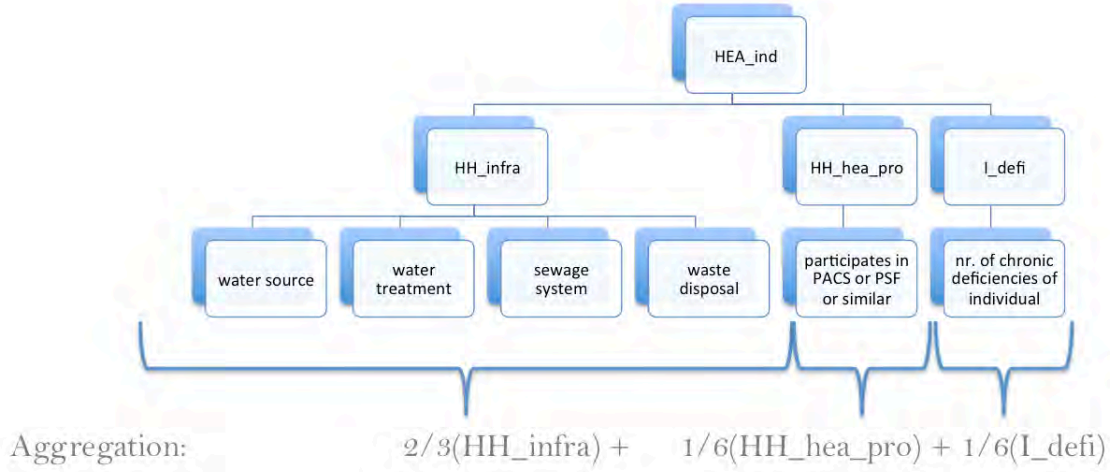
Figure 4: Data Structure of the Health Achievement Indicator. *Source*: Author's elaboration.

status of an individual.[47]

The measure is meant to capture employment quality much more than income. The employment status ($STABind$) tells us something about the stability of a job, and how much the individual is exposed to indiosyncratic shocks.

The relative earning ability ($RENDAind$) describes whether an individual tends to earn much less than others around him, or more or less the same, or maybe more. I prefer using a relative measure due to two concerns: first of all, the regional differences in price and earning levels across Brazil make it hard to compare labour-market income in absolute terms. For example, a person earning 200 reais per month in a rural area of Pernambuco is very likely to be better off than a person earning the same amount in urban Sao Paolo. I further include the experience on the formal labour market ($CTPSind$) because it provides information on work experience in general, which is very relevant on the Brazilian labour market in general. An experience in a formal job can easily be regarded as an *asset* for concurring for other formal jobs. Further, having worked in the formal sector at some point in time opens an individual's access to benefits to which an informal worker otherwise does not have access.

Figure 5 summarizes the structure of the employment achievement indicator ($EMPind$) which aggregates the three mentioned subdimensions. All subindicators range between 0 and 1.[48]

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[47]The job categories included are (in ascending order of stability): unemployed, rural worker, self employed without social security, rural employer, informal employee, self employed with social security, employer, formal employee.

[48]The $STABind$ subindicator uses a linear membership function for seven different occupational categories. The $RENDAind$ value is obtained by dividing the single labour market income by the median wage of the municipality in which the individual lives. In
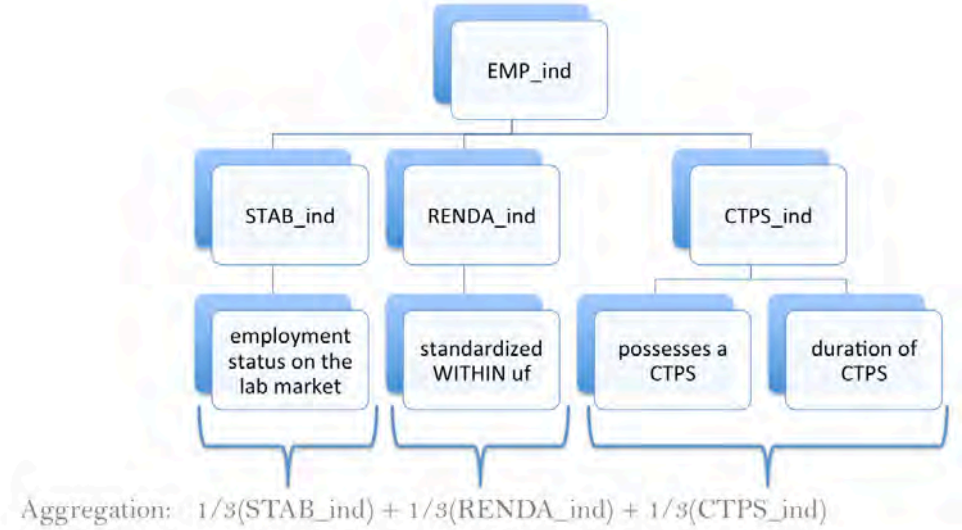
Figure 5: Data Structure of the Employment Achievement Indicator. *Source*: Author's elaboration.

Achievements in Education   The achievement in education follows two different approaches for the younger, and the adult segment of society, respectively. For adult individuals (20 years or above)[49] the indicator reports the highest educational level achieved and considers whether additional schooling is still being pursued. For the younger population, a by-age approach has been followed: for each age, the indicator measures how distant the person is from a full educational achievement. The full educational achievement in this case corresponds to the schooling level that is foreseen for that particular age by the Brazilian school system.[50]

One should note that the same absolute educational level can account for different degrees of educational achievement at different ages: attending the 1st grade of primary school is associated to an achievement value of 1 for a six-year old, of 0.67 for a seven-year old, but only of 0.25 for a 12 year old, or of 0.15 for an 18 year old. Figure 6 outlines the structure of the educational achievement indicator.

I combine the three indicators in an overall, well-being indicator: the aggregation operator is the simple mean and the weight system chosen is that of equal weights for each of the three subdimensions (health, educational and

the $CTPSind$ indicator, half of the achievement consists in having had a formal job, ever. The other half weights the time distance (*how long ago*) of the issueing of the CTPS.

   [49]I choose the threshold of 20 years as by this age — and tolerating a lag or lateness in school of 2 years in average — the individual should have concluded her/his schooling path. The indicator for adults considers whether the individual is still in school and attributes a slightly greater achievement to those that are still pursuing higher educational levels. In case of ongoing enrolment, the adult is attributed a higher value than a peer with the same highest completed educational level that is not enrolled.

   [50]The indicator uses a linear membership function for each age and therefore does not make any particular assumption about any educational threshold being more important than the other. A different type of membership function could be used. For an overview of implications of chosing different types of membership functions, see Chiappero-Martinetti and von Jacobi, 2012[15].

22
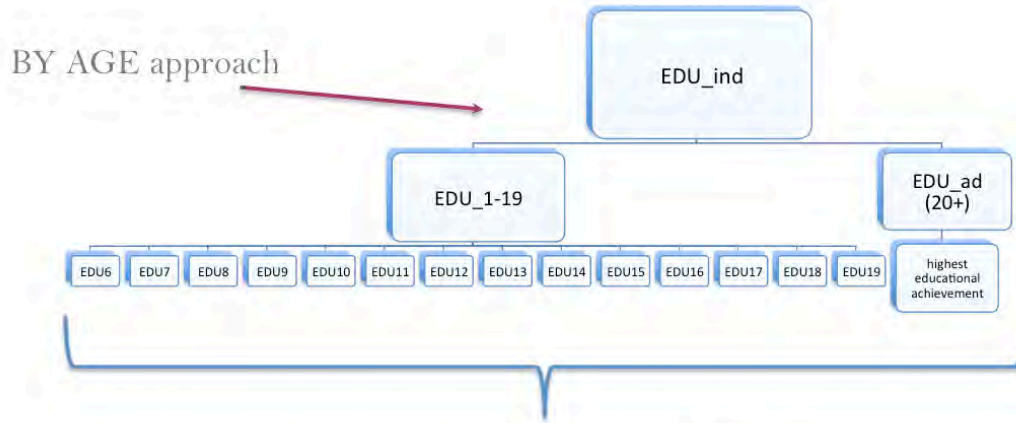
Figure 6: Data Structure of the Educational Achievement Indicator. *Source*: Author's elaboration.

employment achievements) considered.

4.4 Contextual Variables

Contextual Conditions   Conceptually, I group the pool of meso variables according to eight thematic areas, which arise from the existing literature on institutions and growth: geography, history, demography, tradition, economic structure, formal institutions, social heterogeneity and social attitude (for a graphical representation of contextual interlinkages, see figure 7).

The overarching groups merely serve as general guidance to qualify the contextual measure and should not be regarded as strict categories. Most meso-measures can be categorized into different thematic areas.

Selected Contextual Variables and their Construction   I concentrate on the diversification of public income at the municipality level. Diversification is usually interpreted as a risk buffering mechanism, be it in finance (portfolio diversification) or within development economics (sectoral/export diversification). My hypothesis is that a greater public income diversification can mitigate contingent fluctuations such as sharp decreases in transfers or an economic downturn. I use public income diversification as a proxy for local state effectiveness for two reasons: (i) greater diversification hints the ability of the local government to gather resources with different activities (tax collection, service delivery, lobbying for transfers among higher governmental levels) (ii) greater diversification is likely to stabilize the flow of income of the municipality and should therefore have positive effects on municipality's spending levels and their continuity.

23

Geography (resources, climate, fragility)

History (conflict, settlement patterns, migration)

Demography (structure, trend)

Tradition (informal institutions, values, expectations)

Economic Structure (activities and qualifications)

Formal Institutions (political, economic)

Social Heterogeneity (inequality, diversity)

Social Attitude (culture, sociability, activism, trust)

the INDIVIDUAL is embedded in the contextual web

Figure 7: The contextual web: conditions are interlinked. *Source*: Author's elaboration.

Public income diversification[51] is measured through a standard diversification index, which is defined as

$$DI = 1 - HI = 1 - \sum_{i=1}^{N} W_i^2 \qquad (2)$$

where DI stands for the Diversification Index and HI for the Herfindahl Index of Concentration. W_i is the proportion of the considered revenue category over total revenues. N is the number of public revenue categories considered, which are five: taxes, social contributions, income from the economy, capital goods and transfers.

The *formality*[52] of the local economy is proxied by a measure of the formality of demand, which I calculate by dividing the amount of indirect taxes over factor GDP. The hypothesis that I test is whether a context with greater formality is able to better "absorb" low-quality employment such as that of informal workers or the self-employed.

I measure *social heterogeneity*[53] as the number and size of gaps in educational levels between different groups living in the context. I make three assumptions: (1) people with different educational background are less likely to relate to each other within society (they are more *heterogeneous*) (2)

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[51]The variables of the *meso-level* dataset that I use come from FAZENDADATA.

[52]The variables of the *meso-level* dataset that I use come from IPEADATA.

[53]The variables of the *meso-level* dataset that I use come from the CENSO 2010.

24

groups with different average educational background tend to relate less with each other (3) the share of illiterates within a group can proxy educational background of the group.[54]

My synthetic measure, which I call the *likeliness of missing communication* is constructed by following a network approach: The adult population of each municipality is grouped along two characteristics which I deem salient for educational differences: ethinicity and age. The dataset that I use allows for the distinction between five different ethnicities[55] and three different age groups.[56] Each group assumes the role of a *node*[57] within the network. The difference between shares of illiterates in the group proxies the *educational distance* between the two groups and represents the likeliness of *missing* communication between them.[58] I compute the distances between all pairwise combinations of groups and make a sum of the gaps.

To check for the presence of *natural resources*, I control for the transfers that the municipalities receive from the state or the Federal Union through the redistributive system (see previous section).[59] For each of the following resources — water, mineral resources and petroleum — I check whether the municipality receives one type of transfer only or more types of transfers.[60]

My indicator of *cultural equipment* counts the presence in the municipality of any of the following: libraries, museums, theatres, cultural centres, cinemas, movie rentals, stadiums, sport infrastructure, internet points, secondary schools, shopping centres, music stores, book stores, radio AM, radio FM, community radio, TV channel, leisure clubs and associations.

For *social spending*, I construct a measure of spending on public goods that includes spending on urban planning, environmental management, science and technology, culture, public security and transport.[61]

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[54]This hypothesis implies *isomorphism* of educational differences and likeliness of communication/interaction.

[55]As in the Censo, 2010: branco, preto, pardo, amarelo, indio.

[56]15-24 years, 25-39 years, 40-49 years.

[57]In network analysis, nodes (or vertices) are units which are connected to each other by edges.

[58]Potentially, the contextual communication network can therefore have 15 nodes. The exact amount of nodes clearly depends on the ethnic diversification in the context. All three age groups are always present in each municipality, but some ethnic groups might be present in some municipalities and absent in others. Consequently, also the number of possible connections (gaps) can vary: for the 5565 municipalities, the number of connections varies between 23 and 150.

[59]The variables of the *meso-level* dataset that I use come from FAZENDADATA.

[60]Those that only receive one type of transfer benefit from the general distribution of revenues from natural resources, whereas those that receive more than one type of transfer can be identified as municipalities that are directly involved in the extraction of natural resources.

[61]Public security only includes civil security and excludes any military spending. The original categories from the public accounts dataset are: *urbanizmo, gestão ambiental, ciencia e tecnologia, cultura, segurança publica, transporte.*

4.5 A Random Coefficients Model

A tool that is typically used when differences between contexts are taken into account are "fixed-effect models". There are two drawbacks for using these models to investigate the framework that I propose: first of all, the use of fixed effects is reasonable when the number of contexts is small. Secondly, fixed effects allow to detect differences in starting positions (intercepts) only. They "lump" the contextual effect together into the fixed effect, or the constant. Yet, as I plan to detect different conversion rates, I also need the coefficients of explanatory variables to vary. Further, by synthesizing the contextual effect in the constant term, fixed effects do not allow to *explain* which contextual features are driving the effect.

Mixed effect models[62] on the other hand allow the inclusion of contextual covariates and provide exactly the type of estimates that the framework requires: differences in starting levels (*random intercepts*) and in conversion rates (*random slopes*). The choice of multilevel analysis is justified by the focus that these models pose on the role of clustering: they presume data structures that are nested. Multilevel models are designed to study latent factors whose precise content can be explained by including more and more explanatory variables.

For the empirical analysis of this study I use a random coefficients model - or *multilevel model* (Snijders and Bosker, 1999[68]; Hox, 2002[34]; Raudenbush and Byrk, 2002[48]) with two levels in which: level 1 comprises individuals with the index $i = 1, ..., n_j$ within the municipality j and level 2 refers to the context (municipality) in which the individual lives, carrying the index $j = 1, ..., J$.

