



Evaluating the impact of market-assisted land reform in Brazil

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ABSTRACT

This paper evaluates the impact of land reforms on household agricultural investments, livelihood strategies, and income levels in Brazil. Given the persistence of rural poverty in Northeast Brazil and the existence of both land and credit market failures, land reforms remain important policy tools for alleviating poverty and increasing growth. This paper evaluates the impact of the recent National Program of Land Credit, a controversial market-assisted land reform program that provides access to land through private land markets. Household-level panel data covering similar beneficiary and control groups allows for identification using both propensity score weighting and difference-in-difference methodologies. The evidence indicates that the Land Credit successfully transitions households into agriculture, with land holdings and investments increasing as a result of the program. As with many earlier land reform programs in Latin America, the new wave of market-assisted land reforms does not increase access to private credit. While land reforms have the potential to drive redistribution, poverty reduction, and growth, these findings suggest that ensuring greater access to credit, irrigation, and higher return economic activities remains important.

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1. Introduction

Despite reductions in recent decades, rural poverty remains a pressing concern in Brazil. Landlessness is a major cause of rural poverty and, given the persistence of unequal land ownership and growing social and political pressure, land reforms surged in recent decades, with 1.5 million Brazilian families participating in land reforms between 1995 and 2010 (Navarro, 2009). During President Lula's first term alone, an area the size of Belgium, Denmark, Portugal, and Switzerland combined was redistributed in Brazil (Navarro, 2009). Despite being called a “lost” cause politically in 1989 (de Janvry & Sadoulet, 1989) and being viewed as historically unsuccessful in Latin America (Thiesenhusen, 1995), land reforms are once again politically relevant. In addition to political and social arguments in favor of land reforms, economic theory suggests that land reforms can achieve both efficiency and equity gains by unlocking the productivity advantage of small farmers. However, despite the recent surge in land reform in Brazil, doubts remain about the effectiveness of these programs and this paper aims to better understand the impact of Brazil's *Programa Nacional de Crédito Fundiário* (the National Program of Land Credit or the

Land Credit), a market-assisted land reform (MALR) program.¹ As described further below, MALR programs are designed to provide access to land through land markets (by incentivizing greater supply of land while subsidizing poor farmers on the demand side), while assuming that land ownership will allow beneficiaries to access credit, insurance, technical assistance and other factor markets (Deininger, 1999). Although the Land Credit comprises a relatively small share of Brazil's total land beneficiaries (approximately 40 thousand out of 1.5 million families according to Sparovek & Maule, 2009), it remains an extremely controversial program in Brazil (see, for example, Borrás Jr, 2003; Deere & Medeiros, 2007; Pereira, 2007; Wolford, 2007) and has the potential to influence the future direction of global land reform policies.

This paper discusses the theoretical and empirical arguments for and against MALR before evaluating the impact of the Land Credit program in Northeast Brazil on a range of agricultural investments, livelihood strategies, and income levels. While redistributive land reforms remain politically important, relatively little empirical evidence exists analyzing their effectiveness and the

¹ Other commonly used names for MALR programs include negotiated, market-led, market-friendly, neoliberal, or community-based land reforms. While the Land Credit also includes a subprogram that benefits existing family farms, this paper focuses on the primary Land Credit and Rural Poverty Alleviation (CF-CPR) program that targets landless households.

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conditions under which land reforms are successful.² This paper employs a data set collected by the Brazilian Ministry of Agrarian Development (*Ministério do Desenvolvimento Agrário*) that includes approximately 500 households interviewed as part of a 2006 baseline survey and a 2010 follow-up survey.

As with any impact evaluation, the main identification challenge involves the creation of a reliable control group and this paper uses propensity score weighting and difference-in-difference methods to compare beneficiaries with similar control households. Specifically, the analysis estimates treatment effects conditional on selection into the program by utilizing a pipeline control group that applied for and was approved for participation in the program, but failed to receive land despite a continuing expectation to do so. Identification relies on this group being similar to beneficiary households and balance is achieved across a wide set of observable characteristics and their continual expectation of receiving land (even four years after the original survey) suggests that they remain interested in agricultural opportunities. At the baseline, a quarter of the sample lives in extreme poverty (less than US\$30 per person per month) and almost the entire sample is low income (per capita incomes below the minimum wage). In addition to lacking access to land, beneficiaries only have 3–4 years of education on average, which is low but consistent with other studies of rural Brazil and indicates limited opportunities in nonfarm labor (Kageyama & Hoffmann, 2000; Jonasson & Helfand, 2010). As a result, the Land Credit successfully targets a vulnerable group that it has the potential to greatly benefit.

