Changing family structure and impacts on income distribution: the swift demographic transition in Brazil[1]

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Abstract

This paper analyzes the impact of changing family structure on the income distribution in Brazil between 1981 and 2011. Specifically, the paper evaluates how changes in the composition of the types of families within the richest and poorest family groups contributed to increase per capita income, to reduce inequality and poverty. Additionally, the paper provides a comparison between rural and urban areas in order to understand how these dynamics had different impacts on more developed (urban) and less developed (rural) areas. Results highlight that changes observed in the family structure were more pronounced among the richest families, contributing to increase the income of the richest families and the income inequality between richest and poorest families, as well as between urban and rural areas. The overall impact on poverty reduction was insignificant. The paper then discusses the relation between the dynamics of the family structure and the socioeconomic development in Brazil.

Key Words: Demographic changes; poverty inequality; Urban and Rural differences; family type

Introduction

Demographic changes have important implications for income distribution and social inequalities (McLanahan & Percheski, 2008). First, the volume and distribution of resources depend directly on the size and the distribution of families among the poorest and richest households (Barros, et al., 2001). Additionally, demographic dynamics tend to affect the labor force supply and the dependency ratio differently across social groups, impacting indirectly on the income distribution and living conditions of the poorest and richest families (Lee, 2005).

Demographic changes use to be in sync with economic development (Ashraf, et al., 2011). For instance, changes in the family structure tend to be driven by the wealthier population, with higher levels of education (Economic Commission for Latin America and the Caribbean, 2005). In the short term, this dynamic usually increases income inequality between the richest and poorest families, since the dependency ratio of the former group reduces faster (Almas, et al., 2011). However, when these changes are followed by the poorest social segments, it may contribute to reduce poverty and to attenuate income inequality. In the long run, despite the heterogeneity of effects between different social groups, when the demographic transition attains the high stages observed in the developed nations, the benefits tend to be positive for all the social segments (Bloom et al., 2010).

Brazil provides a rich reference to analyze the impacts of demographic changes on income distribution. In this country, demographic changes have occurred in a relatively short period, at the same time that the country witnessed a substantial reduction in its high levels of poverty and inequality. According to *Instituto de Pesquisa Econômica Aplicada* (2012), the Brazilian fertility rate dropped from 4.3 children per woman in 1981 to 1.7 in 2011. Moreover, the poverty rate was significantly reduced from 33% to 7% in the same period, as well as the differences between the per capita income of the poorest and richest families, both within and between rural and urban areas (Maia & Buainain, 2011).

This paper analyzes the impacts of changes in the family structure on the income distribution in Brazil between 1981 and 2011. More specifically, the paper evaluates how changes in the composition of the family structure within the richest and poorest family groups contributed to increase per capita income, and to reduce poverty and inequality. Additionally, we provide a comparison between rural and urban areas in order to understand how these dynamics had different impacts on more developed (urban) and less developed (rural) areas.

Results highlight that, besides increasing per capita income, the faster dynamics of demographic changes among the wealthiest families contributed, per se, to increase inequality between more developed and less developed regions, as well as between the poorest and richest families within these regions. The overall impact on poverty reduction was insignificant. Analyses are based on a comprehensive methodology of decomposition that allow us to estimate the specific contribution of changes in the family structure of the richest and poorest families on the variation of per capita income, poverty and inequality. The paper uses a detailed categorization of the family structure that considers both differences in the family relations and fertility rates.

1. Literature review

1.1. Family structure and income inequality

Among the components of demographic changes affecting income distribution, family structure plays a central role as a mechanism for the reproduction of inequalities (McLanahan & Percheski, 2008). Family experiences are associated with the opportunities that their members encounter in the economy and in the labor market, which may vary considerably across social groups and family types. Moreover, since children's life chances are strongly influenced by family experiences, changes in the family structure tend to affect both inequality and intergenerational mobility (Parson, 1949).

Studies have highlighted the rise of single-headed families, especially single-mothers, and its implication on income distribution (Martin, 2006). Besides putting additional individuals at risk of poverty, the fast growth of female-headed families among the most vulnerable social groups has also played an important role in reproducing and increasing inequalities in developed nations (Ellwood & Jencks, 2004). Single-mothers are the only potential earner in the household and tend to be subjected to lower hourly wages than men and their married women counterparts (Cancian & Reed, 2001). Moreover, children living far from a biological parent are more likely to live in poverty, which will probably affect their future expectancies and ability to move up the income ladder (McLanahan & Percheski, 2008).

But the growth of single-mother families is not the only important demographic change in the family structure. Cohabitation, decline in marriage, increases in divorce, non-marital childbearing, delays in the marrying age, and late pregnancy resulted in a diversity of new forms of family living arrangements (Martin, 2006; Cancian & Reed, 2001). Changes in

the relationships between family members, especially women's empowerment, are crucial to understand changes occurred in recent decades (Lesthaeghe, 1995). Results suggest a loss of centrality of the marriage in the family formation (dissociation between marriage and reproduction), as well as the emergence and dissemination of new types of families. There is a growing number of single parent families and the so-called *beanpole* families (characterized by a small number of family members in each generation, they are "long" and "thin"). These changes are related to several factors, such as the fertility reduction, late motherhood, high longevity, increasing number of divorces, and increasing number of stepchildren (new families with children from past marriages).