The specification I choose is a two-level random intercept random slope model which allows to capture differences in "starting levels" — in line with more standard *fixed effects* analyses that detect a context-specific intercept — and in conversions. The first level model assumes the form of:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \epsilon_{ij} \tag{3}$$

where the dependent variable Y_{ij} of individual i nested in context j is a quasi-quantitative indicator with range $[0 : 1]$ measuring the achievement in well-being or in any of its sub-dimensions (education, health or employment).

Relation (3) shows that, for each context j, the individual achievement is explained by the average outcome in context j, a vector of individual characteristics X plus an individual error term that is i.i.d in the sense of $\epsilon_{ij} \sim N(0, \sigma^2)$. As it is likely that a common effect among individuals belonging to the same context is present, a context-level error term is added to the specification of the intercept and the slope:

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[62]Also known as *Random coefficients models*, or as *Multilevel models*.

$$\beta_{0j} = \gamma_{00} + u_{0j} \tag{4}$$
$$\beta_{1j} = \gamma_{10} + u_{1j} \tag{5}$$

For each context j, the intercept (4) and the slope (5) are defined by an average outcome for the entire population, γ_{00} and γ_{10} respectively, and a context-specific error term; u_{0j} for the intercept and u_{1j} for the slope, where both context-level errors are i.i.d in the sense of $u_j \sim N(0, \sigma^2)$ and orthogonal to the individual error term ϵ_{ij}.[63] In order to better specify the *ways* in which the context can influence individual achievements, I introduce a vector of covariates defined at the second level: W. Any covariate defined at level 2 can change the context-specific parameters β_{0j} and β_{1j} in the following way:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j} \tag{6}$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_j + u_{1j} \tag{7}$$

where $\gamma_{01}W_j$ captures the mean difference in the intercept that is due to the contextual explanatory factor W, and, similarly, $\gamma_{11}W_j$ identifies the mean difference in slope due to factor W. The new, complete random intercept, random slope multilevel model is obtained by combining equations (3), (6) and (7):

$$Y_{ij} = \gamma_{00} + \gamma_{01}W_j + \gamma_{10}X_{ij} + \gamma_{11}W_jX_{ij} + u_{0j} + u_{1j}X_{ij} + \epsilon_{ij} \tag{8}$$

The parameters that are of particular interest for this study are those in which context-specific covariates, W_j, are at play: for example, the way in which a certain contextual characteristic shapes the average intercept of the context $\gamma_{01}W_j$ can give an important insight as to which contexts (and due to *which* features) provide a better starting position for individual achievements. The *cross-level interaction* term $\gamma_{11}W_jX_{ij}$ on the other hand tells us something about how the contextual conversion factor affects the average conversion rate of the beneficiaries living in that context.

4.6   Estimation Strategy

In order to detect in which contexts Bolsa Familia seems to work best, I proceed in the following way. After investigating the CadÚnico dataset in terms of poverty and inequality statistics, I compute a multilevel model with individual and contextual covariates for each of the three subindicators of well-being, and for the composite well-being indicator. The two Bolsa Familia input variables that I include into the model are i) the per capita

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[63]This does not imply that the error term of the intercept has the same variance as the error term of the slope.

amount transferred and ii) the length of participation in the programme (expressed in years). Where model fitting does not decrease, I also include an interactive term between i) and ii) — $BFpcapLength$.

I test whether a random intercept or a random slope specification is more adequate, and consistently find better fitting with the random slopes model. Therefore, only the results of the random slope model are presented.[64]

As this study focusses on contextual characteristics, I do not explicitly aim at identifying individual characteristics that determine well-being achievements. However, a number of individual-level control variables have been included into the model.

In the choice of contextual characteristics to include in the analysis, I build upon an extensive exploration of the meso dataset. Without going into the methodological details at this point, the factors selected tend to be very relevant for the context in overall. I use network analysis and quantile regressions to detect which contextual features are i) most interlinked with other contextual features ii) dominant in relative terms.[65] When inserting contextual covariates into the multilevel model I pay attention to possible collinearities.

Due to the extensive size of the CadÚnico dataset, I specify the four models on one state, Minas Gerais, which is usually considered to be the most representative state of Brazil as it resembles characteristics of all different parts of the country. I run the same model specifications on each single state and try to identify i) which contexts tend to provide better or worse starting positions for achievements ii) whether the conversion of Bolsa Familia input to achievements is different in different contexts. I find that the model fitting is not equally good throughout different states.

In a second stage analysis, I add cross-level interaction terms to the model in order to detect the exact effect that particular contextual characteristics have on the conversion ability of Bolsa Familia beneficiaries. This provides a first insight on *linear* contextual effects. The last stage of the analysis computes model predictions for subgroups of contextual characteristics, e.g. categories of urbanization levels, or quintiles of the distribution

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[64]As the computation of the R^2 is not straightforward in multilevel analysis, I report a proxy statistics, interpretable as the *percentage of explained variance*. This can only be calculated on the random intercept specification, which has slightly lower fitting in terms of *AIC*, *BIC* and *deviance* - these are commonly used in random coefficients models (see for example Snijders and Bosker, 1999[68], Albright and Marinova, 2010[3], Rabe-Hesketh and Skrondal, 2012[46]).

[65]The concept of dominance is derived from ecology: Symbiotic relationships between two organisms can be classified as being *mutual* — both organisms benefit in the same way, *commensalist* — one organism benefits from the other, while the other neither benefits nor is affected, *parasitic* — one organism benefits from the other, while the other is being harmed. The contextual factors identified as dominant are those that behave as *commensalists* over other contextual features. Briefly, the logic behind this conceptual framework is to transfer ecological knowledge to the investigation of institutional interlinkages and evolution.

of a contextual factor. The graphical analysis resulting from this last stage allows to detect non-linear influences of contextual characteristics on conversion rates. It also provides an insight on relative convergence and *catching-up* phenomena.

5   RESULTS

5.1   Inequality and Poverty Profile of Bolsa Familia Beneficiaries

When analyzing the data of the CadÚnico, it is quite obvious that Bolsa Familia has reduced inequalities. The gini index of income *without* the Bolsa Familia transfer, and the gini of income *including* the transfer are quite different. Inequality among the beneficiaries drops drastically once we include the monetary transfer into household income. Inequality does not only decrease within the state, but also across the different Brazilian states, hinting that — at least for the beneficiaries — regional differences basically disappear.

A similar trend can be observed when looking at education. As in many other developing countries, the recent wave of education-focussed policies has produced a huge gap between older generations, which still tend to have rather high illiteracy rates and the younger groups in society. The younger the individual, the higher the probability that she/he will be enrolled to school, and the higher the average educational achievement obtained. This is also true for Brazil, and the CadÚnico data confirm it: educational achievements are generally lower among older people and they increase within younger generations.

Measures of educational inequality, therefore, mainly capture this generational gap throughout the country. The educational achievements of older generations (say those *antecedent* to the introduction of Bolsa Familia) stand for previous deprivations and inequalities. These are indeed rather different across different states. On the other hand, we notice that inter-state differences among the younger generations are barely noticeable. My interpretation is that Bolsa Familia is already closing a huge structural gap that determined regional differences within the country for decades (and centuries). This is very promising for a continued decrease of inequality in the future.

To better understand the profile of beneficiaries that are present in the CadÚnico dataset, I construct poverty and inequality measures for each of the achievement indicators. Table 3 reports the median value, the PGI, SPG and gini index for each of the achievement indicators constructed ($EDUind$, $EMPind$, $HEAind$ and $WBind$). As can easily be seen, health is the dimension in which least inequality among beneficiaries can be detected. This can be explained by i) the relative homogeneity of the population recorded

within the CadÚnico and ii) the "generous" definition of the indicator which tends to understimate poverty in order to avoid an urban bias as much as possible. Inequalities among beneficiaries are higher in the dimensions of education (generationally driven, as mentioned) and employment. In some states inequality is higher in education, in others there is more inequality on the labour market.

5.2 The Role of the Context for Well-being

The role of the context (municipality) in explaining differences in well-being varies widely in Brazil. In general, I find that educational achievements are less influenced by contextual characteristics. This again hints for a *homogeneizing* effect that Bolsa Familia has on all beneficiaries throughout the country. Figure 4 reports the % of indicator variability explained by the context in the different states.[66]

The percentage of variability in the educational achievement explained by the context varies between 1.12% and 4.21%. Employment quality, on the other hand is much more conditioned by contextual characteristics. I find that the context accounts for between 2.80% and 12.61% of variability in the employment quality indicator. It is the health achievement indicator that is most affected by the context: the percentage of explained variability that depends on contextual factors ranges between 9.06% and 36.41%.

As the well-being indicator aggregates these three subindicators, the relevance of the context also is an average effect (between 1.10% and 13.34%), mainly driven by the health dimension. Low values of the clustering effect do not automatically imply that the context does not play a role. It can also hint that contextual characteristics are rather homogenous within the state. Higher levels of the clustering effect on the other hand indicate that there are significant differences within the state, so they concur with individual characteristics in explaining achievement levels.

5.3 Different Achievements among Bolsa Familia Beneficiaries

For the sake of interpretation I treat all well-being indicators as if their range were between 0 and 100 instead of between 0 and 1. This allows to refer to explanatory variables as factors that increase/decrease the achievement indicators by points.

In what follows, I briefly refer to factors that tend to increase or decrease achievements of the Bolsa Familia beneficiaries: I refer only to one state,

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[66]This can be computed when running the empty multilevel model. It is also know as the *intra-class coefficient ICC* or as the *clustering effect*. The *ICC* is defined as ratio of the total variance explained by the variance at level 2: $ICC = \tau^2/(\tau^2 + \sigma^2)$, where τ^2 stands for the variance at level 2 and σ^2 for the variance at level 1.

Table 3: Poverty and Inequality Profile of Bolsa Familia Beneficiaries, CadÚnico 2010

macroregion	state	Median	PGI EDUind	SPG	Gini	Median	PGI EMPind	SPG	Gini	Median	PGI HEAind	SPG	Gini	Median	PGI WBind	SPG	Gini
North	Rondonia	410	.563	.393	.362	.331	.660	.468	.279	.920	.120	.024	.060	.496	.509	.269	.114
	Acre	460	.566	.401	.379	.318	.668	.476	.276	.847	.179	.056	.104	.468	.538	.304	.146
	Amazonas	500	.527	.347	.319	.293	.696	.512	.298	.847	.171	.053	.100	.473	.528	.292	.132
	Roraima	590	.479	.297	.284	.281	.704	.539	.383	1.00	.088	.024	.068	.517	.496	.258	.120
	Parà	450	.563	.383	.340	.319	.671	.477	.265	.847	.181	.051	.091	.462	.538	.300	.126
	Amapá	570	.496	.321	.310	.322	.668	.477	.285	.920	.132	.033	.077	.500	.507	.268	.118
	Tocantins	500	.519	.345	.323	.333	.644	.455	.306	.920	.112	.031	.078	.510	.496	.260	.128
Northeast	Maranhao	500	.554	.384	.358	.308	.701	.515	.271	.773	.220	.076	.120	.450	.548	.313	.140
	Piaui	400	.589	.419	.375	.298	.703	.523	.298	.847	.224	.090	.145	.443	.556	.325	.157
	Ceara	470	.547	.375	.347	.300	.678	.502	.335	.920	.133	.038	.088	.493	.510	.273	.130
	R.G.d.No	460	.559	.385	.352	.230	.660	.473	.292	.920	.117	.030	.075	.500	.498	.260	.121
	Paraiba	350	.595	.429	.388	.289	.695	.514	.295	.920	.134	.042	.094	.474	.525	.287	.131
	Pernambuco	430	.564	.393	.340	.298	.690	.502	.265	.920	.138	.045	.091	.487	.517	.280	.126
	Alagoas	350	.611	.450	.310	.313	.673	.483	.285	.920	.143	.042	.077	.470	.532	.295	.118
	Sergipe	410	.584	.412	.323	.243	.706	.540	.306	.920	.125	.037	.078	.471	.532	.296	.128
	Bahia	470	.542	.357	.363	.333	.632	.441	.341	1.00	.096	.023	.108	.512	.493	.254	.145
CenterWest	M.G.d.Sul	500	.519	.350	.340	.333	.592	.396	.288	.920	.081	.018	.057	.532	.473	.236	.118
	Mato G.	500	.520	.342	.321	.333	.603	.407	.288	.920	.098	.021	.061	.520	.484	.246	.117
Southeast	Minas G.	470	.545	.368	.323	.333	.596	.406	.306	1.00	.074	.017	.078	.527	.475	.238	.128
	Espirito S.	470	.543	.364	.323	.333	.605	.412	.306	1.00	.086	.021	.078	.523	.475	.237	.128
	Rio d. J.	460	.551	.361	.323	.333	.613	.418	.306	1.00	.074	.016	.078	.515	.482	.244	.128
	Sao Paolo	590	.489	.309	.323	.333	.593	.400	.306	1.00	.044	.010	.078	.557	.444	.208	.128
South	Parana	500	.524	.353	.336	.333	.578	.389	.307	.920	.102	022	.064	.526	.477	.240	.119
	S. Catarina	470	.535	.357	.326	.333	.571	.382	.309	.920	.109	.026	.072	.517	.485	.247	.120
	R.G.d.Sul	470	.542	.357	.314	.333	.632	.441	.304	1.00	.096	.023	.068	.512	.493	.254	.113

Source: Author's elaboration on CadÚnico, 2010.

Table 4: % of indicator variability explained by the context, all states, CadÚnico 2010

| macroregion | state | Nr.mun | ICC, empty model | | | |
			WB	EDU	EMP	HEA
North	RONDONIA	52	3.72%	2.11%	5.05%	9.06%
	ACRE	22	12.53%	3.88%	2.80%	17.63%
	AMAZONAS	62	13.34%	4.21%	5.56%	25.01%
	RORAIMA	15	13.16%	2.51%	5.82%	34.31%
	PARA	143	9.41%	3.01%	6.13%	17.63%
	AMAPA	16	5.83%	1.71%	3.11%	11.40%
	TOCANTINS	139	12.53%	1.58%	8.00%	19.24%
Northeast	MARANHAO	217	9.28%	2.66%	6.67%	18.03%
	PIAUI	224	11.93%	2.44%	7.37%	19.91%
	CEARA	184	6.51%	1.62%	6.37%	11.60%
	RIOGRANDEDONORTE	167	5.73%	1.20%	4.11%	14.88%
	PARAIBA	223	7.94%	2.18%	5.04%	17.84%
	PERNAMBUCO	185	9.47%	2.11%	6.55%	18.68%
	ALAGOAS	102	6.87%	1.62%	4.05%	16.86%
	SERGIPE	75	7.82%	1.58%	8.72%	12.40%
	BAHIA	417	9.15%	1.92%	9.51%	19.50%
CenterWest	MATOGROSSODOSUL	78	8.60%	2.12%	6.79%	20.74%
	MATO GROSSO	141	7.23%	1.71%	6.23%	20.15%
Southeast	MINAS GERAIS	853	1.10%	1.60%	8.13%	28.02%
	ESPIRITO SANTO	78	7.48%	1.99%	3.67%	20.45%
	RIO DE JANEIRO	92	6.38%	2.05%	3.41%	17.57%
	SAO PAOLO	645	4.44%	1.23%	3.76%	19.31%
South	SANTA CATARINA	293	9.77%	1.12%	10.33%	32.78%
	PARANA	399	8.97%	1.32%	7.49%	31.30%
	RIOGRANDEDOSUL	496	12.39%	1.52%	12.61%	36.41%

Source: Author's elaboration on CadÚnico, 2010.