There are three general findings. First, the Land Credit successfully transitions beneficiaries into independent agricultural producers. The program is shown to provide access to land while increasing animal ownership, agricultural assets, and possibly the value of agricultural production. This indicates that the Land Credit successfully helps landless farmers (who select into the program based on their interest in agriculture) transition into independent landowners and agricultural producers. Thus, the most direct goal of the Land Credit is achieved and it may help increase the number of small farmers in rural areas.

Second, both the beneficiary and control groups earn considerably higher incomes in 2010 than in 2006, with monthly per capita incomes increasing by almost R\$30 (approximately US\$15)³ for each group between the two survey rounds. While increasing income levels is a positive trend, the impact evaluation fails to find a significant causal effect because of the similar increase across both groups. This occurs because of two related factors. First, the beneficiary households transition into agriculture but simultaneously reduce their likelihood of earning nonfarm labor income, thus indicating a change in household livelihood strategies. Second, while the beneficiary households earn higher total incomes in 2010 through increased agricultural earnings, the control group increases their total incomes through increased labor earnings. In fact, during the 2000s, poverty and inequality fell as a result of labor market improvements, increases in the minimum wage, and social programs including *Bolsa Família* transfers (Neri, 2010).

In combination, these first two findings are positive. Given that the Land Credit assists willing beneficiaries that are interested in agricultural production, these results indicate an improvement in welfare since households transition into their desired livelihoods while matching relevant regional income trends.

² There is a growing empirical literature analyzing land policies generally, including tenancy reform (Besley & Burgess, 2000; Besley, Leight, Pande, & Rao, 2016), land titles (Boucher, Barham, & Carter, 2005), and land tenure and institutions (Banerjee & Iyer, 2005), but few empirical studies of land reforms programs that redistribute land.

³ During the time period being analyzed, the exchange rate varied between R\$1 = US\$0.44–0.58.

A third result is that private credit access remains extremely low (with only 4–5% of households receiving private loans), indicating that market failures likely continue to be biased against small farmers who lack sufficient collateral. As a result, the continued reliance on the private provision of these services through rural markets will limit the success of MALR programs in Brazil and future policies should better ensure “level playing fields” in the rural sector (Boucher et al., 2005; Carter & Barham, 1996).

Collectively, these results suggest that the Land Credit is neither a panacea that unlocks small farmer productivity advantages through well-functioning rural markets, nor a tragedy that leaves beneficiaries worse off and trapped in debt while struggling to produce on marginal lands. Rather, these findings indicate that the Land Credit is one means of providing greater access to land and a pathway into agricultural production, but that it is insufficient for ensuring that small farmers transition into highly competitive producers without further assistance and structural reform.

The remainder of this paper proceeds as follows: the land reform literature is analyzed while highlighting the theoretical justification of MALR; Brazil’s history with land reform and the controversies around MALR are discussed in more detail; the data set is described; the impact evaluation is formalized and implemented; and the final section concludes.

2. Land reform literature

This paper is most directly related to the literature on land reforms and this section provides the economic argument for land reform before discussing the theoretical justification for MALR that informs the empirical analysis. The economic argument in favor of land reform traditionally relies on an understanding that land sales are biased against small farmers (Carter & Salgado, 2001), but that small farmers can be highly productive given the inverse farm size-productivity relationship, in which productivity per acre (or unit of capital) is higher on smaller farms than larger farms (Dorner, 1972; Eastwood, Lipton, & Newell, 2010).

The inverse farm size-productivity relationship is supported by a large number of empirical studies and, while there are multiple theoretical explanations for it, the most commonly cited reason is that larger farms rely on wage labor, which increases shirking and supervision costs and thus reduces productivity in comparison to smaller farms that rely on family labor. Evidence supporting the inverse relationship in Brazil is provided by Berry and Cline (1979) with data from the 1960s and 1970s as well as Thiesenhusen and Melmed-Sanjak (1990) with census data from 1980. More recent research questions whether or not the inverse farm size-productivity relationship is due to fundamental differences in productivity or empirical challenges, including omitted variable bias or measurement error. Barrett, Bellemare, and Hou (2010) use household and plot-level soil data to argue that factor market imperfections cause some of the observed inverse relationship but that soil quality differences (a variable that is frequently omitted in other studies) have no explanatory power. Carletto, Savastano, and Zezza (2013) use precise GPS data to argue that more accurate plot size data actually strengthens the inverse relationship, because small farmers tend to overreport land size while large farmers tend to underreport. Other recent research suggests that the labor intensive production on small farms is the main reason for the inverse relationship (Ali & Deininger, 2015; Henderson, 2015), which continues to be seen as an empirical regularity.

Given the evidence that small farmers have a fundamental productivity advantage, we might expect to see more small farms. However, this is not likely to occur if market imperfections are biased against the poor. First, evidence suggests that land sales markets fail to provide “level playing fields” since they are often

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