



# Economic Premise

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## Gender Equality and Economic Growth in Brazil

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*This note studies the long-run impacts of policies aimed at fostering gender equality on economic growth in Brazil. After a brief review of gender issues in Brazil, this note describes a framework for quantifying the growth effects of gender-based policies in developing economies. The analysis is based on a computable overlapping generations (OLG) model that accounts for the impact of access to infrastructure on women's time allocation, as well as human capital accumulation, inter- and intra-generational health externalities, and bargaining between spouses. The model is calibrated for Brazil and is used to conduct two experiments, the first involving improved access to infrastructure, and the second a reduction in gender bias in the marketplace. The key lesson of these experiments, among others reported in Agénor and Canuto (2013), is that fostering gender equality, which may depend significantly on the externalities that infrastructure creates in terms of women's time allocation and bargaining power, can have a substantial impact on long-run growth in Brazil.*

In recent years, Brazil has been very successful in reducing poverty and income inequality. According to World Bank data, relative poverty (based on a purchasing power parity [PPP] US\$2 per day metric) has fallen markedly, from 21 percent of the population in 2003 to 11 percent in 2009. Extreme poverty (based on a PPP US\$1.25 per day metric) also dropped significantly, from 9.8 percent in 2004 to 6.1 percent in 2009. At the same time, income inequality fell significantly. Between 2001 and 2009, the income growth rate of the poorest decile of the population was 7 percent per year, while that of the richest decile was 1.7 percent; as a result, income inequality (as measured by the Gini index) fell significantly, from 0.594 in 2001 to 0.521 in 2011—a 50-year low. Key drivers of these achievements have been low inflation; sustained economic growth, at a yearly average of 4.0 percent during 2002–8 and 5.1 percent during 2010–11; well-focused social programs; and real increases in the statutory minimum wage.

Despite these achievements, inequality remains at relatively high levels, and there is still a large gap in access to edu-

cation. Although universal coverage in primary education has been achieved, quality at both the basic and secondary levels remains a concern. Growth and private sector activity continue to be hampered by various barriers and regulations, as well as inadequate infrastructure and a weak business climate.

Gender inequality remains high, despite some significant improvements. In 2003, under his first presidency, Luiz Inácio Lula da Silva created a federal governmental body for the purpose of addressing gender equality issues. This also led to the creation of a National Plan for Women's Policies (NPWP), which was adopted in 2004. The NPWP reaffirmed the commitment of the Brazilian federal government and other governmental bodies to incorporating a gender perspective into public policies. The NPWP prescribed several concrete actions to be implemented by different government sectors in cooperation with the private sector and addressed specific needs of mothers, particularly health care before and during pregnancy and at birth, as well as child care and education.

Brazil's first female president, Dilma Rousseff, also promised when elected in 2010 to make gender equality a priority. At the same time, however, there has been limited effort to quantify the impacts of gender-based policies on gender inequality and economic growth in Brazil.

This note, which draws on Agénor and Canuto (2013), provides a quantitative analysis of the long-run impacts of policies aimed at fostering gender equality on economic growth in Brazil, especially through their impact on women's time allocation and intrahousehold bargaining power. This analysis uses the gender-based OLG model described in Agénor (2012) and Agénor and Canuto (2012a). In the model, women's time allocation takes center stage. In addition, women's bargaining power is endogenously related to time allocated by women to human capital accumulation—and thus indirectly to access to infrastructure, which has a direct impact on time devoted to home production. This creates an important channel through which public policy can affect gender equality and economic growth.

After a brief review of gender issues in Brazil, this note provides an outline of the model and its calibration. In addition, two policy experiments are discussed, both with potentially important direct and indirect effects on gender inequality and growth: the first involves improved access to infrastructure, and the second covers institutional reforms aimed at reducing gender bias in the marketplace. The results of these experiments are used to inform broader policy lessons discussed in this note's conclusion.

## Background: Gender Inequality in Brazil

In the past two decades, Brazil has made significant progress in reducing gender inequality. According to the results of a 2010 study by the Brazilian Institute of Geography and Statistics (IBGS), illiteracy rates for women aged 15 years and older fell from 20.3 percent in 1991 to 13.5 percent in 2000 and 9.8 percent in 2008. Brazilian women are now generally more educated, with female participation in tertiary education significantly exceeding male participation. As a result, the share of the female labor force with tertiary education increased from 7.4 percent in 1992 to 8.5 percent in 1999 and 11.9 percent in 2007, compared to 5.3, 6.2, and 7.3 percent for males, respectively. Working women have an average of 8.8 years of schooling, while their male counterparts have an average of 7.7 years. This is important because, as discussed in the next section, educated mothers tend to have greater bargaining power within the household over intrafamily allocation of monetary resources, are more able to act on their preference for investing in children, and have a greater impact on family decisions regarding the allocation of children's time to household chores. Professions that traditionally were dominated by males, such as law, medicine, and engineering, are becoming more balanced in terms of gender, and some already have

more women than men. The proportion of women in the workforce rose from 52.8 percent to 57.6 percent between 1998 and 2009, whereas the share of women in wage employment in the nonagricultural sector rose from 35.1 percent in 1990 to 41.6 percent in 2007. The female to male labor force participation rate increased from 52.2 in 1990 to 63.9 in 1995, 66.7 in 2000, and 73.3 in 2010.