Minas Gerais in the macroregion Southeast as an example. Tables 6, 7, 8 and 9 in the Annex summarize the results obtained in the random slope multilevel model.

I find that age increases achievements in employment and is associated to lower levels in educational achievement, as expected.[67] Women tend to have slightly higher health (1 point) and educational (2 points) achievements but much lower employment quality (11 points). Living in an urban area tends to increase employment quality (by 3 points) and health achievements (by 16 points). It has little (positive) effect on educational achievements. Income associates positively with all achievement indicators.[68]

The achievement indicators themselves also work as explanatory variables. One point increase in the educational achievement indicator is associated to a lower employment quality indicator (likely to be driven by age). A one point increase in the health indicator is associated to higher employment quality (by ca. 3 points) and to higher educational achievement (by 12 points).

In terms of contextual explanatory factors, I find that the proactive promotion of employment and enterprises on the local labour market is significant and has a positive effect. A more formal economy increases individual employment quality as expected. The local employment rate itself (formal and informal), displays a negative sign, which can be interpreted in the following way: even when employment levels are higher, the type of jobs available to the most vulnerable people (such as the beneficiaries of Bolsa Familia) tend to have low quality (e.g. informal jobs or self-employment).[69] Social heterogeneity, here proxied by the likeliness of missing comunication, has a negative effect on employment, as expected: more fragmented/diverse societies are affected by lower employment quality.

5.4   Coefficients of the Bolsa Familia Input

When analyzing the results of the random coefficients estimation, it is possible to observe positive, negative and insignificant coefficients for the Bolsa Familia inputs.

Two different effects might be at play in determining the signs of the Bolsa Familia input coefficients: on one hand, there is the *programme placement effect* which transfers higher amounts of money to families with greater deprivations. The basic transfer ($70 Reais$) that extremely poor families receive is directly dependent on the amount of per capita income of the family. Lower income is associated to lower well-being achievements, too. The per capita amount of money transferred tends to reflect this programme place-

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[67]In the employment model I include a dummy for being an adult instead of the continuous variable age.

[68]I include the log of household per capita income into the model.

[69]The coefficient is significant at the 5% level.

Table 5: Prevalent signs of coefficients for Bolsa Familia input, CadÚnico 2010

	BFpcap	lengthBF	BFpcaplength
WB	-	+	+/ -
EDU	-	+	+/ -
EMP	+/ -	-/ +	
HEA	INS	-	-/ INS

Source: Author's elaboration on CadÚnico, 2010.

ment effect, and is therefore negatively associated with my achievement indicators.

On the other hand, the prolonged exposure to the programme can increase achievements. As summarized in table 5 the coefficients of the Bolsa Familia input variable *lengthBF* tend to be positive.[70]

The overall coefficients found at the state level combine the two opposing tendencies of the programme placement effect and the positive-return-to-policy effect. So, how can we interpret the observed coefficients for Bolsa Familia inputs? A negative coefficient for the monetary input seems to indicate that the programme placement effect is strong, and should therefore confirm that more vulnerable families are receiving greater support. The positive sign that the monetary input displays in some cases, can be attributed — in my view — to the *positive liquidity shock* hypothesis.

The sign associated to the length of exposure should reflect the effects of prolonged participation in the programme on well-being.[71] Within the municipality, however, this effect should not be strong. Negative coefficients for the length of participation could further hint that the initial starting levels of well-being of the first-included were so low, that Bolsa Familia is not sufficient for significantly improving their well-being achievements. On the other hand, greater exposure to the programme might only buffer income levels, but not significantly change well-being and achievements of beneficiaries.

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[70]When I run a marginal effect analysis on some datasets, these two opposing tendencies are confirmed. In particular, I estimate the predicted values for achievement indicators at different levels of income and at different years of participation in the programme. What I find supports my hypothesis, namely that negative signs of the cash transferred to families are driven by the *programme placement effect*, whereas the exposure to the programme in terms of length of participation tends to have a positive effect on achievement indicators.

[71]A note of caution is appropriate when interpreting negative coefficients for the length of exposure: the time of inclusion into the programme could also capture a programme placement effect, as more vulnerable families could have been included first. For Brazil, this seems to be true at the municipality level — meaning that very poor municipalities have been included first into the programme. I control for this *level 2 endogeneity* by including the average length of participation as level 2 covariate into the model, following Grilli and Rampichini, 2011[28].

Only a time comparison will show if starting conditions or an insufficient impact of Bolsa Familia drive negative correlation between length of participation and well-being measures. Positive coefficients for the length of participation hint that the programme increases well-being of beneficiaries, either because initial starting conditions were not so severe, or because the programme has had greater impact in these contexts.

The reason why the coefficients of the Bolsa Familia input variables are so low can be brought back to three features of the analysis: (i) the dependent variables range between 0 and 1, which automatically decreases the size of the coefficients to values below 0.10.[72] (ii) Beneficiaries within the sample tend to be rather similar, which decreases the sizes of all coefficients of a model that tries to explain variability. (iii) The two tendencies (*negative, due to programme placement effect* and *positive, due to exposure to the programme*) might be both at play in different municipalities and therefore result in an average low or insignificant coefficient at the state level.

A closer look at subgroups of contextual factors further shows, that the sign associated to the years of participation in Bolsa Familia is not homogenous.

5.5 Contextual Conversion Factors for Bolsa Familia

Which contextual factors *do* account for more positive slopes? I first run a series of models in which I include cross-level interaction terms.[73] The results show that some contextual factors tend to influence the conversion rate of beneficiaries. Figure 8 reports the sign and significance of the cross-level interaction terms for each state. While some prevalent trends can be identified, differences between macroregions and states persist.

The engangement of the local municipality into activities that promote employment and enterprises ($Promolb$) has a positive effect on conversion of transfers into employment quality. Further contextual characteristics that improve the conversion of the transfer are: public income diversification ($RECmunDI$) and a more formal economy ($ESformaldemand$). The likeliness of missing communication ($comNTWK$) tends to have a negative effect on conversion rates.[74] The presence of natural resources such as minerals, water and oil has a mixed effect in average. While their role for conversion rates in education tends to be positive, the factor is insignificant in overall for employment quality. The formality of demand has a positive

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[72]To better interpret the meaning of coefficients, two decimals should always be deleted, in order to read the coefficients as *points* of the achievement indicators.

[73]Results for Minas Gerais are summarized in tables 10, 11 and 12 in the Annex.

[74]This is not strange as this contextual factors captures educational heterogeneity between ethnic groups and age classes. What this result implies is that contexts with greater educational heterogeneity seem to be still lagging behind in terms of conversion of monetary transfers into higher educational achievements.

	EDU					EMP				Nr. of municip	Nr. of individuals
	comNTWK	RECmunDI	EquipCult	formaldem	terres	Promolb	RECmunDI	formaldem	terres		
RONDONIA	INS	+ (*)	+ (**)	+ (***)	INS	INS	INS	INS	INS	52	399,270
ACRE	- (***)	+ (***)	+ (***)	+ (***)	+ (***)	INS	INS	INS	INS	22	329,624
AMAZONAS	- (***)	+ (***)	+ (***)	+ (***)	+ (***)	INS	INS	INS	INS	62	1,167,467
RORAIMA	- (**)	- (**)	INS	- (***)	- (*)	INS	INS	+ (**)	INS	15	198,120
PARA	+ (***)	+ (***)	+ (***)	+ (***)	INS	INS	INS	INS	INS	143	2,787,922
AMAPA	- (**)	- (**)	INS	- (***)	- (*)	INS	INS	+ (**)	INS	16	189,269
TOCANTINS	INS	+ (***)	+ (**)	+ (***)	+ (**)	INS	+ (***)	+ (***)	INS	139	560,625
MARANHAO	- (***)	+ (***)	+ (***)	+ (***)	+ (**)	INS	INS	INS	INS	217	3,192,895
PIAUI	- (*)	+ (*)	INS	- (*)	+ (***)	+ (***)	+ (***)	+ (**)	INS	224	1,551,223
CEARA	- (***)	+ (***)	+ (***)	+ (***)	+ (***)	- ()	- (**)	- (***)	INS	184	4,316,263
RIOGRANDEDONORTE	- (***)	+ (***)	+ (**)	+ (***)	INS	+ (*)	+ (***)	+ (***)	INS	167	1,385,404
PARAIBA	+ (**)	+ (***)	+ (*)	+ (***)	+ ()	+ (**)	INS	INS	INS	223	1,664,659
PERNAMBUCO	- (***)	+ (***)	+ (***)	+ (***)	+ ()	+ (***)	+ (***)	+ (***)	INS	185	3,744,727
ALAGOAS	- (*)	+ (***)	+ (***)	+ (***)	INS	INS	INS	INS	INS	102	1,493,542
SERGIPE	- (***)	+ (***)	+ (***)	+ (***)	+ (***)	INS	INS	+ (***)	+ ()	75	915,929
BAHIA	- (***)	+ (***)	+ (***)	+ (***)	INS	+ (*)	+ (***)	+ (***)	INS	417	6,576,197
MINAS GERAIS	- (***)	+ (***)	+ (***)	+ (***)	+ (**)	+ (***)	+ (***)	+ (***)	INS	853	5,282,075
ESPIRITO SANTO	+ (**)	INS	+ (**)	+ (**)	INS	+()	+ (**)	+ (***)	INS	78	844,588
RIO DE JANEIRO	INS	- (**)	INS	INS	INS	INS	+ (**)	INS	- ()	92	2,195,546
SAO PAOLO	INS	+ (***)	+ (*)	+ (***)	+ (*)	+ (***)	+ (***)	+ (***)	INS	645	5,481,777
SANTA CATARINA	INS	+ (***)	+ (***)	+ (***)	+ (*)	INS	+ (***)	+ (***)	INS	293	806,935
PARANA	INS	+ (***)	+ (***)	+ (***)	INS	+ (***)	+ (***)	+ (***)	INS	399	2,331,655
RIOGRANDEDOSUL	INS	+ (***)	+ (***)	+ (***)	+ (***)	+ (***)	+ (***)	+ (***)	+ (**)	496	1,801,513
MATOGROSSODOSUL	- (***)	INS	INS	+ ()	INS	+ (**)	+ (***)	+ (**)	- ()	78	606,101
MATO GROSSO	+ ()	INS	INS	- (**)	INS	+ (**)	+ (***)	+ (***)	- (*)	141	595,599

Figure 8: Cross-level interaction terms between contextual variables and Bolsa Familia input (BFcap), sign and significance, all states. *Source*: Author's elaboration on CadÚnico, 2010.

effect in overall, hinting that a greater formal sector *does* absorb informal and low-quality employment at some point.

Contextual Groupings Apart from including the interactive terms, I am interested in detecting whether the contextual variables used work in a monotonic way, or if some threshold levels or non-linear patterns can be identified. Using the estimates of my mixed effects models, I predict the achievements in education, employment and well-being for subgroups of municipalities. I select eight contextual characteristics[75] and group municipalities (and beneficiaries living in them) according to their categories or the quintiles of their distribution.[76] Figures 10(a) to 24(a) report the results of some selected states graphically. The random slope graph computed for contextual groups allows to basically identify two major elements:

- *Starting Positions*: by comparing the intercept levels of the different groups, it is possible to detect which feature of the context — for example belonging to the highest quintile of female empowerment —

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[75]1) urbanization levels 2) public income diversification 3) social heterogeneity 4) formality of the local economy 5) nr. of cultural equipments present 6) presence and typology of natural resources 7) female empowerment 8) local demographic dependency ratio

[76]Quintiles refer to the overall (national) distribution of the contextual characteristic across the 5565 Brazilian municipalities.

provides higher average levels for the well-being of Bolsa Familia beneficiaries, in other words: better starting positions for those who want to attain higher achievements. How widespread the distribution of intercepts is, further allows us to identify *between inequalities* across municipalities in the same state. Where intercepts are more dispersed, we are detecting contextual characteristics that reflect big structural disparities within the single states.

- *"Catch-Upers"*: slopes can be read as the rate at which the policy has been converted into well-being. Where groups of contexts start from lower starting positions and a positive slope can be seen, we are identifying *convergence* in the sense that a longer exposure to the programme seems to help to "grow out" of the structural disadvantage. Steeper slopes hint higher rates of return to the policy and greater *within inequality* between long-term participants and new beneficiaries.

In what follows I briefly summarize the salient results of the graphical analysis of contextual conversion factors.[77]

The graphical analysis shows that conversion rates differ between contexts and states but that some trends of catching-up can be observed. Returns to the policy tend to be higher in less urbanized areas in the North and in the Northeast, but are detectable in medium-sized cities from the Center to the South, and even in some big cities in the South. There is catching-up across the country, especially in (more vulnerable) contexts with less formal economies, greater social heterogeneity, little cultural equipment, reduced female empowerment and with low public income diversification.[78]

With regards to the presence of natural resources, results differ widely between macroregions and states. Catching up can be recorded for municipalities without any resources but also for municipalities where all resources (water, minerals, petroleum) are present. The single most relevant resource for positive conversion seems to be petroleum, but not everywhere. Dependency ratios seem not to be a too relevant factor, but conversion tends to be higher in contexts with higher dependency ratios.[79]

While positive conversion into educational achievements and well-being are more common, conversion into higher employment quality is rare in the North and becomes more common when shifting to the South: high public income diversification (5th quintile) is a contextual feature that seems to facilitate conversion into employment quality. Realities with lower public income diversification are still catching up in the Southern part of the country,

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[77]The analysis has been implemented for the subdimensions of education and employment, and for the aggregate well-being indicator.

[78]This seems to be true for the second or third quintile of public income diversification, and not for the lowest one/s — hinting a threshold level.