The impacts of these and other important demographic changes, such as fertility reduction and population aging, have been analyzed between the richest and the poorest countries (Hausmann & Székely, 2001), as well as between the richest and poorest families within these countries (Bloom *et al.* 2010). First, the rise of the single-parent and other economically vulnerable family types tend to place upward pressure on poverty rates (Iceland, 2003). On the other hand, the growth of cohabitation, women employment and the overall fertility decline acted conversely, restraining the rise in poverty (Cancian & Reed, 2001). Moreover, changes in the distribution of these family types among the social groups also affected income inequality. For instance, the income of cohabitating families has shown itself to be more equally distributed in relation to the income of nuclear and single-headed families (Martin, 2006). Additionally, the faster reduction in the number of children born among the more affluent families can contribute to increase inequality. Income inequality can also rise if families become increasingly divided into groups with one earner and groups with two earners (Lerman, 1996).

1.1. Social and demographic trends in Brazil

In recent decades, Brazil witnessed pronounced demographic changes in addition to substantial socioeconomic improvements. In the 1980s, the number of children per woman fell dramatically, even among the poorest families (Cariello, 2013). In the 1990s, the absolute number of children stopped growing for the first time, as a result of the falling fertility witnessed one decade before. The fertility rate continued dropping in the 2000s: from 2.2 children per woman in 2002 to 1.7 in 2011 (Instituto de Pesquisa Econômica Aplicada, 2012). The differences between income strata also reduced considerably. In 1992, the richest 20% had a fertility rate of 1.4 per woman and the poorest had 4.7; in 2011 these rates reduced to

0.9, and 3.6, respectively. In other words, the ratio of the number of children per woman between these groups reduced from 3.3 to 2.7. In a relatively short period, the Brazilian richest women are now experiencing extremely low fertility rates, comparable to those observed in developed countries like Italy, Spain, and Japan. The country also has a high aging population, caused by both a great decline in fertility and a fast increase in life expectancy.

Simultaneously, Brazil experienced significant changes in their living conditions, especially in the years 2000. After a long period of economic instability in the 1980s and early 1990s, poverty and income inequality have been reduced considerably since mid-90s (Barros, et al., 2011). Many factors have been pointed as central determinants of such socioeconomic improvements. The country was specially benefited by the increasing prices of commodities and growing exports in the 2000s, boosting economic growth and socioeconomic improvements. Moreover, institutional factors also contributed to attenuate poverty and inequality, such as income cash transfer programs (*Bolsa Família*) and rural pensions (Maia & Buainain, 2011). Non-labor income has risen faster than labor income over the past decades, especially in rural areas. As a result, in spite of the fact that rural areas in Brazil are historically characterized by poor living conditions, poverty reduced faster in these areas, as well as the urban-rural inequality.

The family structure in Brazil has also changed progressively since the 1980s (Leone, et al., 2010). The most significant changes were related to an increasing share of single head units, couples without children, and single mothers with children. On the other hand, the share of nuclear and extended families (those characterized by diverse generations living together) reduced substantially. Now the elderly also have a higher empowerment in the households, as a consequence of social program targeted to this population, such as the *Benefício de Prestação Continuada* program and the rural pension (Beltrão, et al., 2005). Moreover, cash transfer programs, such as *Bolsa Familia*, also contributed to attenuate socioeconomic conditions of the more vulnerable family groups, reducing poverty and inequality.

2. Materials and Methods

Analyses are based on data of the Brazilian National Household Sample Survey (PNAD) from 1981 to 2011, provided by the Brazilian Institute of Geography and Statistics (IBGE). PNAD is a cross-sectional survey applied annually and is nationally representative of the Brazilian territory, with the slight exception of a few remote rural areas in six northern

states, which represented less than 3% of the Brazilian population in 2000 (Instituto Brasileiro de Geografia e Estatística, 1995)[2]. The long period of analysis, 30 years, and the huge changes witnessed in the period attenuate potential noises generated by annual fluctuation in the relation between demographic changes and income distribution.

The categorization of the family structure considers both differences in the family relations (single-headed, couples and extended families) and differences in the fertility rate, expressed by the number and age of the children. As a result, ten types of families were considered: i) single male unit; ii) single female unit; iii) couple without children; iv) couple with children under 14; v) couple with (at least one) children 14 or older; vi) single mother with children under 14; vii) single mother with (at least one) children 14 or older; viii) single father with children under 14; ix) single father with (at least one) children 14 or older; x) extended family[3]. People living in collective households and those live-in domestic workers with their relatives were excluded in our analysis.

We compared the impacts of changes in the family structure on the per capita income of the 10% richest and the 40% poorest families. We also considered differences between urban and rural areas in order to analyze in what extend such changes affected differently the income distribution in more developed (urban) and less developed (rural) areas.

Decomposing variation in the per capita income

In order to evaluate the impacts of changes in the family structure on the dynamics of the income distribution, we first decomposed the variation in the per capita family income (PCFI) in two sources: (i) changes in the participation of the types of families (*composition effect*, CE); and (ii) changes in the per capita income of each type of family (*within effect*, WE). Supposes, initially, $\Delta\bar{Y}$ as the variation in the PCFI between periods $t-1$ and t. This variation can be represented by the weighted sum of the variation witnessed in each type of family:

$$\Delta\bar{Y} = \sum_{g=1}^{k}\Delta(p_g\bar{Y}_g) \qquad (1)$$

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[2] PNAD excludes the rural areas of the states of Rondônia, Acre, Amazonas, Roraima, Pará and Amapá. Since 2004, these areas were added to the PNAD sampling survey. However, in order to maintain historical comparability, those areas were not considered in this study.

[3] The extended family is composed by different types of relatives and/or aggregates.