However, gender gaps in access to formal employment and market income still persist in Brazil. The proportion of women with formal jobs increased from 41.5 percent in 1999 to 48.8 percent in 2009, but it is still lower than that of employed men, which stood at 53.2 percent in 2009. At the same time, women in formal sector employment work less than men—an average of 36.5 hours a week in 2009, compared to 43.9 hours for men. Even though there has been progress in the share of women employed in the nonagricultural sector, their comparative advantage in education has not been reflected in relative market wages—despite the average higher skill level of the female labor force. In 2008, women's wages were 84 percent of men's, and the gap increases at higher levels of education.<sup>1</sup> Among those with 12 or more years of schooling, women earned merely 58 percent of men's salaries. Brazilian women, even those working full time, continue to bear the brunt of time allocated to family chores (Bruschini 2007); in 2008, women devoted an average of 25.1 hours per week to caring for their families and housekeeping, whereas men devoted an average of only 10 hours per week to such tasks.

The unemployment rate for females consistently exceeds that of males by an average of 4–5 percentage points; the gap is up to twice as high for those aged 15–24. According to the Gender Inequality Index (GII) introduced by the United Nations in 2011, Brazil's rank is only 80 out of 187 countries, with a score of 0.449—the same as in 2008. The Gender Gap Index (GGI) developed by the World Economic Forum and produced since 2006 gives similar results; in 2011, Brazil was ranked 82 out of 135 countries, with a score of 0.668, compared to 0.654 in 2006.<sup>2</sup>

What explains the gender pay gap in Brazil? According to some recent economic studies, only a small portion—between 11 percent and 19 percent of wage differentials in the formal labor force—can be attributed to differences between men and women in their endowments (such as education or experience). For the most part, the wage gap appears to reflect discriminatory practices and social norms (see van Klaveren et al. [2009]). The model presented in the next section considers both potential causes—in the form of gender bias in the workplace and mothers' time allocation between boys and girls. The model also considers a third potential cause, related to access to infrastructure services, and its implications for women's time allocation to household production, child rearing, human capital accumulation, and market work. The as-

sumption under analysis is that poor access to core infrastructure services forces women to allocate a large fraction of their available time to family chores. As a result, they have less time available to take care of their children—a productive use of time if it helps to improve children’s health, and if health and productivity in adulthood depend on health in childhood; further their own education; and occupy formal sector jobs.<sup>3</sup> By implication, improved access to infrastructure services may free women’s time in such a way that they could devote more time to building their own human capital. If bargaining power between men and women depends (directly or indirectly, through wages) on relative human capital stocks of men and women, and if higher bargaining power for women translates into more savings and more investment in girls’ education, then the positive growth impacts from closing the gender gap could be fairly large in the long run.

## The Analytical Framework

To study the interactions between gender and growth, the approach here draws on the gender-based OLG model of economic growth described in Agénor (2012) and Agénor and Canuto (2012a, 2013), and summarized in Agénor and Canuto (2012b). Key features of the model include:

- (i) Home production combines women’s time allocated to that activity with infrastructure services;
- (ii) In families, fathers have a relatively higher preference for current consumption, whereas mothers have a higher preference for children’s health, thus familywide preference parameters for consumption and children’s health depend on women’s bargaining power;
- (iii) Women allocate their time between four alternatives: market work, raising children, human capital accumulation, and home production;
- (iv) The gender gap in the workplace is captured by assuming that women earn only a fraction of their marginal product, and differences in economic outcomes between men and women are fundamentally related to gender bias experienced in the home during childhood; and
- (v) Women’s bargaining power depends on the relative levels of human capital of husband and wife, and thus indirectly on access to infrastructure, which influences women’s time allocation and thus the time that they allocate to human capital accumulation.

The model produces equilibrium values for women’s time allocation and an explicit expression for the economy’s growth rate in the long run. These static, long-run relationships are then calibrated and simulated using data for Brazil. The calibration uses a variety of information sources, including data from the 2009 National Household Sample Survey (PNAD) and the calculations performed in Lopes Ribeiro and Marinho (2012). The result of the calibration exercise shows, for instance, that in the benchmark case, the initial public-

private capital ratio is relatively low, suggesting that public capital remains a relatively scarce factor in Brazil, and that women allocate 20.6 percent of their time to home production, 11.7 percent to child rearing, 18.5 percent to human capital accumulation (over their lifetime), and 42.1 percent to market work. In line with the evidence reviewed earlier, the degree of gender bias in the work place is estimated at 0.71, indicating that women engaged in market activity earn on average about 30 percent less than men.

## Policy Experiments

To illustrate the role of gender-related and gender-based public policy on economic growth in Brazil, and how these policies affect women’s time allocation and bargaining power, two experiments were conducted: the first on impacts from improved access to infrastructure and the second on impacts from a reduction of gender bias in the marketplace.