[79]This implies a greater liquidity input as the benefit increases with family size.

however. High levels of female empowerment tend to be associated to better conversion, not only in education and well-being, but also in employment quality. In the Northern part of the country, contexts with little cultural equipment do not succeed in catching up in employment quality, although their trend in education and well-being is positive. In the Southern part, on the other hand, catching up in employment quality is occuring even where cultural equipment is very reduced.

6 CONCLUDING REMARKS

My analysis indicates that the context (municipal characteristics) plays a role for well-being in Brazil. In particular, I find that the context makes the biggest difference for health achievements, and is able to explain some variability in the employment quality of beneficiaries. The context has least effect on educational achievements, which hints that the implementation of Bolsa Familia is rather homogenous throughout the country and is closing important structural gaps that have marked regional differences throughout decades.

In the attempt to identify contextual characteristics that make a difference for the conversion of Bolsa Familia input into human development achievements, I find that my model has better fitting for some states than others. Among the contextual factors that seem to improve conversion rates for employment, I identify the diversification of public income (quality of formal institution), the promotion of entrepreneurship (active policy) and the formality of the local economy (economic structure). For an improved conversion of Bolsa Familia into educational achievements, I find that the presence of cultural equipment, formality of the economy and public income diversification have a positive effect. Social heterogeneity worsens the conversion. The presence of natural resources tends to have a positive effect for the conversion in education, but has no significant effect on employment apart from few exceptions.

In a further investigation, I have grouped beneficiaries and contexts according to municipal characteristics, and have found that the *contextual effect* varies at different levels of the contextual variable analyzed — else put, is not linear. This analysis of non monotonic influences of the context shows that there are consistently lower returns in big cities which seems to suggest that the effectiveness of Bolsa Familia for the urban poor is reduced, possibly because price differentials between urban and rural areas are so big that the transfer amount is simply not big enough in urban areas to make a difference (as suggested for example by Higgins, 2012[31]). The only exception among mega-cities seems to be Rio de Janeiro, where the participation in Bolsa Familia is being converted into higher achievements. Diversifying the transfer between urban and rural areas might have unde-

sired consequences, such as increasing migration. Still — and possibly — the programme implementation in highly urbanized areas should be complemented with additional support, whether of monetary or more service-based nature.

Apart from this limitation, I find that the rate of catching-up of those realities that have historically and structurally been lagging behind is important. In general terms for the country, conversion rates of beneficiaries tend to be higher in contexts that have higher poverty rates, less formal economies, greater social heterogeneity and little cultural infrastructure. This hints that the programme is playing an important role in closing structural gaps. This is most probably happening through the provision of new opportunities and incentives there where starting positions are historically lower. While this is remarkably true for achievements in education and well-being, the trend is less widespread for achievements in employment. Conversion of the participation in Bolsa Familia into higher employment quality is mainly happening at small urbanization levels, and more so in the Center, Southeast and the South. In more informal economies, with little infrastructure, less monetarization and little public income diversification, positive conversion into employment is likely to be driven by a *positive liquidity shock* effect.

In addition to the good news of more vulnerable contexts catching up in terms of achievements, some contextual characteristics matter in particular: public income diversification seems to provide greater opportunities to convert the exposure to the programme into higher employment quality, especially at higher levels of diversification (fourth and fifth quintile). This is true for all of the five macroregions, and seems to hint that local state capacity is crucial to consolidate the policy effort implemented by the Federal Union. Support and integrative policies that increase technical know-how and management skills of local administrations should remain high on the Brazilian agenda.

Higher levels of female empowerment also significantly improve the conversion rates throughout the country in education, employment and well-being. The effect on employment is more common in the Southern part of the country, though. Despite of some catching-up among those contexts in which average female empowerment is low, the programme tends to deliver higher rates of return in those contexts, in which women are more empowered. This seems to suggest that supportive policies for promoting female empowerment might significantly increase the rates of return to Bolsa Familia.

Municipalities where natural resources are present seem to have a comparative advantage for the conversion of Bolsa Familia into achievements. Especially the presence of petroleum is associated to higher conversion rates, probably because of greater amounts of funds available for education and other complementary public policies. Having petroleum, or all three nat-

ural resources considered (water, petroleum and minerals) is associated to better conversion in education, well-being and employment. In few cases, municipalities without any resources also have positive conversion rates in education (Acre, Bahia), employment (Mato Grosso, São Paolo and Rio Grande do Sul) and well-being (Acre, Bahia and Paranà).[80]

These findings require further testing in particular the comparison across time should eliminate doubts about the *effect* of Bolsa Familia. In future analyses, I would like to run additional regressions to identify the linear and non-linear patterns with which contextual characteristics affect starting positions (intercepts obtained from the multilevel estimates) and conversion rates (slopes obtained from the multilevel estimates). It could further be interesting to detect the exact threshold levels of public income diversification and of female empowerment at which the positive effects on conversion rates start.[81]

In a final remark I would like to suggest minor improvements to the data quality of the CadÚnico dataset: namely a change to the Decree 6.135/07, which is currently regulating the collection of information present in the single registry. According to my view, a change from the current rule that *any* of a group of variables needs to be updated in order for the observation to result as updated, to a more restrictive implementation — that *all* of the crucial variables have to be updated in order for the observation to result as updated in general — is needed.

Such a change would reassure researchers that investigate the datasets and could most probably trigger a greater use of this extensive data source. The Ministry of Social Development would directly benefit from advanced research on the dataset in terms of informational detail for complementary policies to the actual social policy package. It is unlikely that such a change would have drastical implications for the costs and burdens of data collection, as the number of variables collected is limited and the dataset already seems to perform pretty well in this sense. However a change in the decree would swipe away doubts about the quality of the CadÚnico for research purpose and would therefore make it a more important informational resource for future social policy designs.

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[80]The recent change in the redistributive system that will guarantee greater compensation to non-producing municipalities therefore seems to be appropriate in order to facilitate the catching-up process of context that are not endowed with natural resources.

[81]Furthermore, a sub-group analysis could provide greater detail as to which contextual features are relevant for the conversion of *whom*, and whether some groups tend to be marginalized in certain contexts more than others.

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Criteria		Expectant or breast-feeding mothers / Children aged 0 to 15	Cash Transfer	Youths aged 16 to 17	Cash Transfer
Family Situation	Household per capita Income				
Families in poverty: receive variable benefit	From R$ 70 to R$140 (US$ 41.20 to US$ 82.40)	1 individual	R$ 32 (US$ 18.80)	1 youth	R$ 38 (US$ 22.35)
		2 individuals	R$ 64 (US$ 37.60)	2 or more youths	R$ 76 (US$ 44.70)
		3 individuals	R$ 96 (US$ 56.40)		
		4 individuals	R$ 128 (US$ 75.20)		
		5 or more individuals	R$ 160 (US$ 94)		
Families in extreme poverty: receive variable + fixed benefit	Up to R$ 70 (US$41.20)	Even if no children/youths and no expectant/breast feeding mother in the family	R$ 70 (US$ 41.20)		

Figure 9: Matrix of possible *Bolsa Família* transfers. *Source*: Simões, 2012

Table 6: Random slope model, MINASGERAIS, dependent variable: $WBind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : WB_ind	
BFpcap	0.000**
	(0.000)
BFpcapLength	0.000**
	(0.000)
lengthBF_y	0.001**
	(0.000)
urban	0.002**
	(0.000)
fem	0.007**
	(0.000)
single	0.024**
	(0.000)
EMP_ind	0.308**
	(0.000)
HEA_ind	0.373**
	(0.001)
income_trans	0.011**
	(0.000)
age	-0.003**
	(0.000)
HHsize	-0.002**
	(0.000)
qtbasicofam	0.004**
	(0.000)
ctx_Bfpcap	0.001**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
RECmun_DI	0.005
	(0.004)
IAI_sum	0.000**
	(0.000)
ratiopermcult	-0.004**
	(0.001)
childpov3_2010	0.000
	(0.000)
ter_resources	-0.002
	(0.004)
Ipromolbmkt	0.000
	(0.000)
ES_formaldemand	-0.014
	(0.013)
ES_emptot10	-0.031*
	(0.013)
comNTWK_norm	-0.007†
	(0.004)
Intercept	0.139**
	(0.014)
N	1878520
Log-likelihood	2343520.653
$\chi^2_{(23)}$	1832289.907

Source: Author's elaboration on CadÚnico, 2010.

Table 7: Random slope model, MINASGERAIS, dependent variable: *EDUind*

Variable	Coefficient
	(Std. Err.)
Equation 1 : EDU_ind	
BFpcap	-0.001**
	(0.000)
BFpcapLength	0.000**
	(0.000)
lengthBF_y	0.005**
	(0.000)
urban	0.004**
	(0.000)
fem	0.021**
	(0.000)
single	0.073**
	(0.000)
EMP_ind	-0.077**
	(0.001)
HEA_ind	0.122**
	(0.002)
income_trans	0.032**
	(0.000)
age	-0.009**
	(0.000)
HHsize	-0.006**
	(0.000)
qtbasicofam	0.014**
	(0.001)
ctx_Bfpcap	0.002**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
RECmun_DI	0.021*
	(0.010)
IAI_educacao	0.017**
	(0.006)
ratiopermcult	-0.015**
	(0.004)
childpov3_2010	-0.001*
	(0.000)
Intercept	0.318**
	(0.011)
N	1878520
Log-likelihood	280284.43
$\chi^2_{(18)}$	1071012.005

Source: Author's elaboration on CadÚnico, 2010.

Table 8: Random slope model, MINASGERAIS, dependent variable: $EMPind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : EMP_ind	
BFpcap	0.001**
	(0.000)
lengthBF_y	-0.003**
	(0.000)
urban	0.022**
	(0.001)
fem	-0.113**
	(0.000)
income_trans	0.067**
	(0.000)
adult	0.063**
	(0.000)
EDU_ind	-0.022**
	(0.001)
HEA_ind	0.038**
	(0.002)
qtbasicofam	-0.062**
	(0.001)
ctx_Bfpcap	-0.002**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
ter_resources	0.021**
	(0.007)
Ipromolbmkt	0.003**
	(0.001)
ES_formaldemand	0.064*
	(0.027)
ES_emptot10	-0.073†
	(0.037)
comNTWK_norm	-0.037**
	(0.010)
Iequipcult	0.000
	(0.000)
Intercept	0.249**
	(0.039)
N	1054815
Log-likelihood	327157.484
$\chi^2_{(17)}$	252478.804

Source: Author's elaboration on CadÚnico, 2010.

Table 9: Random slope model, dependent variable: $HEAind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : HEA_ind	
BFpcap	0.000**
	(0.000)
lengthBF_y	-0.001**
	(0.000)
BFpcapLength	0.000**
	(0.000)
urban	0.161**
	(0.000)
fem	0.001**
	(0.000)
single	-0.003**
	(0.000)
EMP_ind	0.001**
	(0.000)
EDU_ind	0.009**
	(0.000)
famadultEDU	0.039**
	(0.000)
income_trans	0.009**
	(0.000)
age	0.000**
	(0.000)
ctx_Bfpcap	-0.002**
	(0.000)
ctx_lengthBF	0.000*
	(0.000)
ter_resources	0.004
	(0.013)
RECmun_DI	0.028*
	(0.012)
childpov3_2010	-0.002**
	(0.000)
SPsh_saude	0.047†
	(0.028)
comNTWK_norm	-0.019
	(0.012)
Intercept	0.800**
	(0.013)
N	2414085
Log-likelihood	2555743.631
$\chi^2_{(18)}$	1358484.898

Table 10: RSmodel with cross-level interaction, MINASGERAIS, dependent variable: $EMPind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : EMP_ind	
BFpcap	0.001**
	(0.000)
lengthBF_y	-0.003**
	(0.000)
BFpcapPromoLBMK	0.000**
	(0.000)
urban	0.027**
	(0.000)
fem	-0.113**
	(0.000)
income_trans	0.067**
	(0.000)
adult	0.071**
	(0.000)
qtbasicofam	-0.061**
	(0.001)
ctx_Bfpcap	-0.002**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
ter_resources	0.032**
	(0.011)
Ipromolbmkt	-0.001
	(0.001)
ES_formaldemand	0.058*
	(0.028)
ES_emptot10	-0.082*
	(0.038)
comNTWK_norm	-0.034**
	(0.010)
RECmun_DI	0.005
	(0.011)
Intercept	0.283**
	(0.040)
N	1148416
Log-likelihood	348463.13
$\chi^2_{(16)}$	277226.451

Source: Author's elaboration on CadÚnico, 2010.

Table 11: RSmodel with cross-level interaction, MINASGERAIS, dependent variable: $EMPind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : EMP_ind	
BFpcap	0.000**
	(0.000)
lengthBF_y	-0.003**
	(0.000)
BFpcapRECmunDI	0.005**
	(0.000)
urban	0.027**
	(0.000)
fem	-0.113**
	(0.000)
income_trans	0.067**
	(0.000)
adult	0.071**
	(0.000)
qtbasicofam	-0.061**
	(0.001)
ctx_Bfpcap	-0.002**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
ter_resources	0.032**
	(0.011)
Ipromolbmkt	0.003**
	(0.001)
ES_formaldemand	0.057*
	(0.028)
ES_emptot10	-0.083*
	(0.038)
comNTWK_norm	-0.035**
	(0.010)
RECmun_DI	-0.066**
	(0.012)
Intercept	0.295**
	(0.040)
N	1148416
Log-likelihood	348523.276
$\chi^2_{(16)}$	277517.582

Source: Author's elaboration on CadÚnico, 2010.