Where p_g is the proportion of the g-th type of family and $\bar{Y}_g$ is its respective PCFI. Making some adjustments, expression (1) can be rewritten as:

$$\Delta \bar{Y} = \sum_{g=1}^{k} \left[\Delta p_g (\bar{\bar{Y}}_g - \bar{\bar{Y}}) + \bar{p}_g \Delta \bar{Y}_g \right] = \sum_{g=1}^{k} \left[CE_g + WE_g \right] \tag{2}$$

Where $\bar{p}_g$ is the average share of the g-th type of family in periods $t - 1$ and t, $\bar{\bar{Y}}_g$ is the respective average PCFI for this type of family, and $\bar{\bar{Y}}$ the average PCFI for all families in the same periods. The first term in expression (2), CE, represents the composition effect, i.e., the share of the variation in the PCFI due to changes in the relative participation of the g-th type of family. In turn, the second term WE represents the within effect and expresses the share of the variation in the PCFI due to changes in the PCFI of the g-th type of family.

We computed this decomposition for the whole population, for the 10% richest and the 40% poorest families, as well as for the urban and rural families. This analysis allows inferring, for example, if the monetary gains of each social group were due to changes in the family structures or due to the income dynamics itself. The greater the value of the CE, the greater is the impact of changes in the family structure on the income variation for the respective social group.

Decomposing variation in the poverty rate

First, we defined poverty rate as the ratio between the population living on less than $2.00 a day at international prices (R$ 3.6 per day in 2011) and the whole population. We then used similar procedures to decompose the variation in the poverty rate (*PR*) in two sources: (i) changes in the participation of the types of families (*composition effect on poverty*, CEP); and (ii) changes in the poverty rate of each type of family (*within effect on poverty*, WEP). The variation in the poverty rate between periods $t - 1$ and t can be represented by the weighted sum of the variation witnessed in each type of family:

$$\Delta PR = \sum_{g=1}^{k} \Delta (p_g PR_g) \tag{3}$$

Where PR_g is the poverty rate of the g-th type of family. Making the necessary adjustments, we have:

$$\Delta PR = \sum_{g=1}^{k} \left[\Delta p_g (\overline{PR}_g - \overline{PR}) + \bar{p}_g \Delta PR_g \right] = \sum_{g=1}^{k} \left[CEP_g + WEP_g \right] \tag{4}$$

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Where $\overline{PR}_g$ is the average poverty rate of the g-th type of family in periods $t-1$ and t, and $\overline{PR}$ is the average poverty rate for all families in the same periods. The first term in expression (4), *CEP*, represents the composition effect on poverty, i.e., the share of the variation in the poverty rate due to changes in the relative participation of the g-th type of family. In turn, the second term *WEP* represents the within effect on poverty and expresses the share of the variation in the poverty rate due to changes in the poverty of the g-th type of family.

Decomposing variation in the inequality rate

Finally, we evaluate the impacts of changes in the composition of the family structure on the inequality variation. Analyses are based on the *inequality ratio* (IR), a ratio between the PCFI of the 10% richest and the 40% richest families:

$$IR = \frac{\overline{Y}^{10}}{\overline{Y}^{40}} \tag{5}$$

Where $\overline{Y}^{10}$ is the PCFI of the 10% richest families and $\overline{Y}^{10}$ is the PCFI of the 40% poorest families. In turn, the variation in the *IR* between periods $t-1$ and t can be represented by:

$$\Delta IR = IR_t - IR_{t-1} \tag{6}$$

Make some adjustments we have:

$$\Delta IR = \frac{\overline{Y}_t^{10}}{\overline{Y}_t^{40}} - IR_{t-1} = \frac{\overline{Y}_{t-1}^{10} + \Delta\overline{Y}^{10}}{\overline{Y}_{t-1}^{40} + \Delta\overline{Y}^{40}} - IR_{t-1} \tag{7}$$

Merging equations (2) and (7) we have:

$$\Delta IR = \frac{\overline{Y}_{t-1}^{10} + \sum_{g=1}^{k}\left[CE_g^{10} + WE_g^{10}\right]}{\overline{Y}_{t-1}^{40} + \sum_{g=1}^{k}\left[CE_g^{40} + WE_g^{40}\right]} - IR_{t-1} \tag{8}$$

In other words, the variation in the inequality ratio depends both on the composition effects (CE^{10} and CE^{40}) and within effects (WE^{10} and WE^{40}) of the richest 10% and the poorest 40% families. Now, making counterfactual simulations, we can estimate the direct impact of two main sources of variation on the *IR*: (i) changes in the participation of the types of families (*composition effect on inequality*, CEI); and (ii) changes within each type of family (*within effect on inequality*, WEI):

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$$CEI = \frac{\overline{Y}_{t-1}^{10} + \sum_{g=1}^{k} CE_{g}^{10}}{\overline{Y}_{t-1}^{40} + \sum_{g=1}^{k} CE_{g}^{40}} - IR_{t-1} \qquad (9)$$

$$WEI = \frac{\overline{Y}_{t-1}^{10} + \sum_{g=1}^{k} WE_{g}^{10}}{\overline{Y}_{t-1}^{40} + \sum_{g=1}^{k} WE_{g}^{40}} - IR_{t-1} \qquad (10)$$

The *CEI* (expression 9) represents the expected variation in the *IR* if changes in the PCFI of the 10% richest and the 40% poorest families were restricted to the composition effect, i.e., changes in the family structure. In turn, the *WEI* in (expression 10) represents the expected variation in the *IR* if changes in the PCFI were restricted to the within effect, i.e., changes in the PCFI within the family types. Since the variation in the *IR* (expression 6) does not allow a simple linear decomposition between *CEI* and *WEI*, we have also to consider the *interaction effect on inequality* (IEI), this means, changes that depend simultaneously on the variation of the *CE* and the *WE* and cannot be linearly decomposed. Thus, the total variation in the *IR* will be given by:

$$\Delta IR = CEI + WEI + IEI \qquad (11)$$

3. Results

3.1. Family Structure

Table 1 shows the income distribution in urban areas according to the type of family and income stratum between 1981 and 2011. Similar results are presented to rural families in Table 2. First, results highlight the fast growth of the urban population (72.8 million people between 1981 and 2011) and the sharp decrease of the rural population (9.5 million people in the same period). Unlike the demographic dynamics in developed countries, the transition from rural to urban population occurred in a relatively short period in Brazil. According to Tafner (2006), more than 24 million people moved from rural to urban areas between the 1980s and the 1990s.