### Improved access to infrastructure

Consider the case of a public policy aimed at promoting access to infrastructure by investing in rural roads, power grids, and others: the direct effect of this policy is of course an increase in the public-private capital ratio, which therefore promotes growth directly. In addition, this increase reduces mothers’ time allocated to home production and raises time allocated to market work, human capital accumulation, and child rearing. The latter is also productive; it leads to improved health in both childhood and adulthood. Thus, all of these effects also help promote growth and health outcomes.

Crucially, the increase in time devoted to human capital accumulation raises women’s bargaining power, which translates into a higher family preference for girls’ education and children’s health, an increase in the average share of family income spent on children, and a lower preference for current consumption. The first two effects increase further the amount of time allocated to education and child rearing, whereas the last effect contributes to a rise in the savings rate. Because increases in the level of income and in the savings rate raise private savings and the private capital stock, there is a positive effect on the growth rate of outputs. At the same time, female health in adulthood also improves—as a result of receiving more care in childhood and higher government spending on health.

In quantitative terms, the numerical experiments focused on a policy that takes the form of a budget-neutral increase in government spending on infrastructure investment, from its current value of about 2.1 percent of gross domestic product (GDP) to 3.1 percent. Calculations suggest that this policy could add between 0.5 and 0.9 percentage points to Brazil’s annual rate of output growth once direct and indirect effects—most notably through changes in women’s time allocation and their bargaining power over family resources—are accounted for. This positive effect could be even higher if the

increase in the share of spending of investment is accompanied by reforms aimed at improving the quality of such spending. Thus, a policy aimed at promoting access to infrastructure could have a substantial impact on the population's standards of living over a relatively short time horizon.

### Reduction in gender bias in the marketplace

Suppose now that the government introduces antidiscrimination laws that lead to a complete elimination of gender bias against women in the workplace. Women's "take-home" pay therefore increases, all else being equal. The direct effect of this policy (at the initial level of wages) is to raise family income. In turn, higher income leads to a higher level of private savings and higher private capital stock, which have a direct positive effect on growth and bring higher tax revenues. Because changes in the degree of gender bias in the workplace affect tax revenues and private savings in exactly the same way, the public-private capital ratio is not affected, and women's time allocation is not affected either. Nevertheless, because higher tax revenues lead to higher public spending on health, there is a positive effect on health in childhood and female health in adulthood. Thus, a reduction in gender bias leads to an increase in the growth rate of output and improved health outcomes.

In quantitative terms, the model-based calculations suggest that an "equal work, equal pay" policy that would ensure that women earn a wage that fully reflects their marginal contribution to market production could add up to 0.2 percentage points to the country's annual growth rate. Over a sufficiently long period of time, this would also have a significant impact on the population's standards of living. In addition, it is important to note that the analytical framework from which this estimate is derived does not capture the possibility that gender gaps in access to managerial positions and employment may also distort the allocation of talent and women's incentives to invest in particular skills, thereby constraining overall productivity growth. If these effects were to be accounted for, the growth benefits of eliminating gender bias in the marketplace would be even higher.

### Concluding Remarks

Brazil has made significant progress in reducing poverty and income inequality in recent years. However, despite this progress and the government's continuing commitment to incorporating gender perspectives, gender inequality remains high. To determine the long-run impacts of policies aimed at fostering gender equality on economic growth in Brazil, this analysis applied a gender-based OLG model that accounted for women's time allocation between market work, child rearing, human capital accumulation, and home production. Crucially, bargaining between spouses was assumed to depend on relative human capital stocks, and thus indirectly on access to

infrastructure, given the complementarity between infrastructure and women's time in home production. In that sense, this analysis draws fundamentally on a *macro* theory of bargaining power in the family.

The model was calibrated using a variety of data sources and two experiments were conducted, one on a policy aimed at promoting access to core infrastructure, and another on an "equal work, equal pay" policy aimed at reducing gender bias in the marketplace through active enforcement of antidiscrimination laws. The key lesson of these experiments, as well as other experiments reported in Agénor and Canuto (2013), is that fostering gender equality, which may partly depend on the externalities that infrastructure creates in terms of women's time allocation and bargaining power over family resources, may have a substantial positive impact on long-run growth as well as human capital and health outcomes in Brazil.

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### Notes

1. There are also considerable gender differences across regions. For instance, wage gaps tend to be lower in Rio de Janeiro than in São Paulo; the largest gaps are found in the Northeast.
2. For the GII index, see [http://en.wikipedia.org/wiki/Gender\\_Inequality\\_Index](http://en.wikipedia.org/wiki/Gender_Inequality_Index); for the GGI index, see <http://www.weforum.org/>.
3. Housework may affect market wages (and thus the gender wage gap) indirectly as well, by influencing women's choices regarding their selection of job characteristics (and thereby via job-related compensating wage differentials). Women who spend more time on household chores, particularly during the working week, may seek out jobs that offer more flexible work arrangements, such as shorter commuting time or greater flexibility in scheduling. Flexible working arrangements are likely to be costly to firms, and therefore wages may be lower in such jobs to compensate employers.

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