Table 12: RSmodel with cross-level interaction, MINASGERAIS, dependent
variable: $EMPind$

Variable	Coefficient
	(Std. Err.)
Equation 1 : EMP_ind	
BFpcap	0.000**
	(0.000)
lengthBF_y	-0.002**
	(0.000)
BFpcapESformaldem	0.010**
	(0.001)
urban	0.027**
	(0.000)
fem	-0.113**
	(0.000)
income_trans	0.067**
	(0.000)
adult	0.071**
	(0.000)
qtbasicofam	-0.061**
	(0.001)
ctx_Bfpcap	-0.002**
	(0.000)
ctx_lengthBF	0.000**
	(0.000)
ter_resources	0.021**
	(0.007)
Ipromolbmkt	0.003**
	(0.001)
ES_formaldemand	-0.090**
	(0.031)
ES_emptot10	-0.075*
	(0.038)
comNTWK_norm	-0.036**
	(0.010)
Iequipcult	0.000
	(0.000)
Intercept	0.282**
	(0.039)
N	1172077
Log-likelihood	355898.849
$\chi^2_{(16)}$	284172.507

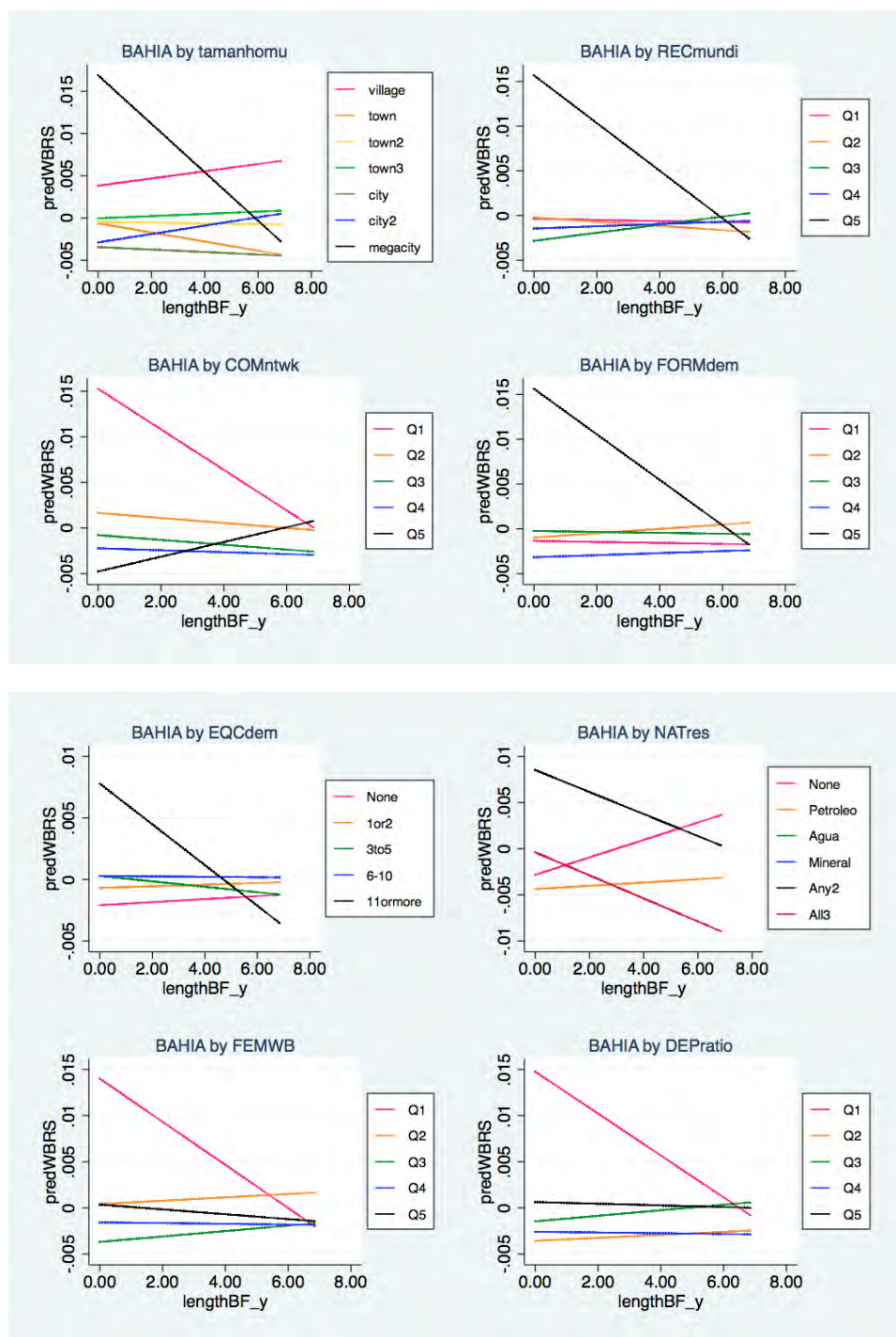*Source*: Author's elaboration on CadÚnico, 2010.
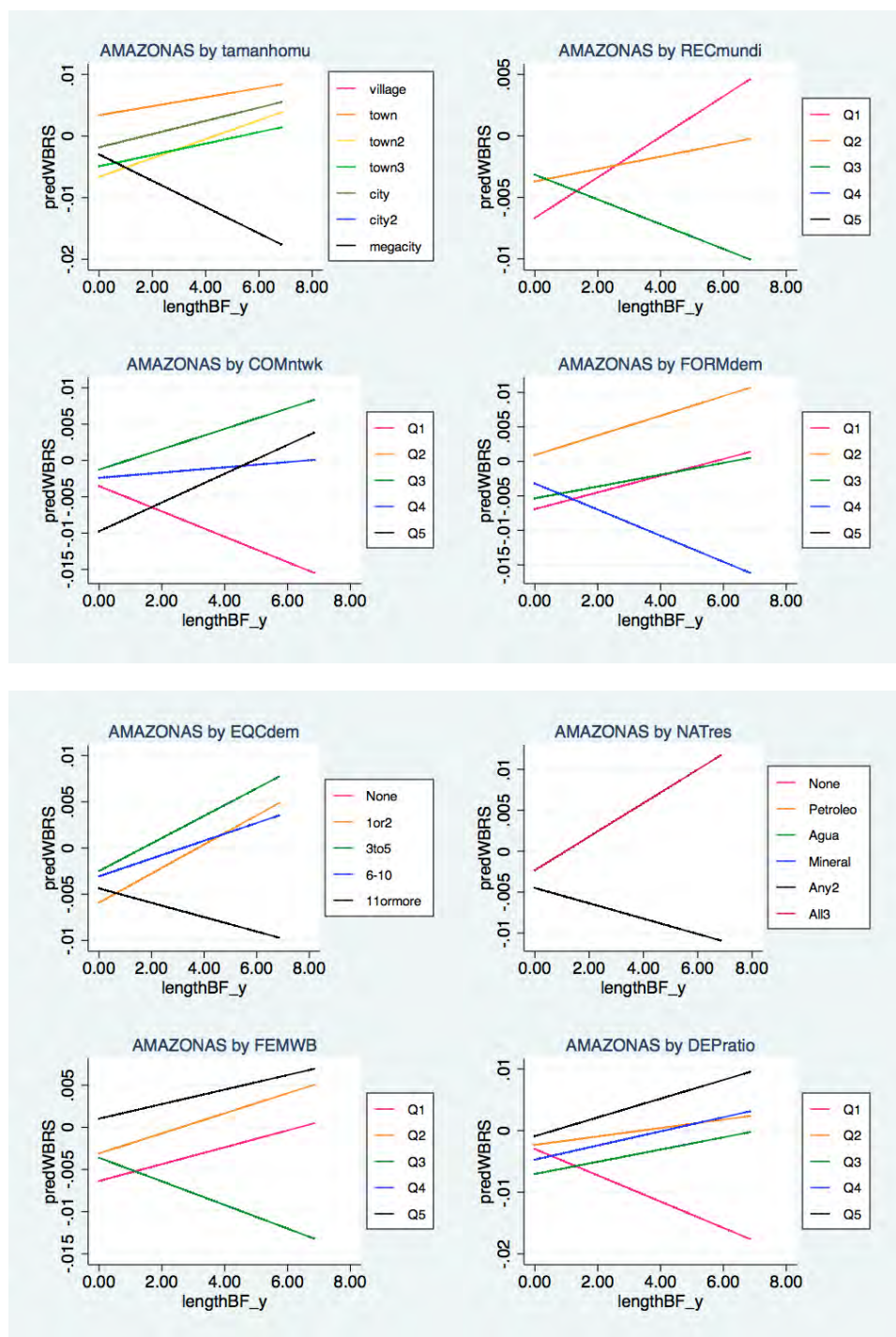
Figure 10: Conversion rates of years participated in BF into WB achievements, predicted by contextual groups, Amazonas — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMWB: *Female WBowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