Table 1. Per capita family income according to type of family and income strata – Urban Brazil, 1981 and 2011.

	Family Structure	1981			2011		
		N (1,000)	%	PCFI (R$)	N (1,000)	%	PCFI (R$)
The richest 10%	Single male	191	2.3	4,321	762	4.9	4,717
	Single female	140	1.7	3,545	819	5.2	4,373
	Couple without children	1,021	12.3	3,163	3,316	21.3	3,729
	Couple with children under 14	2,498	30.0	2,464	2,637	16.9	3,123
	Couple with children 14 or older	2,490	29.9	2,500	4,540	29.1	3,213
	Single mother with children under 14	43	0.5	2,157	134	0.9	2,729
	Single mother with children 14 or older	334	4.0	2,264	1,021	6.5	3,073
	Single father with children under 14	9	0.1	2,290	33	0.2	3,548
	Single father with children 14 or older	101	1.2	3,123	193	1.2	3,278
	Extended	1,499	18.0	2,356	2,148	13.8	2,936
	Total	*8,327*	*100.0*	*2,600*	*15,603*	*100.0*	*3,392*
The poorest 40%	Single male	76	0.2	163	299	0.5	117
	Single female	215	0.6	179	347	0.6	130
	Couple without children	808	2.4	157	2,916	4.7	261
	Couple with children under 14	11,069	33.2	139	18,167	29.1	230
	Couple with children 14 or older	10,908	32.8	147	15,884	25.5	240
	Single mother with children under 14	1,632	4.9	88	4,716	7.6	163
	Single mother with children 14 or older	2,138	6.4	140	5,361	8.6	215
	Single father with children under 14	72	0.2	127	314	0.5	213
	Single father with children 14 or older	248	0.7	157	434	0.7	236
	Extended	6,137	18.4	149	13,972	22.4	240
	Total	*33,305*	*100.0*	*142*	*62,410*	*100.0*	*228*
Total	Single male	560	0.7	1,859	3,127	2.0	1,741
	Single female	697	0.8	1,056	3,673	2.4	1,540
	Couple without children	4,255	5.1	1,150	16,654	10.7	1,320
	Couple with children under 14	26,214	31.5	556	35,503	22.8	661
	Couple with children 14 or older	26,963	32.4	568	43,661	28.0	844
	Single mother with children under 14	2,206	2.6	224	5,994	3.8	320
	Single mother with children 14 or older	4,981	6.0	481	12,804	8.2	728
	Single father with children under 14	162	0.2	449	541	0.3	601
	Single father with children 14 or older	771	0.9	758	1,522	1.0	974
	Extended	16,455	19.8	568	32,547	20.9	672
	Total	*83,264*	*100.0*	*594*	*156,024*	*100.0*	*822*

Source: PNAD/IBGE. Constant values (R$) of October 2011.

Table 2. Per capita family income according to type of family and income strata – Rural Brazil, 1981 and 2011.

Family Structure		1981 N (1,000)	%	PCFI (R$)	2011 N (1,000)	%	PCFI (R$)
The richest 10%	Single male	109	3.2	1,011	158	6.4	1,591
	Single female	14	0.4	1,425	106	4.3	1,347
	Couple without children	312	9.1	970	697	28.2	1,472
	Couple with children under 14	831	24.3	752	288	11.6	1,341
	Couple with children 14 or older	1,322	38.6	737	668	27.0	1,453
	Single mother with children under 14	7	0.2	719	11	0.4	1,163
	Single mother with children 14 or older	124	3.6	717	116	4.7	1,177
	Single father with children under 14	4	0.1	554	6	0.2	1,109
	Single father with children 14 or older	66	1.9	660	44	1.8	1,880
	Extended	634	18.5	784	381	15.4	1,276
	Total	*3,423*	*100.0*	*780*	*2,476*	*100.0*	*1,415*
The poorest 40%	Single male	8	0.1	44	54	0.6	59
	Single female	12	0.1	37	23	0.2	59
	Couple without children	89	0.7	47	315	3.2	79
	Couple with children under 14	5,556	40.6	59	3,512	35.5	108
	Couple with children 14 or older	5,610	41.0	61	3,576	36.1	106
	Single mother with children under 14	327	2.4	35	488	4.9	66
	Single mother with children 14 or older	356	2.6	65	432	4.4	92
	Single father with children under 14	18	0.1	51	56	0.6	104
	Single father with children 14 or older	98	0.7	60	82	0.8	103
	Extended	1,619	11.8	64	1,361	13.8	115
	Total	*13,693*	*100.0*	*60*	*9,900*	*100.0*	*104*
Total	Single male	240	0.7	589	544	2.2	771
	Single female	133	0.4	333	285	1.2	802
	Couple without children	1,301	3.8	371	2,842	11.5	681
	Couple with children under 14	11,433	33.4	163	6,418	25.9	263
	Couple with children 14 or older	13,932	40.7	191	8,059	32.6	352
	Single mother with children under 14	457	1.3	79	628	2.5	138
	Single mother with children 14 or older	1,139	3.3	210	1,164	4.7	370
	Single father with children under 14	53	0.2	160	96	0.4	256
	Single father with children 14 or older	405	1.2	245	261	1.1	561
	Extended	5,140	15.0	224	4,455	18.0	380
	Total	*34,233*	*100.0*	*196*	*24,752*	*100.0*	*383*

Source: PNAD/IBGE. Constant values (R$) of October 2011.

In 2011, the main differences between family structures in urban and rural areas were, first, the higher share of traditional nuclear families in the rural areas (51% of couples with

children in urban areas and 58% in rural areas). On the other hand, single female units and single mothers with children were more frequent in urban areas (14% of single female heads in urban areas and 8% in rural areas). Independent of the types of family, differences between PCFI are expressive. The ratio between urban and rural PCFI varies between 1.7 (for single fathers) and 2.5 (for couples with children). Overall, the average PCFI is 2.1 higher in urban areas.

The main change observed between 1981 and 2011 was the sharp decrease of the share of nuclear families, especially couples with children under 14 (a drop of 9 percentage points in the urban areas and 8 percentage points in the rural areas). Despite this reduction, couples with children still accounted for more than half of the Brazilian population in 2011. On the other hand, the share of couples without children more than doubled in urban areas (from 5.1% in 1981 to 10.7% in 2011) and almost tripled in rural areas (from 3.8% in 1981 to 11.5% in 2011).

These changes were observed in all strata, but with greater intensity among the richest ones. Among the 10% richest families, for example, the share of couples with children under 14 decreased by 13 percentage points in both urban and rural areas (among the 40% poorest families, it decreased by just 4 and 5 percentage points for urban and rural areas, respectively). Meanwhile, the share of couples without children increased by 9 percentage points in urban areas and by 19 percentage points in rural areas among the 10% richest families (it increased by just 2 percentage points among the 40% poorest in both urban and rural areas). This latter arrangement tends to have higher levels of income in comparison with other nuclear families, except among the poorest rural families, where children usually contribute to the familiar agricultural production.

Other important change was the increasing share of single heads with or without children. Single mother with children under 14 is the most vulnerable group and grew especially among the poorest families, in urban and rural areas (5 and 4 percentage points among the 40% poorest families in urban and rural areas, respectively). Among the richest families, both single male and female units increased substantially, and they present the highest PCFI among all types of family.

Extended families represent another expressive group in the family structure, especially among the poorest urban families (22% in 2011). The dynamic of the family structure also indicate an increasing representativeness of this group among the most vulnerable families (4 percentage points in urban areas and 2 percentage points in rural areas) and decreasing participation among the richest group (4 percentage points in urban areas and

3 percentage point in rural areas). Among the poorest families, this type of family with distant relatives and aggregates may indicate a strategic defense, i.e., the need for sharing resources among family members. As a result, it presents one of the lowest levels of poverty among urban and rural families (Table 3).

PCFI grew and poverty reduced substantially between 1981 and 2011 for most types of families. This dynamics was more expressive in rural areas, reducing differences between less and more developed regions in Brazil. For example, average PCFI increased by 95% in rural areas and by 38% in urban areas. As a result, the ratio between the urban and rural PCFI reduced by 29%, from 3 to 2.1. In the same time, poverty reduced by 50 percentage points in rural areas and 24 percentage points in urban areas.

In turn, inequality showed had opposite trends within less and more developed areas in Brazil. Since PCFI grew faster among the poorest families in the urban areas, the ratio between the PCFI of the 10% richest and the 40% poorest families reduced from 18.3 to 14.9. On the other hand, since PCFI grew faster among the richest in the rural areas, inequality ratio increased from 13 to 13.6. As a consequence of these divergent dynamics, the high levels of urban inequality were comparable with those of the rural areas in 2011.

Table 3. Poverty and inequality ratios according to type of family – Urban and Rural Brazil, 1981 and 2011.

Family Structure	1981				2011			
	Urban		Rural		Urban		Rural	
	Poor (%)	IR	Poor (%)	IR	Poor (%)	IR	Poor (%)	IR
Single male	4.8	26.5	9.2	23.0	5.7	40.3	7.2	27.0
Single female	9.3	19.8	16.4	38.5	5.2	33.6	6.3	22.8
Couple without children	11.3	20.1	42.0	20.6	2.5	14.3	7.1	18.6
Couple with children under 14	32.8	17.7	77.9	12.7	6.0	13.6	27.6	12.4
Couple with children 14 or older	30.6	17.0	71.7	12.1	4.1	13.4	23.1	13.7
Single mother with children under 14	65.4	24.5	92.9	20.5	31.3	16.7	61.2	17.6
Single mother with children 14 or older	32.7	16.2	66.0	11.0	8.7	14.3	23.7	12.8
Single father with children under 14	32.1	18.0	78.8	10.9	15.9	16.7	30.5	10.7
Single father with children 14 or older	23.8	19.9	53.5	11.0	4.5	13.9	12.5	18.3
Extended	27.3	15.8	66.0	12.3	4.9	12.2	12.9	11.1
Total	*30.3*	*18.3*	*71.0*	*13.0*	*6.1*	*14.9*	*21.0*	*13.6*

Source: PNAD/IBGE.

Finally, it is also worth highlighting the high levels of inequality among the single head units. Although single male and single female units are characterized by high levels of PCFI and low levels of poverty, they present the highest levels of inequality in both urban and rural areas.

3.2. The impacts of changing family structure

We now analyze the impacts of changes in the distribution of the type of family on the total PCFI variation (total effect, TE) between 1981 and 2011 (equation 2). Analyses allowed us identifying the contribution of changes in the family structure (composition effect, CE) and changes in the PCFI of each type of family (income effect, IE) on the PCFI variation (Tables 3 and 4). Besides decomposing the income variation for the total urban and rural areas, we also performed separated analyses for each stratum: the richest 10% and poorest 40%.