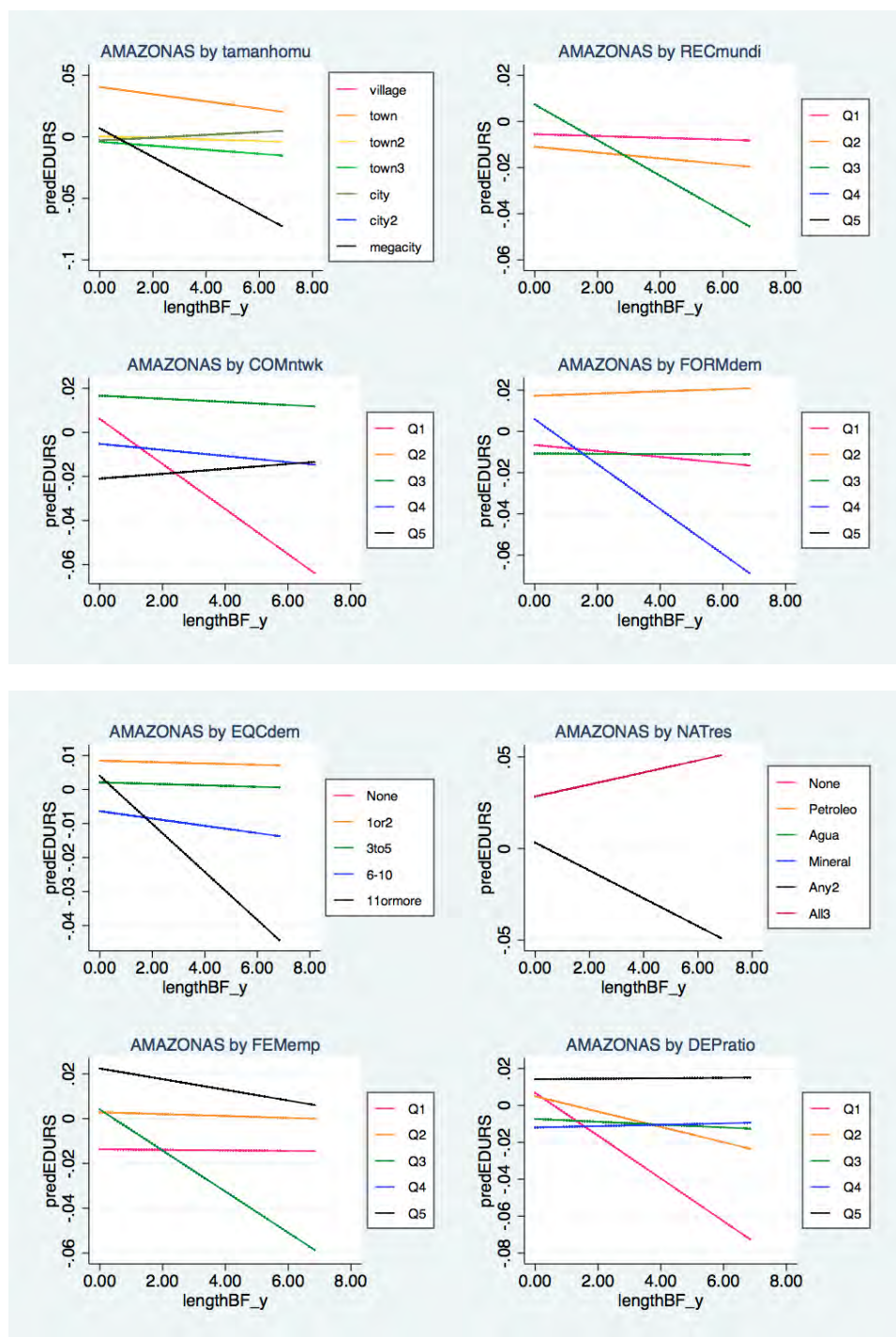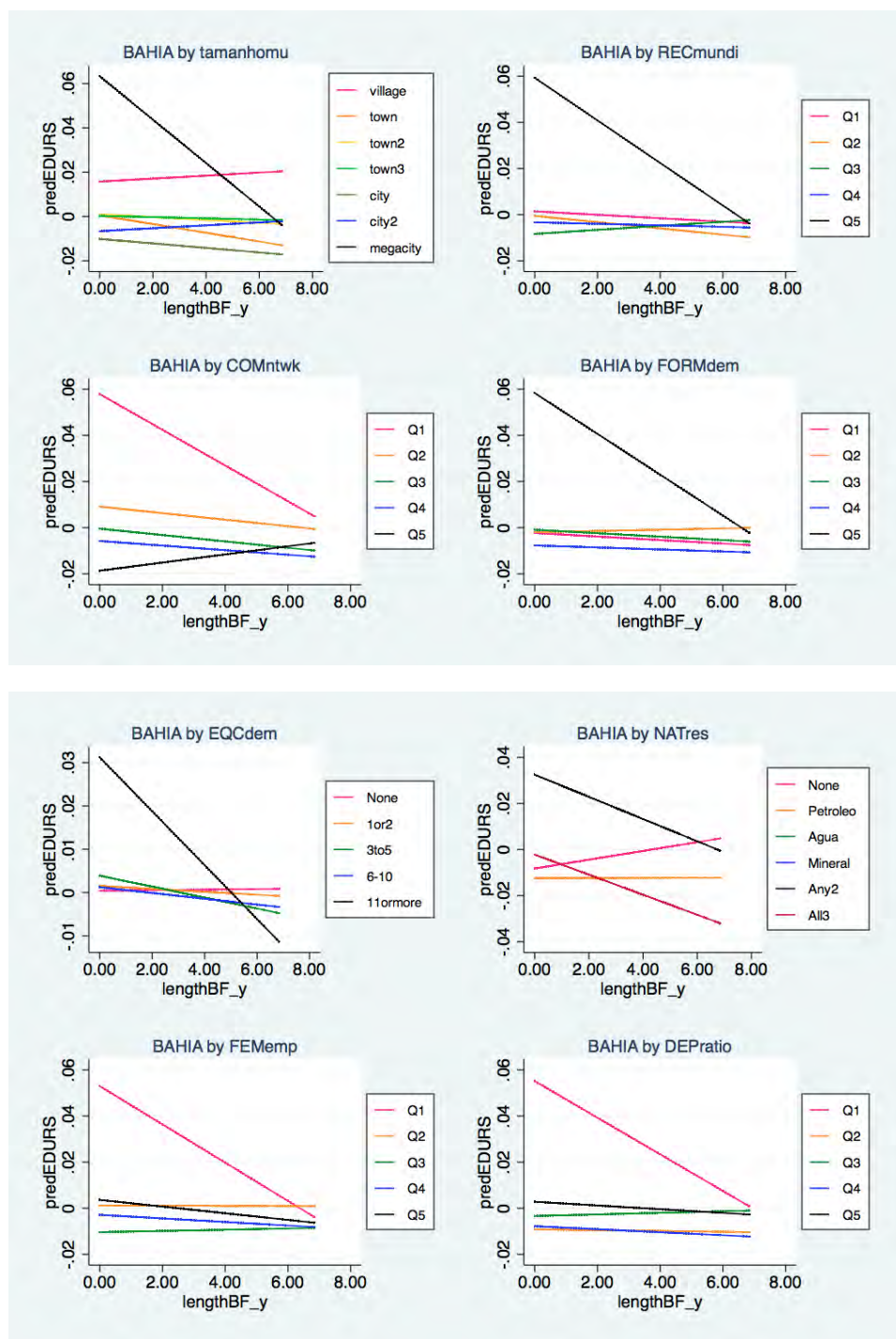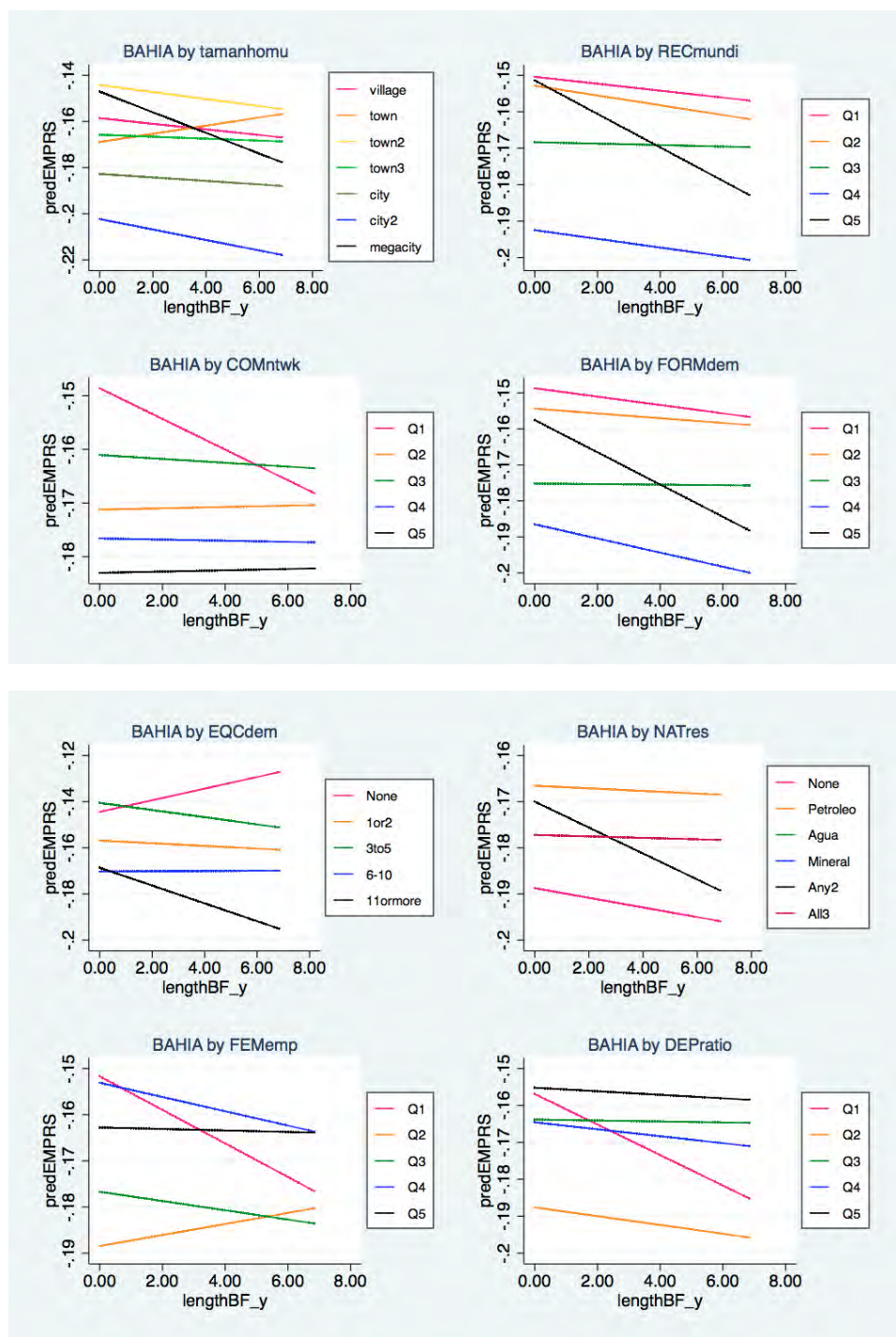
Figure 11: Conversion rates of years participated in BF into EDU achievements, predicted by contextual groups, Amazonas — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
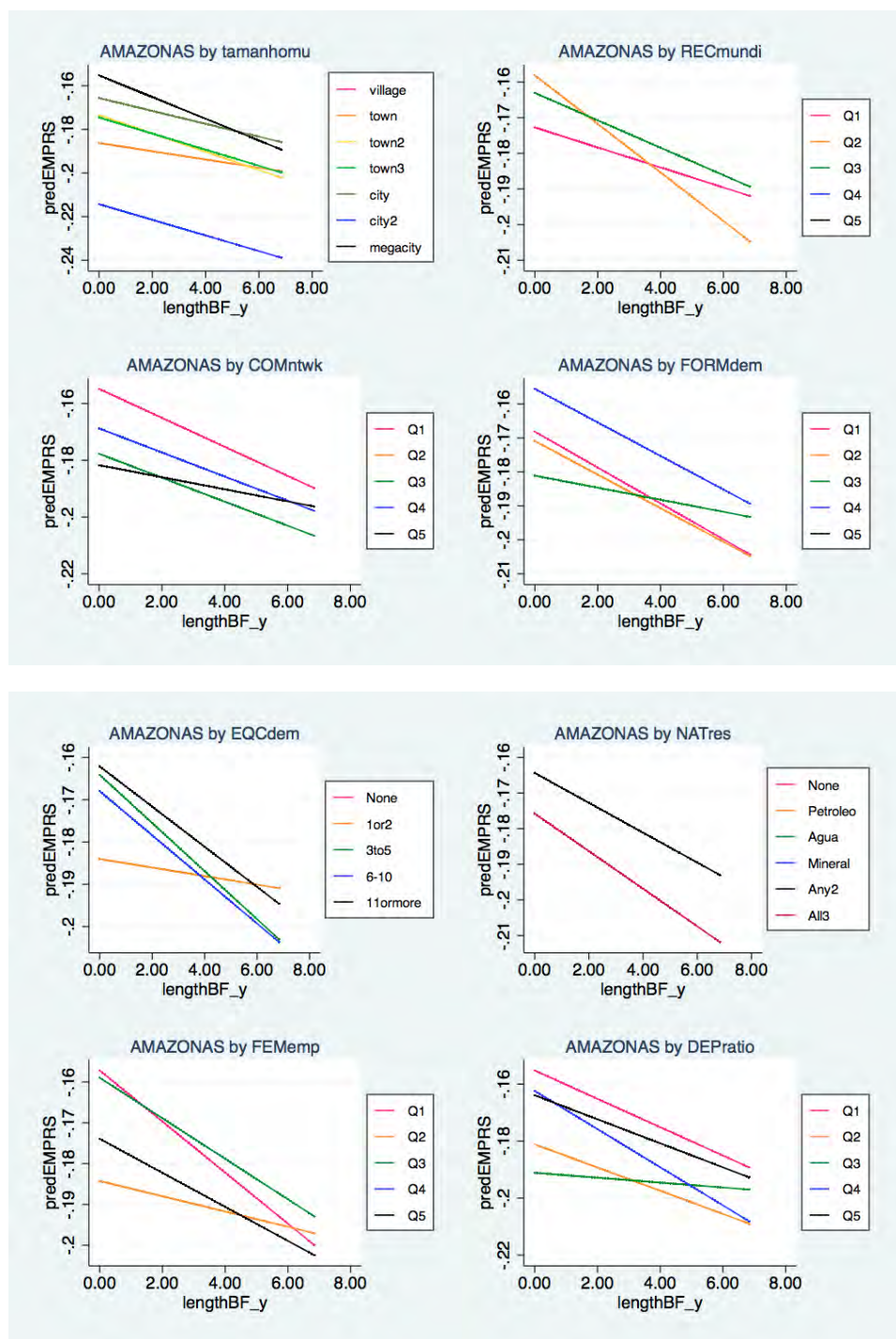
Figure 12: Conversion rates of percapita transfer received by BF into EMP achievements, predicted by contextual groups, Amazonas — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
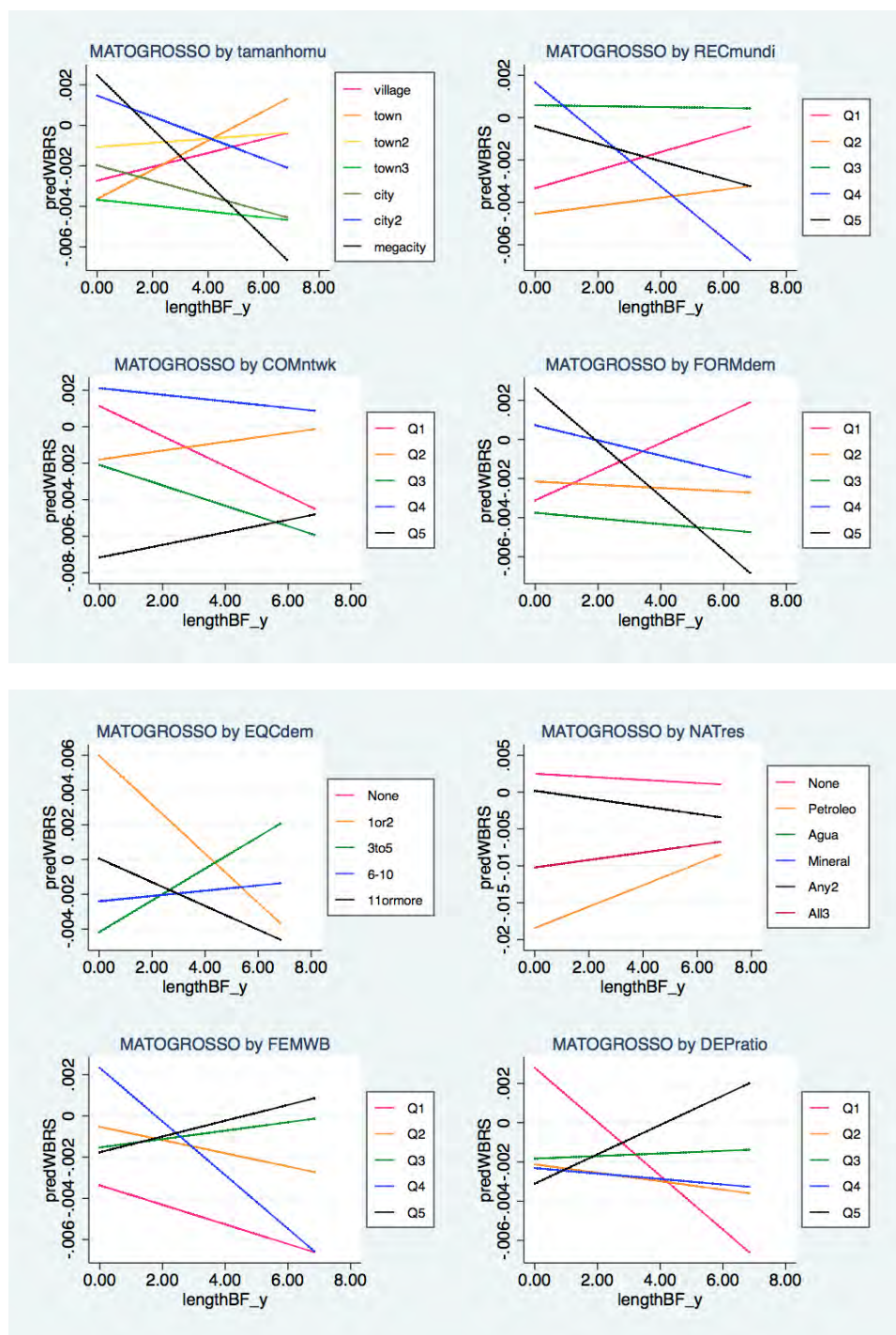
Figure 13: Conversion rates of years participated in BF into WB achievements, predicted by contextual groups, Bahia — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMWB: *Female WBowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
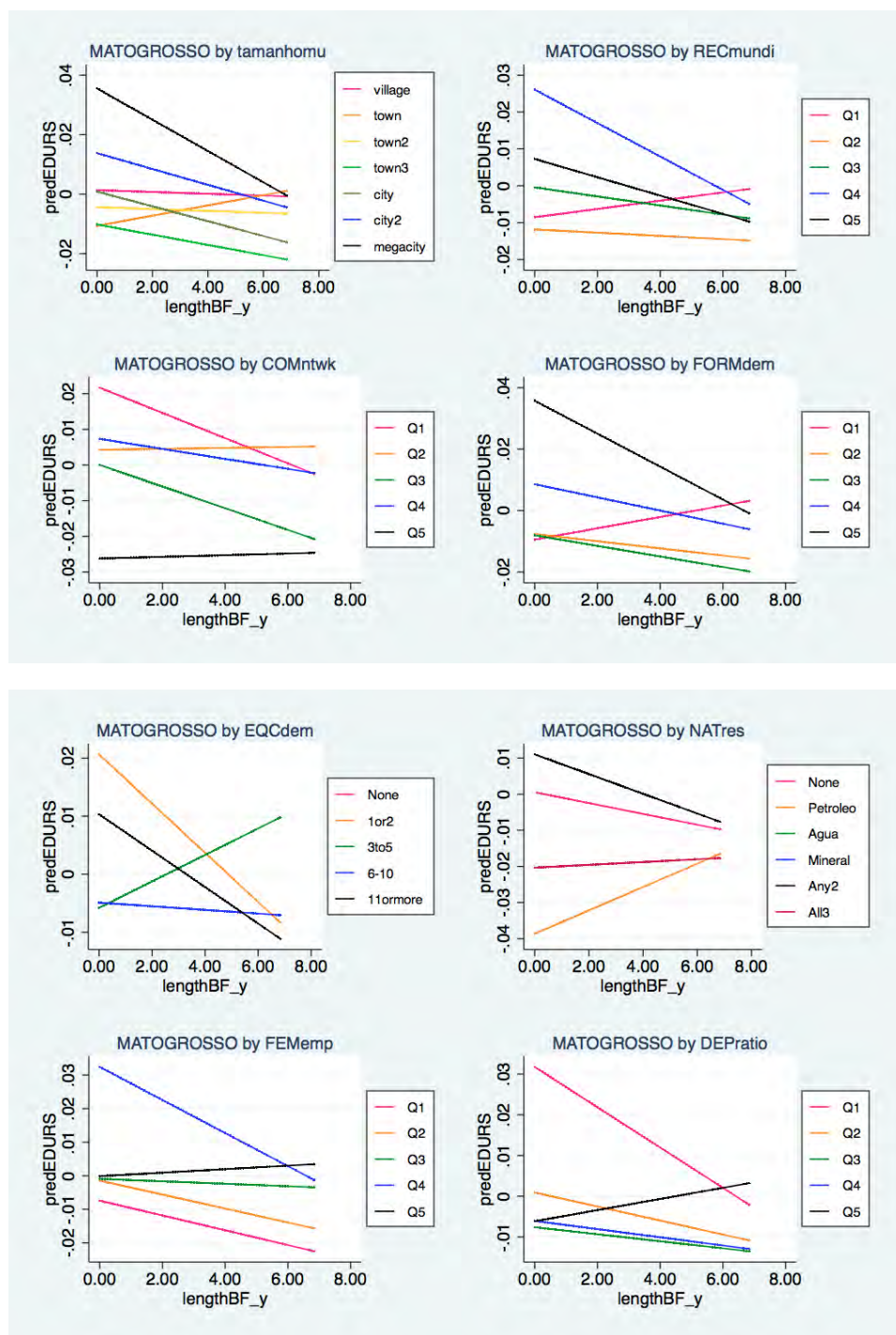
Figure 14: Conversion rates of years participated in BF into EDU achievements, predicted by contextual groups, Bahia — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.