Overall, changes in the family structure had a positive impact on the income variation. The impact was higher in urban areas, where R$ 52.9 of the total R$ 228.5 variation in the PCFI (23%) were due to the CE, i.e., due to changes in the composition of the types of family. The impact on rural areas was lower but still positive: R$ 32.1 of the total R$ 186.7 variation in the PCFI were due to the CE.

These positive impacts were especially due to increasing participation of the less vulnerable groups, such as single male and female units, and couples without children. For instance, the increasing participation of couples without children contributed with 13% to the total variation in the PCFI in urban areas and with 10% in rural areas. The increasing participation of single males and females also contributed with 10% to the total variation in the PCFI in the urban areas and with 4% in the rural areas. Moreover, the reducing participation of couples with children under 14, group with low PCFI, also contributed positively to the income variation: 4% in urban areas and 3% in rural areas. On the other hand, the tenuous growing participation of single mothers with children under 14, the most vulnerable group, resulted in the most expressive negative impact in the PCFI variation: –2% in the urban areas and –1% in the rural areas.

Table 4. Composition Effect (CE), Within Effect (WE) and Total Effect (TE) for the per capita income variation between 1981 and 2011, according to type of family and income strata. Urban Brazil, 1981 and 2011.

	Family Structure	Δ 2011-1981 (R$)			Δ 2011-1981 (%)		
		CE	WE	TE	CE	WE	TE
The Richest 10%	Single male	39.3	14.2	53.6	5.0	1.8	6.8
	Single female	34.3	28.7	63.0	4.3	3.6	8.0
	Couple without children	40.4	94.9	135.3	5.1	12.0	17.1
	Couple with children under 14	26.5	154.7	181.2	3.3	19.5	22.9
	Couple with children 14 or older	1.1	210.4	211.5	0.1	26.6	26.7
	Single mother with children under 14	-1.9	3.9	2.0	-0.2	0.5	0.3
	Single mother with children 14 or older	-8.3	42.7	34.4	-1.0	5.4	4.3
	Single father with children under 14	-0.1	2.0	2.0	0.0	0.3	0.2
	Single father with children 14 or older	0.1	1.9	2.0	0.0	0.2	0.2
	Extended	14.8	92.1	106.9	1.9	11.6	13.5
	Total	*146.4*	*645.5*	*791.8*	*18.5*	*81.5*	*100.0*
The Poorest 40%	Single male	-0.1	-0.2	-0.3	-0.1	-0.2	-0.3
	Single female	0.0	-0.3	-0.3	0.0	-0.3	-0.3
	Couple without children	0.5	3.7	4.2	0.6	4.3	4.9
	Couple with children under 14	0.0	28.3	28.3	0.0	32.6	32.7
	Couple with children 14 or older	-0.6	27.0	26.5	-0.7	31.2	30.5
	Single mother with children under 14	-1.6	4.7	3.1	-1.8	5.4	3.6
	Single mother with children 14 or older	-0.2	5.6	5.4	-0.2	6.5	6.3
	Single father with children under 14	0.0	0.3	0.3	0.0	0.4	0.3
	Single father with children 14 or older	0.0	0.6	0.6	0.0	0.7	0.6
	Extended	0.4	18.5	18.9	0.4	21.4	21.8
	Total	*-1.5*	*88.2*	*86.7*	*-1.8*	*101.8*	*100.0*
Total	Single male	14.5	-1.6	13.0	6.4	-0.7	5.7
	Single female	8.9	7.7	16.7	3.9	3.4	7.3
	Couple without children	29.3	13.4	42.7	12.8	5.9	18.7
	Couple with children under 14	8.7	28.4	37.1	3.8	12.4	16.2
	Couple with children 14 or older	0.1	83.4	83.5	0.0	36.5	36.5
	Single mother with children under 14	-5.2	3.1	-2.1	-2.3	1.4	-0.9
	Single mother with children 14 or older	-2.3	17.5	15.2	-1.0	7.7	6.7
	Single father with children under 14	-0.3	0.4	0.1	-0.1	0.2	0.1
	Single father with children 14 or older	0.1	2.0	2.1	0.0	0.9	0.9
	Extended	-1.0	21.2	20.2	-0.4	9.3	8.9
	Total	*52.9*	*175.6*	*228.5*	*23.1*	*76.9*	*100.0*

Source: PNAD/IBGE. Constant values (R$) of October 2011.

Table 5. Composition Effect (CE), Within Effect (WE) and Total Effect (TE) for the per capita income variation between 1981 and 2011, according to type of family and income strata. Rural Brazil, 1981 and 2011.

	Family Structure	Δ 2011-1981 (R$)			Δ 2011-1981 (%)		
		CE	WE	TE	CE	WE	TE
The Richest 10%	Single male	6.5	27.8	34.3	1.0	4.4	5.4
	Single female	11.2	-1.8	9.4	1.8	-0.3	1.5
	Couple without children	23.6	93.6	117.2	3.7	14.7	18.4
	Couple with children under 14	6.4	105.7	112.1	1.0	16.6	17.6
	Couple with children 14 or older	0.3	235.0	235.3	0.0	37.0	37.0
	Single mother with children under 14	-0.3	1.4	1.1	-0.1	0.2	0.2
	Single mother with children 14 or older	-1.6	19.1	17.5	-0.3	3.0	2.8
	Single father with children under 14	-0.3	1.0	0.7	0.0	0.2	0.1
	Single father with children 14 or older	-0.3	22.5	22.2	0.0	3.5	3.5
	Extended	2.1	83.4	85.5	0.3	13.1	13.5
	Total	*47.7*	*587.7*	*635.4*	*7.5*	*92.5*	*100.0*
The Poorest 40%	Single male	-0.1	0.0	-0.1	-0.3	0.1	-0.2
	Single female	0.0	0.0	0.0	-0.1	0.1	0.0
	Couple without children	-0.5	0.6	0.1	-1.1	1.4	0.3
	Couple with children under 14	-0.1	18.6	18.5	-0.2	42.2	42.0
	Couple with children 14 or older	-0.1	17.3	17.2	-0.2	39.1	38.9
	Single mother with children under 14	-0.8	1.1	0.3	-1.8	2.5	0.7
	Single mother with children 14 or older	-0.1	0.9	0.9	-0.1	2.1	2.0
	Single father with children under 14	0.0	0.2	0.2	0.0	0.4	0.4
	Single father with children 14 or older	0.0	0.3	0.3	0.0	0.8	0.7
	Extended	0.1	6.6	6.7	0.3	14.9	15.2
	Total	*-1.5*	*45.7*	*44.2*	*-3.5*	*103.5*	*100.0*
Total	Single male	5.8	2.6	8.5	3.1	1.4	4.5
	Single female	2.1	3.6	5.7	1.1	1.9	3.1
	Couple without children	18.1	23.7	41.8	9.7	12.7	22.4
	Couple with children under 14	5.7	29.5	35.3	3.1	15.8	18.9
	Couple with children 14 or older	1.5	59.0	60.5	0.8	31.6	32.4
	Single mother with children under 14	-2.2	1.1	-1.0	-1.2	0.6	-0.6
	Single mother with children 14 or older	0.0	6.4	6.4	0.0	3.4	3.4
	Single father with children under 14	-0.2	0.3	0.1	-0.1	0.1	0.0
	Single father with children 14 or older	-0.1	3.5	3.4	-0.1	1.9	1.8
	Extended	0.4	25.7	26.1	0.2	13.8	14.0
	Total	*31.2*	*155.6*	*186.7*	*16.7*	*83.3*	*100.0*

Source: PNAD/IBGE. Constant values (R$) of October 2011.

The CE was larger among the richest 10% families, accounting for 18.5% of the total PCFI growth in urban areas and 7.5% in rural areas. Similarly to the dynamic observed in the

whole population, this positive effect was especially due to increasing participation of single male and female units, and couples without children, as well as to the reducing participation of couples with children under 14. On the other hand, changes in the family structure of the poorest families had a negative impact on the PCFI variation: −2% in the urban areas and −3.5% in the rural areas. These negative results were especially due to the increasing participation of the most vulnerable family type: single mother with children under 14.

The overall impact of changing family structure on poverty alleviation in Brazil was almost inexpressive (Table 6). The negative effects of the increasing participation of less vulnerable groups on poverty variation, such as couple without children and single head units, were partly offset by the increasing participation of single mothers. Overall, changes in the share of the family types contributed with less than 1 percentage point to reduce poverty in urban areas and with less than 3 percentage points in rural areas. Thus, the expressive poverty reduction witnessed in Brazil between 1981 and 2011 was especially due to changes observed within these types of families.

Table 6. Composition Effect (CEP), Within Effect (WEP) and Total Effect (TE) on poverty variation between 1981 and 2011, according to type of family. Urban and Rural Brazil, 1981 and 2011.

| Family Structure | Δ 2011-1981 (ppt) | | | | | |
| | Urban | | | Rural | | |
	CEP	WEF	TEP	CEP	WEP	TEP
Single male	-0.17	0.01	-0.15	-0.57	-0.03	-0.60
Single female	-0.17	-0.06	-0.24	-0.28	-0.08	-0.36
Couple without children	-0.63	-0.69	-1.32	-1.65	-2.67	-4.32
Couple with children under 14	-0.11	-7.27	-7.38	-0.51	-14.91	-15.41
Couple with children 14 or older	0.04	-8.00	-7.96	-0.11	-17.83	-17.94
Single mother with children under 14	0.36	-1.09	-0.73	0.37	-0.60	-0.23
Single mother with children 14 or older	0.06	-1.71	-1.65	-0.02	-1.69	-1.71
Single father with children under 14	0.01	-0.04	-0.03	0.02	-0.14	-0.13
Single father with children 14 or older	0.00	-0.18	-0.19	0.01	-0.47	-0.46
Extended	-0.02	-4.57	-4.59	-0.20	-8.75	-8.95
Total	*-0.65*	*-23.60*	*-24.25*	*-2.92*	*-47.17*	*-50.09*

Source: PNAD/IBGE.

Moreover, since the effect of changing family structure on the PCFI was higher among the richest families, it contributed to increase inequality in both urban and rural areas. Table 7 presents the counterfactual simulation of the impact of changes in the family structure on IR

and highlights that, if the variation in the PCFI was exclusively due to changes in the composition of the types of families (CE), the ratio between the PCFI of the richest 10% and the 40% poorest families would have increased by 1 point between 1981 and 2011. In urban areas this impact was counterbalanced by the faster growth of the PCFI within poorest families, and IR decreased by 3.5 points. In the rural areas, the overall result was an IR 0.6 point higher in comparison with 1981.

Table 7. Composition Effect (CEP), Within Effect (WEP) and Total Effect (TE) on inequality ratio variation between 1981 and 2011, according to type of family. Urban and Rural Brazil, 1981 and 2011.