Figure 15: Conversion rates of years participated in BF into EMP achievements, predicted by contextual groups, Bahia — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
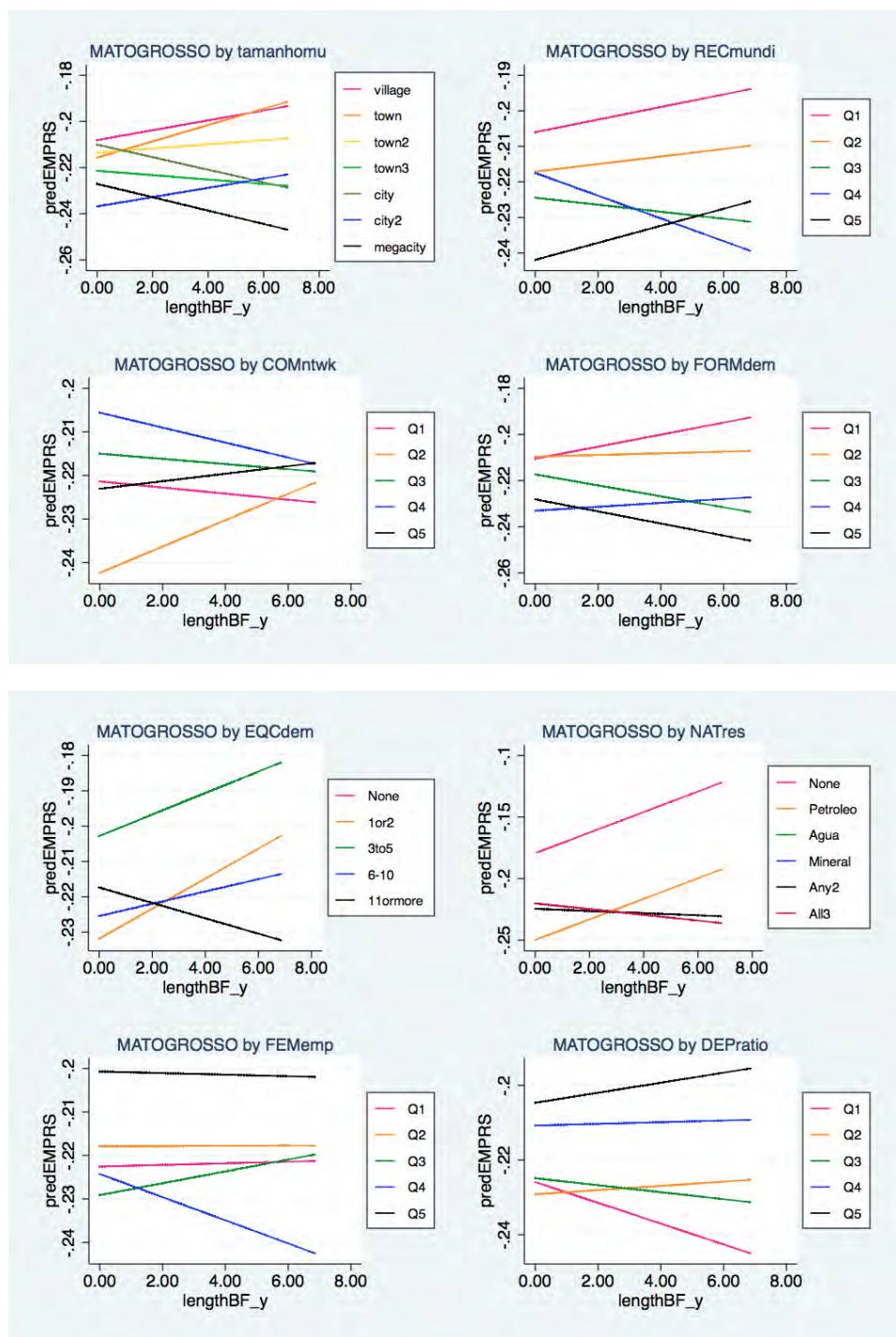
Figure 16: Conversion rates of years participated in BF into WB achievements, predicted by contextual groups, Mato Grosso — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMWB: *Female WBowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
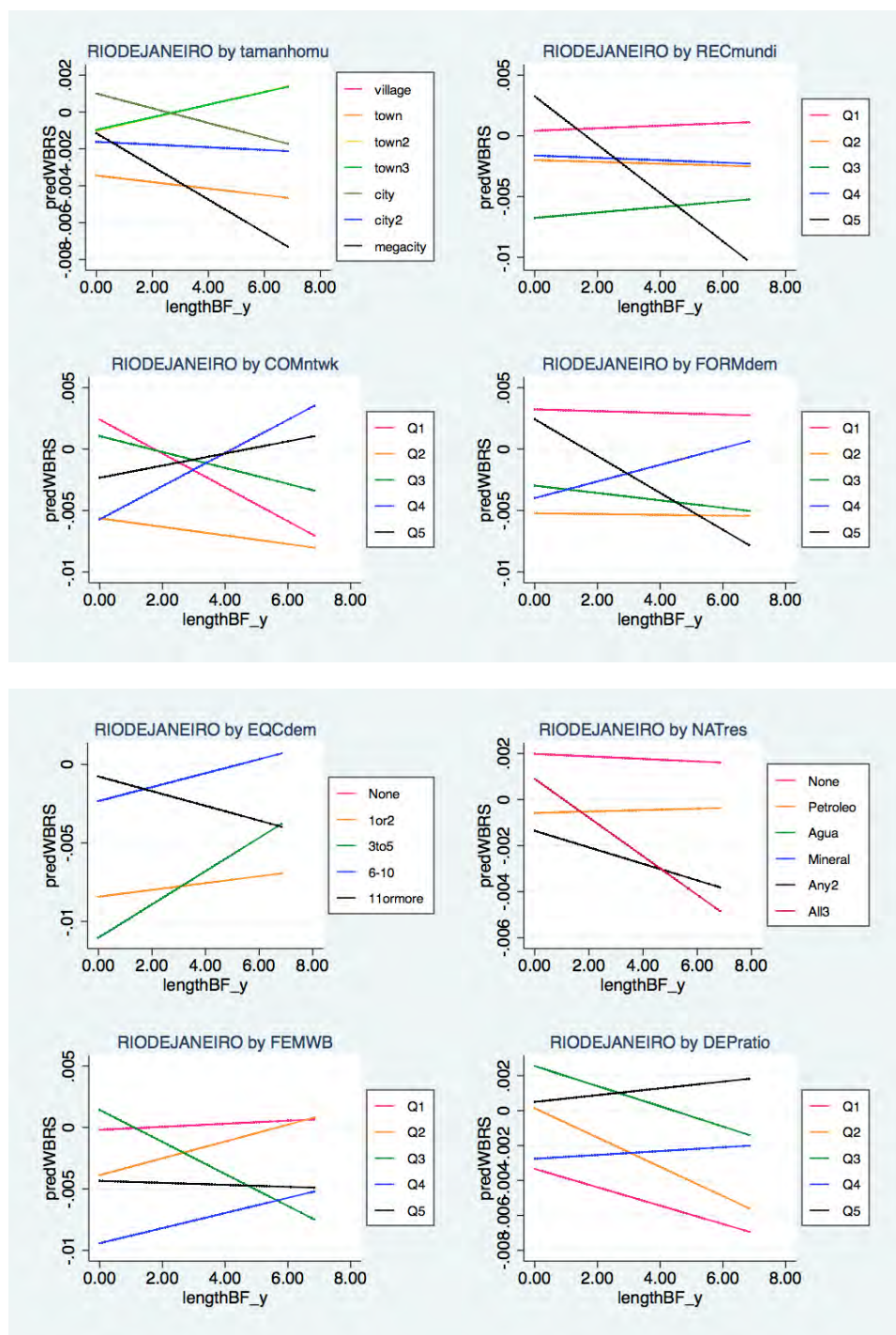
Figure 17: Conversion rates of years participated in BF into EDU achievements, predicted by contextual groups, Mato Grosso — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.

Figure 18: Conversion rates of years participated in BF into EMP achievements, predicted by contextual groups, Mato Grosso — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
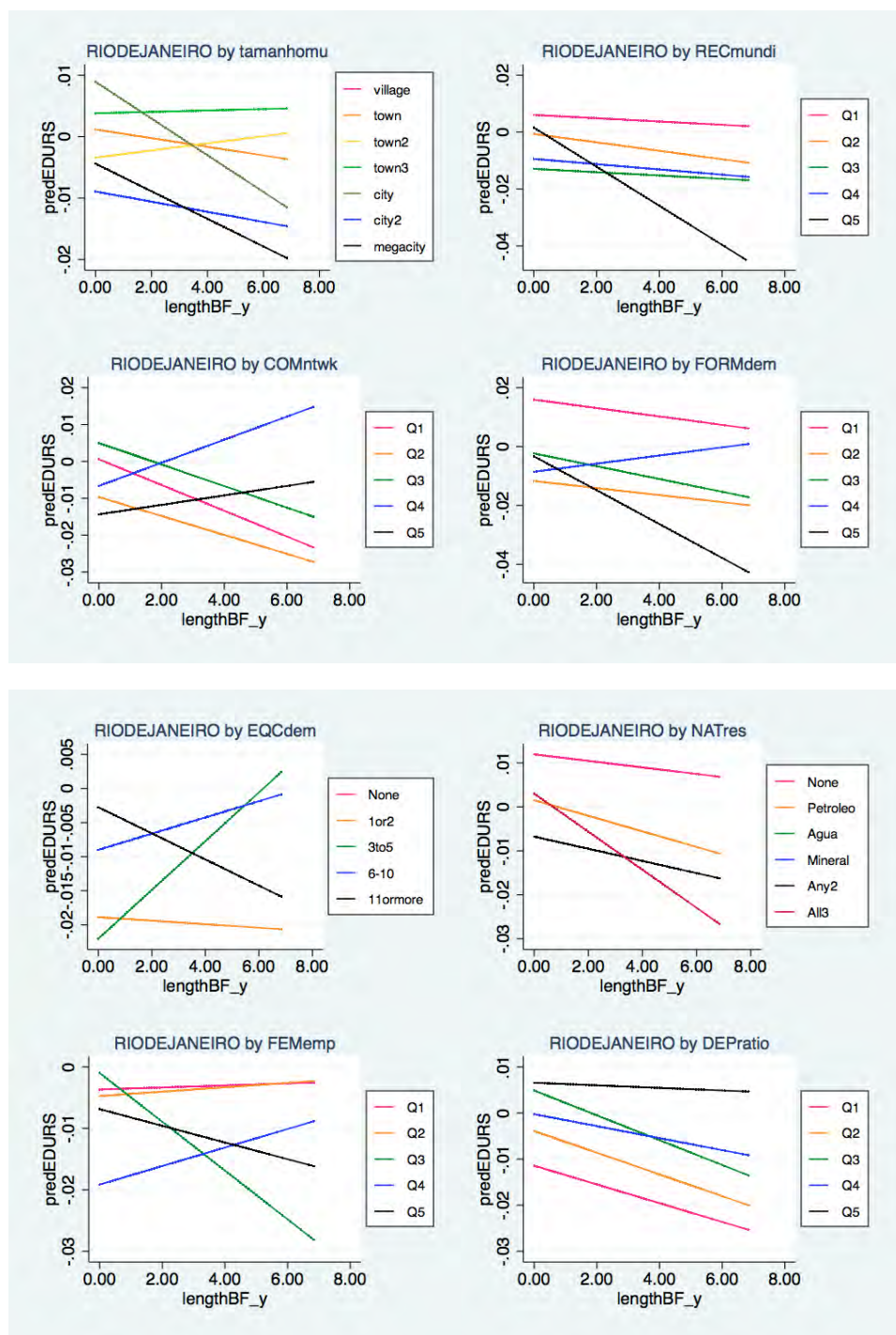
Figure 19: Conversion rates of years participated in BF into WB achievements, predicted by contextual groups, Rio de Janeiro — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMWB: *Female WBowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
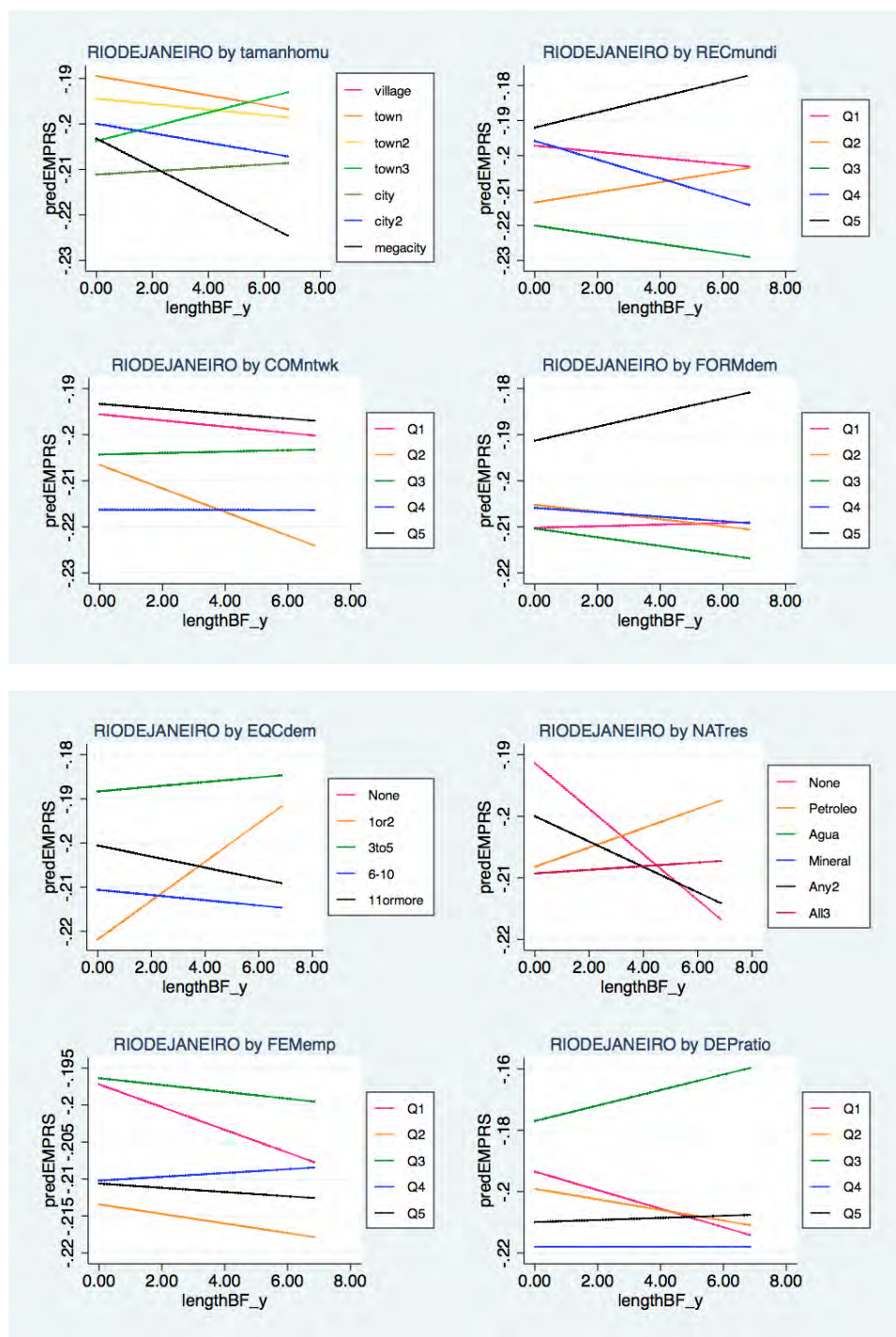
Figure 20: Conversion rates of years participated in BF into EDU achievements, predicted by contextual groups, Rio de Janeiro — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
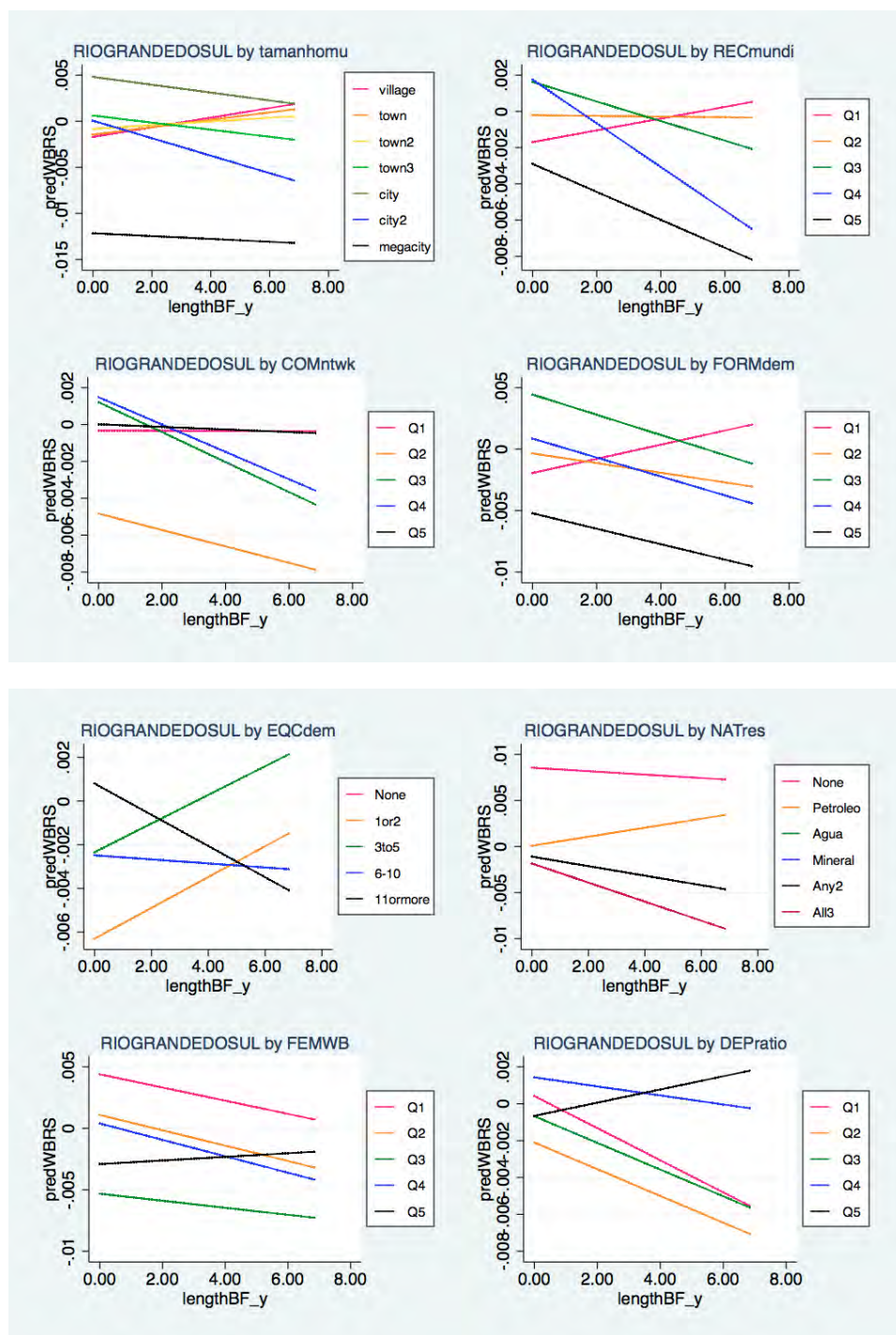
Figure 21: Conversion rates of years participated in BF into EMP achievements, predicted by contextual groups, Rio de Janeiro — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.

Figure 22: Conversion rates of years participated in BF into WB achievements, predicted by contextual groups, Rio Grande do Sul — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMWB: *Female WBowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
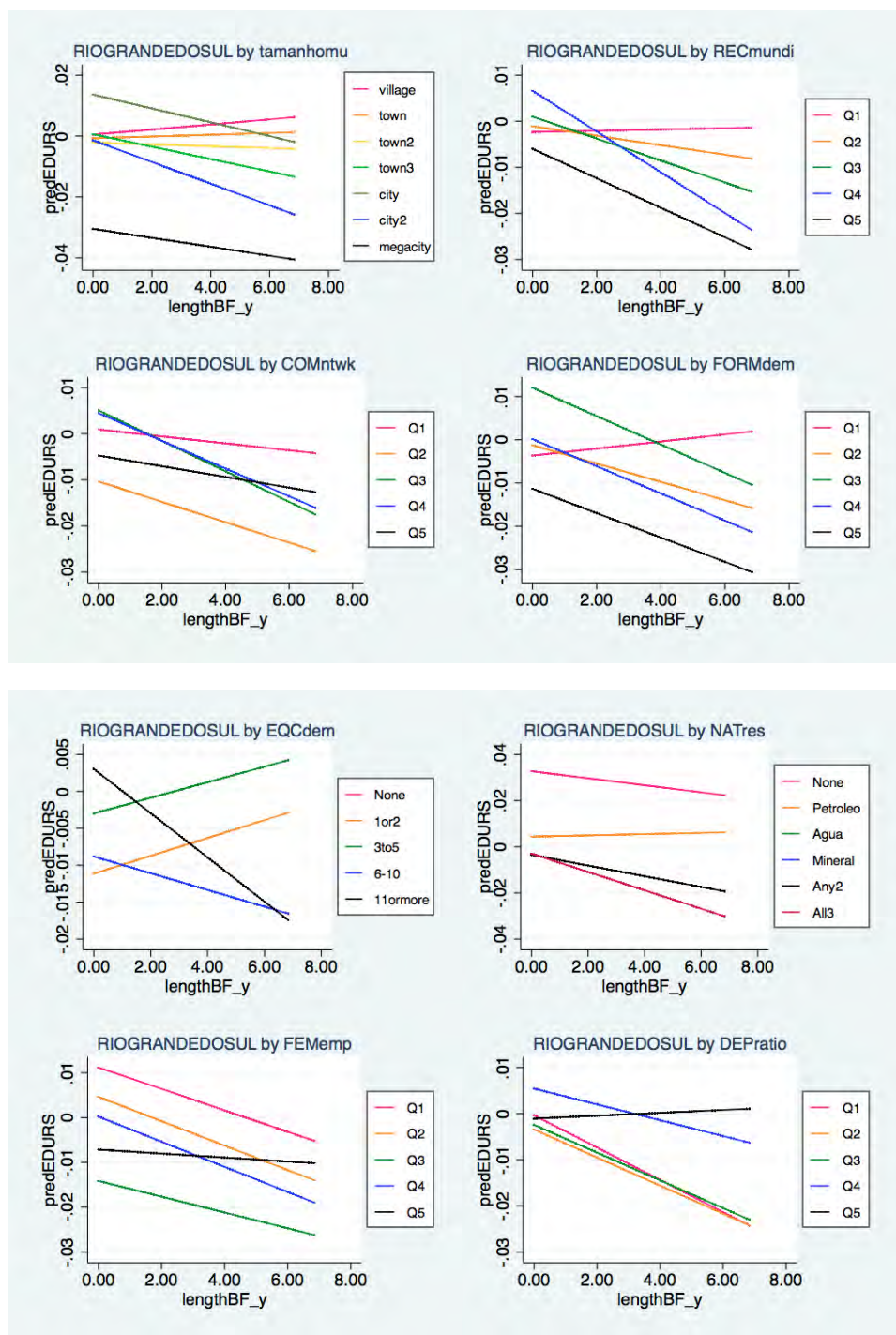
Figure 23: Conversion rates of years participated in BF into EDU achievements, predicted by contextual groups, Rio Grande do Sul — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.
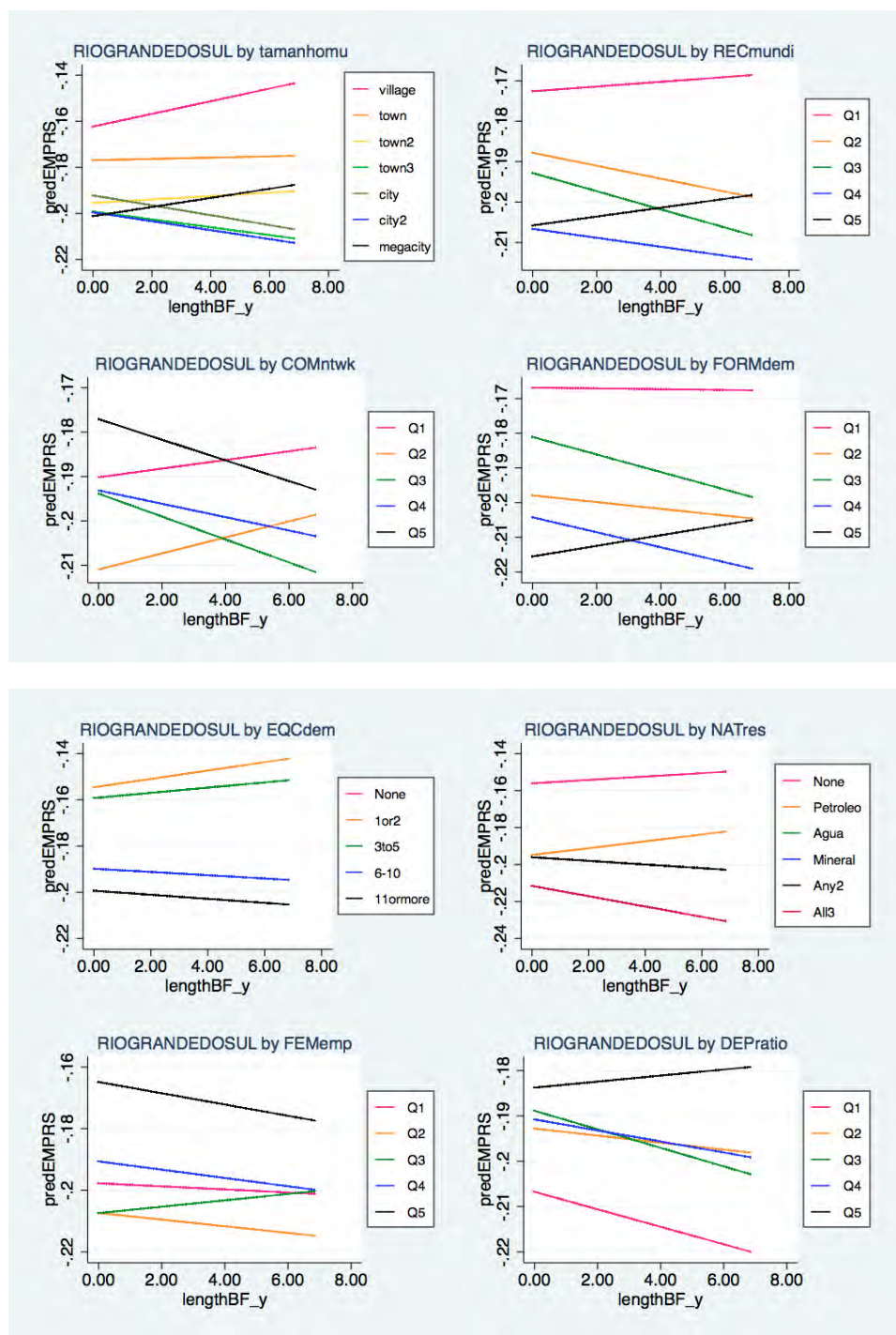
Figure 24: Conversion rates of years participated in BF into EMP achievements, predicted by contextual groups, Rio Grande do Sul — LEGEND: Tamanhomu: *urbanization levels*; RECmundi: *Public Income diversification*; COMntwk: *Social heterogeneity*; FORMdem: *Formality of local economy*; EQC: *Presence of cultural equipment*; NATres: *Presence of natural resources*; FEMemp: *Female empowerment*; DEPratio: *Dependency Ratio*; Q1-Q5: *quintiles* of contextual variable considered. *Source*: Author's elaboration.