Family Structure	Δ 2011-1981 (pts)							
	Urban				Rural			
	CEI	WEI	IEI	TEI	CEI	WEI	IEI	TEI
Single male	0.29	0.13	0.00	0.42	0.13	0.49	-0.02	0.59
Single female	0.24	0.24	0.00	0.48	0.19	-0.03	0.00	0.16
Couple without children	0.22	0.19	-0.01	0.40	0.51	1.54	-0.11	1.93
Couple with children under 14	0.19	-2.13	-0.03	-1.98	0.13	-1.72	-0.05	-1.64
Couple with children 14 or older	0.09	-1.68	-0.03	-1.62	0.03	0.15	-0.02	0.15
Single mother with children under 14	0.20	-0.56	-0.01	-0.38	0.17	-0.04	-0.18	-0.05
Single mother with children 14 or older	-0.03	-0.41	0.00	-0.44	-0.01	0.12	-0.02	0.10
Single father with children under 14	0.00	-0.02	0.00	-0.02	0.00	-0.03	0.00	-0.03
Single father with children 14 or older	0.00	-0.06	0.00	-0.06	0.00	0.31	0.00	0.30
Extended	0.05	-1.54	0.00	-1.49	0.01	-0.06	0.02	-0.02
Total	*1.24*	*-4.21*	*-0.51*	*-3.48*	*1.15*	*0.13*	*-0.69*	*0.58*

Source: PNAD/IBGE.

4. Final considerations

Brazil has a huge income inequality, one of the largest in the world, and a low level of per capita income. Between 1981 and 2011, this country witnessed substantial changes in its family structure, with relevant impacts on income distribution. The average family size declined from 5.0 in 1981 to 3.4 in 2011, in part because fertility decreased but also due to changes in the family structure. The share of traditional nuclear families reduced sharply, increasing the participation of couples without children and single-headed families. The increasing share of extended families with several primary income earners is also noticeable,

characterizing the process of population transition of developing countries that have occurred in a short period of time (Chu & Jiang, 1997).

The sharp decrease of nuclear families and the rise of couples without children in both rural and urban areas reflect mostly a sharp decline in the fertility rates. In rural areas, we have also to consider the migration of many young members from rural to urban areas, in search of better job opportunities. Overall, changes in the family structure contributed significantly to the income dynamics among rural and urban families. First, the reduced number of dependent children had clearly a positive impact on per capita income. However, this positive contribution (i) was greater in urban areas, and (ii) was restricted to the higher income strata. Among the poorest families, changes in the family structure had a negative effect on the income distribution, contributing to reduce average per capita income and to increase inequality within urban and rural areas. Similarly to what happened in developed nations (see, for instance, McLanahan & Percheski, 2008; Martin, 2006; Lerman, 1996; Karoly & Burtless, 1995), the fast increase of single-headed families in the bottom strata, especially single-mother families, subjecting an increasing share of families to low hourly wages and to the risk of poverty.

Poverty rates continue to be substantially high among single-mother families, which contributed to attenuate the positive impact of the increasing number of couples without children on poverty reduction in Brazil. The overall impact of changing family structure on poverty was almost inexpressive, in both urban and rural areas. High income inequality within each family group also helps to explain why the positive impact that changing family structure had on PCFI did not reflect more significantly in poverty alleviation. The average PCFI of the 10% richest families is more than 10 times higher than the PCFI of the 40% poorest families for all family types, especially those formed by single-headed units. Inequality is lower within extended families, since sharing the household with additional earners provides economies of scale and helps to attenuate the socioeconomic condition of many traditional families in vulnerable conditions.

Changes in the family structure were more pronounced in urban areas, contributing to increase inequality between more developed and less developed areas. The lower impact of the demographic changes on the poorest and on the less developed areas gives rise to two main hypotheses: i) the richest population would be the main beneficiary of the demographic changes (i.e., being favored by the higher education levels and consequently by the more pronounced reduction in the fertility rate), ii) the intergenerational mobility of the families, where demographic changes observed in the transition between the generations within the

families would remove these poor families from the lower tenths of the income strata. Unfortunately, the second hypothesis cannot be investigated more accurately, since there is no longitudinal data available in Brazil to analyze family mobility. Nevertheless, the demographic changes that have occurred among the poorest families in Brazil are noticeable (IPEA, 2012). A direct consequence of the fertility reduction among the poorest families would be the reduction of the dependency ratio and growth of the PCFI, resulting in many poor families leaving the lower tenths of the income strata.

Despite the negative contribution of the demographic changes to the income differences between urban and rural families, the income inequality between these areas reduced significantly in this period. The income growth of the poorest families arose from a broad variety of sources, such as higher wages, labor-force participation, pension and cash transfer programs (Barros, et al., 2007). First, it is worth highlighting recent improvements in the Brazilian labor market, as a result of higher rates of formalization and new labor regulations (increasing minimum wage) (Sakamoto & Maia, 2012). The poorest segments were especially benefited, since the Brazilian minimum wage grew faster than the average wage (Saboia, 2010). Pensions also increased substantially for both urban and rural areas. Moreover, several modifications implemented in the Federal Constitution of 1988 greatly benefited the rural population, such as less restrictive conditions for granting the benefits, and the reduction of the minimum age to start collecting the benefits (Beltrão, et al., 2005). Finally, cash transfer programs implemented since the mid-1990s clearly contributed to improve socioeconomic conditions of the poorest family, particularly in rural areas (Maia & Buainain, 2011).

Finally, it is worth noting that our results do not represent causal relationships. In other words, we cannot definitively say that poverty is caused by changes in family structure (Iceland, 2003). Nevertheless, results highlight that a significant share of the population in Brazil has not yet benefited from the changes in the family structure. When considered alone, these changes demonstrated regressive effects and have increased the income inequality in Brazil. However, the poorest families seem to have especially benefited from the economic growth experienced in Brazil in recent years, which contributed considerably to increase income and to reduce the levels of inequality and poverty in Brazil.

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